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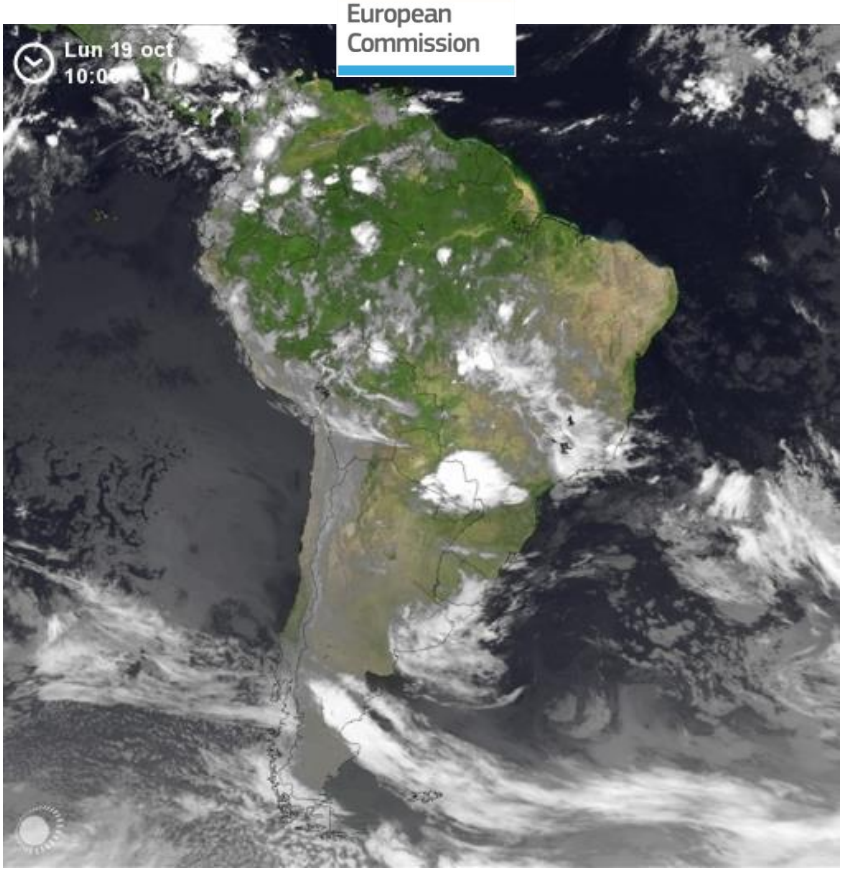

J R C T E C H N I C A L R E P O R T S

EUROCLIMA – Scientific Component Final Report

WATER Component
SOIL Component
AGRI4CAST Component
BIOENERGY Component
DESERT-DROUGHT Component

29/04/2010 – 08/02/2014

Joint Research Centre

European Commission
Joint Research Centre
Institute for Environment and Sustainability

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Contents

PROJECT FICHE JRC-EUROCLIMA

Name Administrative Arrangement Beneficiary	**DG Joint Research Centre**
Contract Number	**DCIO-ALA/ 2010/236-079**
Title of the Project	**EUROCLIMA**
Total duration of the Project	**35 Months**
Start date and end date of the Project	**Start: 29/04/2010 End: 08/02/2014**
Name, title and contact details of the Contact person	**Dr. César Carmona-Moreno** E-mail: cesar.carmona-moreno@jrc.ec.europa.eu
Website of the organization	**http://ies.jrc.ec.europa.eu/** http://www.jrc.ec.europa.eu
Budget	**1,850,000 EURO**
Target country (ies) or region(s)	**LATIN AMERICA AND CUBA**
Country (ies) in which the activities take place	**Argentina, Bolivia, Brasil, Chile, Colombia, Costa Rica, Cuba, Ecuador, El Salvador, Guatemala, Honduras, México, Nicaragua, Panamá, Paraguay, Perú, Uruguay, Venezuela**

LIST OF ACRONYMS

ACCLAC	Alianza para la Mitigación y Adaptación al Cambio Climático y Gestión del Riesgo en América Latina y el Caribe
AMESD	African Monitoring of the Environment for Sustainable Development
CIDA	Canadian International Development Agency
ECLAC	Economic Commission for Latin America and the Caribbean
EULARINET	EU-LA research and Innovation Networks
FAO	Food and Agriculture Organization of the UN
GCCA	Global Climate Change Alliance
IDB	Inter-American Development Bank
IPCC	Intergovernmental Panel on Climate Change
JRC	Joint Research Centre
NGO	Non-Governmental Organisation
NSA	Non-State Actor
OTCA	Organización del Tratado de la Cuenca Amazónica
RIOCC	Red Iberoamericana de Oficinas de Cambio Climático
UNFCCC	UN Framework Convention for Climate Change
UNEP	UN Environment Programme
UNCCD	UN Convention for Desertification
WB	World Bank

Part I: INTRODUCCTION

1.- Background and context

Background

The EU-Latin American and Caribbean Summit held in Lima, Peru, in 16th May 2008, had sustainable development (climate change, environment and energy) as one of the two main themes. In the framework of the on-going efforts to foster bi-regional environmental cooperation with a special focus on climate change, the Lima Summit Declaration announced the launching of a joint EU-LA Environmental programme to the benefit of Latin American countries called "EUROCLIMA", with the main objectives of knowledge sharing, fostering structured and regular dialogue at all levels and ensuring synergies and coordination of current and future actions.

The objective of EUROCLIMA project is improving knowledge of Latin American decision-makers and the scientific community on issues and consequences of climate change, particularly in view of integrating these topics into sustainable development strategies.

A sustainable approach and long term vision for the Climate Change sector in Latin America goes also through the development and empowerment of regional and continental organisations in charge of research, training, high education and capacity building. South-south cooperation is the way to decrease dependence on continuous and aid dependent North capacity building actions in the domain.

JRC thematic Activity is part of the EUROCLIMA Initiative project (Nº DCI-ALA/2009/021–126).

In a general way, the direct beneficiaries of the actions to be coordinated by the JRC are the international scientific and technical community, and specifically, the LAC community that have benefited from the joint implementation, results, data and sharing information systems and mechanisms developed in the framework of this project. Policy

makers have also benefited from results and products in an indirect way through the national and international institutions involved in this programme. The final beneficiary is the Latin American population who should benefit from the increased capacity of LA institutions at continental level in managing the natural resources.

The indirect target groups include the range of different users/beneficiaries of the different thematic activities, products and results proposed who, according to their need and status (institution, wider public), will have correspondingly different benefits, such as regional (i.e. CODIA, OTCA, Comunidad Andina, RIOCC, …) and international institutions like the UN Food and Agriculture Organization (FAO), the World Meteorological Organization (WMO), the UN Environment Program (UNEP), the UN Development Programme (UNDP), development and cooperation agencies, governments.

Context

This work aims to improve the knowledge of the Latin American decision-makers and the scientific community on problems and consequences of Climate Change.

To reach the objectives and results of EUROCLIMA, the programme implementation is based on proven scientific and/or operational skills' capacity and swift mobilisation capability, thus allowing project's activities to start upon completion of decision making procedures.

The JRC have actively contributed to the achievement of Results 2 (***Relevant information and data sharing systems on scientific and socio-economic matters concerning climate change issues (and cross-cutting matters) are improved***), and 3 (***Technical capacities are strengthened to help ensuring beneficiaries' greater ownership and the empowerment of national and regional expertise and skills***). In order to achieve these results, JRC have implemented wholly or partly the following list of activities together with the LA institutions, regarding the scientific aspects of climate change including data collection, mapping, database elaboration, exchange of information, meetings, trainings, and dissemination:

RESULT 2

Activity 2.1 Identify key institutions and their needs concerning scientific assistance and research tools (including support for virtual networks and printed material);

Activity 2.2 Identify key institutions and their needs concerning socio-economic assistance and tools for modelling (including state-of-the-art IT hardware and software);

Activity 2.3 Produce environmental data and theoretical models, in close associations with Latin American national and regional scientific and research institutions;

Activity 2.4 Enable key institutions in having better access to data and models;

RESULT 3

Activity 3.1 Identify relevant stakeholders that require strengthening scientific resources, namely climate change and socio-economic issues, to achieve higher efficiency in the development of policies;

Activity 3.2 Identify thematic training needs (i.e. modelling, others) and the necessary material of key regional and sub-regional public and private institutions;

Activity 3.3 Organise most appropriate training in specific thematic matters;

Activity 3.4 Harmonise and disseminate most relevant training courses, through participatory interaction with leading Latin American research and technological institutes.

The JRC has jointly implemented and coordinated the scientific activities in the following five thematic issues or actions: (i) Soils, (ii) Water Resources, (iii) Food Security, (iv) Sustainability of Bio Energy; and, (v) Desertification Land Degradation and Drought.

The data and products will contribute as data inputs to improve the Climate Change forecasting models and reports. These results and products can be directly used by local and international communities of scientists but also by policy makers for improving their knowledge in the different thematic areas and in Climate Change in general.

2. Executive summary

2.1 Technical Implementation

The activities implemented to reach the expected results were; 1) to enhance policy dialogue addressing climate change issues to increase awareness and raise political visibility at national, sub-regional and regional level, 2) to improve relevant information and data sharing systems on scientific and socio-economic matters concerning climate change issues and cross-cutting matters, 3) to strengthen technical capacities to help ensuring beneficiaries greater ownership and to empower national and regional expertise and skills, were carried out through three main actors:

- The **UN-ECLAC** (Economic Commission for Latin America and the Caribbean) which implemented and coordinated the activities regarding the socio-economic aspects of climate change including improving of socio-economic knowledge of the impacts of climate change in the 18 Latin American countries.
- **Organization and consortiums** capable of supporting, inter alia, policy dialogue; cross-cutting coordination activities and all visibility and communications matter including communication to the general public and relations with the media.
- The **Joint Research Centre** of the European Commission which actively contributed to the achievement of Results 2 and 3, so the JRC implemented and coordinated the activities regarding the scientific aspects of climate change including data collection, mapping, database elaboration, exchange of information, meetings, trainings, and dissemination the following five thematic issues or actions: (i) Soils, (ii) Food Security – Agri4Cast, (iii) Water Resources Management, (iv) Sustainability of Bio-Energy and (v) Desertification, Land Degradation and Drought (DLDD).

Programme implementation was based on proven scientific and/or operational skills' capacity and swift mobilization capabilities, thus allowing project's activities to start upon completion of decision making procedures. Considering this implementation

approach and having in mind that the JRC mission is to provide customer-driven scientific and technical support for the conception, development, implementation and monitoring of Community policies, the different thematic components carried out many activities and generated a number of products that are summarized in the following sections.

2.2. Main results and impact

The results of the JRC implementations on the EUROCLIMA – Scientific project were articulated around five main actions or sub-components. The results of the different activities are the consequences of a close collaboration with the Latin American Institutions specialists in each component internationally recognized. This is important because this aspect will greatly contribute to the future sustainability of the activities and the network established during the EUROCLIMA project. In general terms, the outputs can be classified in three groups:

1) First group encompasses the generated products and its dissemination, which are part of the implementation process. These include:
- Data collection, harmonization and integration, so the generation of different databases for the different components in order to make accessible the information through common platforms (Soil and agro-climatic databases; Soil and Agri4Cast Actions & Biophysical and Socio-economic databases; DLDD Action). Continental precipitation database integrated in the web-based AQUAKNOW information system implemented by the Water Management action.
- Different kind of developments and implementations: software development (REFRAN-CV; Water Resources Management) and modelling solutions or Management Monitoring Systems (BioMa platform; Agri4Cast Action).
- Generation of derived products and its dissemination and exchange through web portals and online GIS platforms and catalogues (DLDD and Soil actions).

2) Communication strategies:
In a general way and in parallel with the implementation of the activities and results, the JRC in close collaboration with partners worked on the organization of meetings and

conferences and actively participated on them in order to evaluate and disseminate the results produced during the implementation phase in the Latin American community but also in international meetings to which the JRC staff participated (i.e. GCC COPs).

Also several scientific publications were submitted and accepted in peer review journals (the publication on those scientific journals attest on the scientific and technical quality of the results obtained). Note that the scientific data in order to be used in the frame of Climate Change community have to be recognised by the international community through peer-reviewed journals.

3) Socialization, Capacity Building and technology transfer
The results and methodology were socialized with the LA institutions through capacity building workshops and seminars in the different actions. Many training seminars were also organized in order to exchange information and experiences about the applied methodologies, set-up of models, organize datasets and conduct the correspondent analysis.

2.3. Main recommendations and lessons learnt

It is clear that the level of development of capacity in general and, in particular, concerning the assessment of the impact of natural resources linked to Climate Change is heterogeneous in the different LA countries and, even, from a LA institution to another of the same topology. For this reason, JRC has adapted the approach in a case by case strategy. This strategy has been also useful to mitigate operational risks, ensuring a good coordination by the different actors and also strengthening the relations within and/or amongst the implementing entities. Political level dialogue, even if remained outside the project's influence, would help to increase awareness of the actions taken and mitigate risks related with regional or national level commitments.

Implementation strategies based on "knowledge management", including assessment and dissemination of scientific and technological data and information is an adequate approach to improve cooperation and capacity development.

Nonetheless, the involvement of heterogeneous nature groups lead to challenging activities and some management and technical difficulties were encountered while organizing networks, ensuring contact among participants, establishing relationships to understand mutual needs, gathering data which weren't homogeneous, etc.

A close integration and a good communication channels between groups helped on addressing some of those issues, while technical expertise assured the good quality and reliability of the products. Sharing raw data was particularly challenging from a point of view of collaboration as these are often sensitive. In order to overpass this issue, JRC proposed that the local partners pre-process their own data (after a previous capacity assured by JRC and/or partners) following the methodology jointly defined (or suggested by JRC) but under condition of sharing results with the other Latin American partners.

It is recommended that the coordination of the different pre-networks developed in this program be assured by international organizations with the external support of JRC to avoid conflictual positions among the different countries.

It is also recommended to pursue with the development of the scientific activities to increase the relationships among the partners and keep the contact among the participants.

It is finally strongly recommended to establish agreements and protocols for sharing data, models and processing procedures that will allow sharing results.

2.4. Conclusion

The very important and close linkage between i) soils and climate change, ii) the combined effects of climate variability, climate change and land-use change on food production and food security, iii) water scarcity issues and its proper management and use, iv) bioenergy and biofuels sustainability, v) desertification, land degradation and droughts, are some of the most challenging Latin-American issues society is facing today because they are typified by complexities in which the relationships and feedback with and among environmental and socioeconomic variables are poorly understood and constantly changing. Synergies between human and climatic drivers need to be

considered and interrelations within coupled human-environmental systems that cause problems in all those variables need to be analyzed.

EUROCLIMA being a project aimed at improving bi-regional dialogue, has identified, assessed and strengthened regional capacity building needed to address those issues, and has also designed and implemented methodologies to generate useful information towards a better understanding of the involved variables. It has integrated technical, scientific and policy-making levels, and has facilitated the required interaction among institutions in the framework of the resources available improving knowledge of Latin American decision-makers and the scientific community, particularly in view of integrating the issues into sustainable development strategies.

Being a pioneer, learning-oriented project, a mutual understanding and agreement on different indicators to monitor and evaluate the project assisted on a constant "learning process" by all participating entities and allowed for a flexible assessment on all foreseen activities, so to reach conclusions leading to learning, based on a new understanding of constantly shifting circumstances and identifying core CC challenges in the complex regional context of the 18 LA countries.

Part II IMPLEMENTATION

3. Methodology

3.1. Overview and methodological approach

This project is meant mainly to improve south to south cooperation and capacity development. Therefore most of the activities have been implemented directly by the LA institutions themselves and, in any case, in close collaboration with/or under supervision of the JRC.

The direct beneficiaries of the actions are the LA institutions. It is clear that the level of development of capacity in general and, in particular, concerning the assessment of the impact of natural resources linked to Climate Change is heterogeneous from country to country and, even, from a LA institution to another of the same topology. For this reason, JRC decided to adapt its approach in a case by case strategy. It is important to already foresee a different distribution of activities between the different institutions. Therefore some LA institutions have contributed to implement fewer activities than other institutions. The distribution of the budget was defined consequently. A schedule of the activities directly carried out in the framework of this project is presented in the Annexe 6.7.

Taking into account of this intensive participatory approach, the implementation details of the different activities have slightly changed according to the technical meetings with the LA institutions and country partners in the limit of the current budget and time of implementation.

The role of JRC has consisted in managing all aspects of this EUROCLIMA-Scientific component project, including specific implementation activities, and reporting to EuropeAid. Besides, the JRC with the support of external assistance has been responsible of:

a. Technical assistance to the LA institutions leaders involved in the EUROCLIMA program for the definition and coordination of the activities

b. Supporting the EUROCLIMA Thematic networks to be built in the definition and design of action plans and detailed activities of the networks related to the EC support project
c. Advocacy to the EUROCLIMA Thematic networks towards:
    i. the definition of policy on research and high education taking into account the different sectors involved in the program;
    ii. improving the multi-stakeholder approach in the different thematic areas;
    iii. use of sustainable (in the LA context) activities in different thematic areas;
    iv. dialogue between research, academia and development partners (also including donors and governmental actors) at regional and national level is improved.
d. Support international partnership development with EU institutions, initiatives and other donors.

All these activities have had as objective improving the role of the EUROCLIMA Scientific Component in acting as a reference in the different thematic areas at regional level either toward advocacy and consultancy.

3.2. Implementation Strategy

As mentioned in the methodology, the activities have been jointly implemented by JRC and Latin American institutions following a Direct Centralized Management approach.

The JRC was directly responsible for supporting the activities of the LA institutions involved in the EUROCLIMA-Scientific Component in the limit of the activities foreseen in EUROCLIMA and budget. The overall project management and, in some specific cases, where regional and international institutions or networks had a predominant position in the region, were delegated also to partners (according to EC procedures) some specific technical skills and activities (such as CIIFEN, IAIGC, CAZALAC, EMBRAPA, CAP-Net, UNESCO-IHE, UNDP, UN-HABITAT, IE among others).
To reach the objectives and results of EUROCLIMA, the programme implementation was based on proven scientific and/or operational skills' capacity and swift mobilization

capability, thus allowing project's activities to start upon completion of decision making procedures.

Since the sub-objectives of EUROCLIMA-Scientific component were very different and the implementation approaches quite dissimilar, a common baseline was followed:

1. Organisation of scientific meetings with a threefold objective:
    a. Identification of the scientific needs in the region
    b. Identification of the actual capacities of the different actors in the region. This with the objective of identifying scientific and technical gaps in view of capacity building strategy (defined in the limits of the EUROCLIMA budget by subcomponent)
    c. Identification of the key partners able to implement the EUROLCIMA activities.
2. Definition of the activities to be implemented and identification of the key Latin-American institutions-actors.
3. Implementation of the activities

4. Organization and Management

4.1. JRC-EUROCLIMA implementing team and organisation

The different thematic areas were managed by the five (5) JRC project managers specialized in the different thematic domains. A JRC scientific-technical steering committee composed of these five thematic project managers coordinates the joint activities: inception note, technical middle and final reports.

A JRC coordinator of the EUROCLIMA-Scientific component was designated in order to be the contact point with DEVCO, the EUROCLIMA Technical Assistance and UNECLAC.
As stated in the Action Fiche, UN-ECLAC was meant to contribute to reach Results 2 and 3 implementing wholly or partially Activities 2.2, 2.5 and 2.6 and Activities 3.1, 3.2, 3.3, and 3.4 for the socio-economic aspect of climate change. The coordination was assured through meetings organized by DEVCO in Santiago de Chile (at UNECLAC premises – May 2010), Ispra (at the JRC premises during the EUROCLIMA Regional meeting – July 2011), in Durban (during the COP17 – December 2011) and in Tula (during the EUROCLIMA regional meeting – Mayo 2012). Exchanges through emails and phone-calls also allowed to assure the coherence of the implementation.

Taking into account the EUROCLIMA-Scientific activities were smoothly implemented, and the pragmatic implementation approach of the JRC, the EUROCLIMA-JRC steering committee decided to organise EUROCLIMA coordination meetings only under request of at least one of the different components. Coordination was mainly assured among the different components through emails, phone calls and informal meetings. Since some minor issues at sub-component level rose during the implementation of the different activities (SOIL: issues regarding Brazil data copy-right which had an impact on the Atlas delivery; Bio-Energy: some issues with the Colombian partners on the organization of the final meeting that finally was held in Santiago de Chile), the global implementation of the EUROCLIMA-Scientific component was not actually affected by this punctual issues.

Regarding the contracts with the Latin American institutions participating to the EUROCLIMA-scientific component, in a general way, no specific contracts were done other than the payment of flight tickets and hotel to the participants to the meetings and/or seminars. The seminars were organized through the DEVCO FWC BENEF-2009.

The JRC EUROCLIMA team implementing the project was constituted as follows:

- **JRC EUROCLIMA-Contact Point/ Designated Coordinator** is Dr. César CARMONA-MORENO
  - **Email:** cesar.carmona-moreno@jrc.ec.europa.eu
  - **Tel.** : +39.0332.789654
  - **Role:** To manage communications and contacts with DEVCO and the other EUROCLIMA partners (UN-ECLAC, Technical Assistance and EUROCLIMA Focal Points) ensuring the JRC internal-external communication of the project. DEVCO, UN-ECLAC and EUROCLIMA Focal Points communications will always be established through the JRC EUROCLIMA Contact point/Coordinator. In any case, EUROCLIMA partners will always have the possibility to directly contact the JRC t
  - **+.**

    hematic component leader (JRC project manager) in the case of a specific action or activity and vice versa but they will keep informed the "JRC EUROCLIMA Contact point/coordinator" for assuring the coherence of the whole programme.
- **JRC EUROCLIMA SOILS component leader** is Dr. Luca MONTANARELLA
  - Email : luca.montanarella@jrc.ec.europa.eu
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- **JRC EUROCLIMA AGRI4CAST component leader** is Dr. Stefan NIEMEYER
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- **JRC EUROCLIMA DLDD (Desertification) component leader** is Dr. Paulo BARBOSA
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4.2. Relationships with other key actors in the programme

The different activities were implemented through regular contacts established with LA partners. These were stablished at the beginning of the initiative and in some cases during the implementation phase. Among others and regarding the different components, these are some of the involved regional and local institutions:

Water Resources Management Component:

CONAGUA (Mexico), EMAAP (Ecuador), IAIGC (LA Intitution based in Brasil), IDEAM (Colombia), LA-WETnet (Latin America network based in Argentina), SENAMHI (Peru), Universidad Nacional, Instituto de Medio Ambiente (Colombia), CAZALAC (Chile), CIIFEN (LA Regional Institution based in Ecuador), CIRA – UNAN (Nicaragua), CONAE (Argentina), Fundación NATURA (Ecuador, Colombia, Ecuador), UMSA (Bolivia), REDICA (Costa Rica).

In order to increase the partnership and bring important contributions and specific skills to the EUROCLIMA-Water component, as already requested by LA Institutions involved in the water sector, JRC also identified external partners with the requested skills working actively in the field and representing an important support for activities to be implemented, result dissemination, visibility and networking:

- INDP, United Nations Development Program. UNDP implemented CAP-NET as LA-WETnet. This is an important network of practitioners in the water sector. CAP-NET already developed important capacity building materials and networks that could be very useful for the project.
- UN-HABITAT – It's working on the implementation of sanitation projects in the region through local and regional partners. Here again their networks can be used for dissemination of EUROCLIMA-Water resources results.
- IADB – They have already expressed a strong interest on the EUROCLIMA initiative. Some complementary activities could be funded by IADB.
- World Bank – They were involved in the development of a Regional Dialogue on Water in the Framework of Climate Change (Diálogo Regional de Política de América Latina y el Caribe).

BioEnergy component:

Main actors or partners involved were CENBIO from Brazil, EMBRAPA, INTA Argentina, CATIE, University of Campinas and Rio de Janeiro, IEA, Oeko Institute (Germany), Wageningen and Utrecht University (Netherlands), CIRAD (France), FAO, UNEP and some other national or international institutions (See Annex 6.3.). Emphasis was put on participation of the poorest countries in LA, during the expert consultation phase and also in the dissemination of results.

DLDD Component:

Some of the partners of this component who collaborated in the different phases are;

- Centro del Agua para Zonas Áridas y Semiáridas de América Latina y El Caribe (CAZALAC) based in Chile and
- Instituto Argentino de Investigación de las Zonas Áridas (IADIZA), Argentina.

Informal contacts had also taken place with CEPAL (UN-ECLAC).

AGRI4CAST Component:

A strong collaboration was possible with the World Bank under a project they financed, which is called Agro Zones Simulator (AZS) and which aimed at making climate change impacts on agriculture for Latin America. In essence, the WorldBank with its AZS project

became the first customer of the BioMA platform for Latin America.

Other key actors involved in activities carried out by this component were the Instituto Nacional de Tecnología Agropecuaria (INTA), and the Centre for Climatic and Meteorological Research Applied to Agriculture (CEPAGRI), which was already working on the studies related to the impacts of CC in Brazil.

4.3. Relationships with national governments

Communications and contacts were managed with DEVCO and the other EUROCLIMA partners, including the Focal Points, to ensure the JRC internal-external communication of the project through the JRC EUROCLIMA Contact Point/Coodinator. In any case, partners always had the possibility to directly contact the JRC thematic component leader (JRC project manager) in the case of a specific action or activity and vice versa but keeping informed the coordinator for assuring the coherence of the whole programme.

EUROCLIMA Focal Points				
Country	**Name**	**Institute**	**Position**	**e-mail**
Argentina	**José Luís Maccarone**	Coordinador de la Unidad de Asuntos Internacionales de la Secretaría de Ambiente y Desarrollo Sustentable	Coordinator	jlmaccarone@ambiente.gob.ar
Bolivia	**Cinthya Silva**	Viceministra de Medio Ambiente, Biodiversidad, Cambios Climaticos y de Gestion y Desarrollo Forestal	Vice-Minister	silvacynthia@yahoo.com
Brasil	**André Odenbreit Carvalho**	Chefe da Divisão de Política Ambiental e Desenvolvimento Sustentável do Ministério das Relações Exteriores	Head of Division	andre.odenbreit@itamaraty.gov.br
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Costa Rica	**Cynthia Cordoba Serrano**	Dirección de Cambio Climático, Ministerio de Ambiente, Energía y Telecomunicaciones	Advisor	ccordoba@minaet.go.cr
Cuba	**Orlando Rey Santos**	Director; Dirección de Medio Ambiente; Ministerio de Ciencia, Tecnología y Medio Ambiente	Director	orlando@citma.cu
Ecuador	**Lorena Falconí**	Ministerio del Ambiente - Subsecretaría de Cambio Climático	Advisor	lfalconi@ambiente.gob.ec

El Salvador	**Antonio Cañas**	Director General de Cambio Climático y Asuntos Estratégicos, Ministerio de Medio Ambiente y Recursos Naturales	Director General	acanas@marn.gob.sv
Guatemala	**Carlos Mansilla**	Director de la Unidad para el Cambio climático del Ministerio de Ambiente y Recursos Naturales	Director	cmansilla@marn.gob.gt
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Perú	**Eduardo Durand**	Director General de Cambio Climático, Desertificación y Recursos Hídricos. Vice Ministerio de Desarrollo Estratégico de los Recursos Naturales, Ministerio del Ambiente	Director General	edurand@minam.gob.pe
Uruguay	**Luís Santos**	Ministerio De Vivienda Ordenamiento Territorial y Medio Ambiente, Unidad de Cambio Climático - DINAMA	Coordinator	lsantos@cambioclimatico.gub.uy

4.4. Relationships with other organisations involved

The direct beneficiaries are each one of the 18 Governments, public agencies responsible and the private sector addressing CC issues, especially on potential policy influencing matters and their subsequent implementation at national level. The aim is to boost skills empowerment, notably through support to the RIOCC, the existing and already functioning network of climate change offices in LA tackling this issue at ministerial level in the 18 Countries.

The indirect beneficiary is the global population of the 18 countries (+530 million persons) targeted by EUROCLIMA and acting in close collaboration with other regional projects addressing CC issues. The aim is to help them better understand CC challenges and available options.

The main stakeholders are all the other "actors" (NGO, NSA, etc.) proactively working within CC matters, especially the civil society members most affected by CC-induced problems. The aim is to help them disseminating easily absorbable technical information on CC issues.

5. Detailed description of the main activities and results

5.1. Technical implementation summary

5.1.1. Main results and products

The results of the different activities, articulated around five actions (Soil, Agri4Cast, Water Resources, Bioenergy and Desertification, Land Degradation and Drought) are a consequence of a close collaboration with different Latin American institutions and specialists.

During the implementation process, not only different products were generated, but 1) many workshops and seminars were organized in order to socialize with the LA institutions, 2) several scientific publications were submitted and accepted in peer review journals (the publication on those scientific journals attest on the scientific and technical quality of the results obtained), and 3) the participants and specialists of the different actions assisted to different national and international meetings and conferences in order to organize and disseminate the results produced.

Regarding the products, these have been edited and/or generated in different formats. Component SOIL for example created, among others (see section 5.2.1), the Soil Atlas of Latin America and the Caribbean, published in Spanish, Portuguese and English, which compiles together different understandable maps covering the continent. It has also reinforced the LAC Soil Network through the participation of the Soil Action to different international seminars and workshops in the Soil domain. The Soil web-site portal was constructed using the data received from different LAC countries. All activities were implemented in agreement with the planning.

Data organization and modelling has also been stated; databases compiling soil, crop and weather information were developed under the Agri4Cast action, as well as models implemented (BioMA) towards the generation of different agro-climatic indices. DDLD action also worked on data collection and harmonisation and generation of different indicators.

A freely available tool (REFRAN-CV) to process meteorological time series and estimate the probability distribution functions of different climatic variables (precipitation, temperature, etc.) was also developed under the Water Resources Management Action. The software was used to process the precipitation datasets of the LA-Institutions involved in the component and different return period maps at regional scale had been made available in the AQUAKNOW web-site.

Different websites were also created in order to ensure the correct dissemination of the information and grant access to the products. For example, Agri4Cast created the Latin America and Caribbean Soil Portal, which provides access to this and other related topics, while BioEnergy created a website on where a given user can find descriptions of workshops, list of participants, full presentations, etc. Water and DLDD actions have provided different online mapping tools to disseminate some of their outcomes.

The different nature of these products show the diverse actions conducted during the project. Disseminating those and ensuring access to them has been a recurrent transversal objective during the implementation phase.

5.1.2. Comparison between planned and achieved results

In order to evaluate the results and foreseen activities of the different components of EUROCLIMA during the period November 201- March 2013, the Joint Research Centre in agreement with DG DEVCO defined a set of indicators to evaluate the different outcomes and its prominence among the stakeholders, users and the scientific community in Latin America.

In general terms it can be said that those expected results were successfully achieved as planned. Sections 3 within each of the action chapters as well as annex 6.2 show the different activities and results versus the Objectively Verifiable Indicators.

Soil action successfully compiled and stablished both the databases and the networks as well as a dissemination strategy through the Latin America Soil Portal. The first served as a first step towards the edition of the "Soil Atlas of Latin America and the Caribbean".

AGRI4CAST planned activities were also achieved: A consistent agro-climatic database as well as the implementation of different crop models and agro-climatic indexes for short to medium-term climate change impact and response analysis were stablished and developed, so allowing Latin American institutions to use those and to tackle questions regarding climate change impacts and risks for agriculture.

Water Resources Management Action Indicators showed that results were also successfully achieved. It was followed a participatory planning process approach; an average of 18 participants from 12 LAC countries assisted the meetings and a virtual support network was stablished. The number of users registered in those networks show the commitment of the different involved institutions. In fact, it was this interest what allowed to achieve the different planned activities; i.e. 1) Development of Water Resources Management database made available through the Aquaknow platform, 2) a Water Resources Management Monitoring System was configured under which different number of regional seminars, meetings and trainings were prepared and 3) the monitoring and dissemination of the process allowed to create a number of scientific publications and oral presentations in different workshops.
EUROCLIMA Bioenergy workshops were also held in Buenos Aires, Campinas and Santiago de Chile during 2011-2013. The Joint Research Centre staff also contributed to this component participating in different meetings.

Some of the Desertification, Land degradation and drought action planned results were to provide access to 1) fundamental biophysical and socioeconomic datasets and 2) indicators at different scales through a mapping tool and the development of a drought maps for Latin America. The successfulness of some of the accomplished results can be seen when checking the performance of the different stablished indicators: i.e. more than 50 national, regional and continental datasets were introduced in the catalogues, 37 Latin American Institutions were contacted, 14 LA institutions provide data to the

DLDD web-based map viewer, many experts (more than 30) attended each of the regional DLDD meetings, as well as capacity building workshops.

Based on all those experiences and reviewing the results, activities and indicators, it can be concluded that many of the planned activities were achieved, which reflects the interest of the different involved institutions and partners. The attendance and presentation of the EUROCLIMA-Scientific activities in different scientific congresses, forums and meetings during the implementation phase of the project show the commitment in terms of visibility and communication strategies. Cooperation and capacity building have been a constant, while the contribution of the different LA institutions, even if in some cases the level of commitment was heterogeneous, were satisfactory.

5.1.3. Visibility and dissemination actions

The coordination of EUROCLILMA emphasized communication, data sharing and information dissemination activities as key elements able of highlighting the project's visibility, transparency and governance, whilst addressing the demand for more proactive and efficient dissemination of CC issues, at national and regional level.

All the products and results obtained were made accessible and fully available to and by the international technical and scientific community, in general, and, in particular, to and by the LA technical and scientific community and institutions involved in the different activities through web-based systems developed in the framework of this initiative (For that purpose JRC has provided all web-links and publications produced under the different actions so they can be published on the web site), and also through the international publications and/or through JRC web-based interfaces (JRC institutes and/or JRC unit and/or JRC actions web-sites) where these data and results are currently available. The distribution and dissemination mechanisms of these results and products are further detailed in the description of each Thematic Activity. Results and products distribution and dissemination are compliant with EC legal position on confidentiality and dissemination of research results policies.

Being a Commission DG, the JRC assures the coherence between EUROCLIMA and other Initiatives implemented in Latin America and financed by the EC, in addition to be able to provide a longer term support to the region through data availability even after the end of the project. JRC assures interaction and synergies among the networks under EUROCLIMA action, (already existing networks and new networks), being climate change, the common axe of their activities.

Each thematic action has put special emphasis on identifying the needs of the poorest Latin American countries regarding scientific research in Climatic Change, on assuring their participation and on reaching their Institutions by the dissemination of results, experiences and knowledge. In the case of study cases based in Latin American countries whose knowledge and resources in research in issues related to Climate Change are more developed (as Brazil, Argentina, Chile or Mexico***).***

Additionally, JRC and EUROCLIMA partners have presented the EUROCLIMA-Scientific activities in the different international scientific congresses, forum and meetings that they attended during this period.

Some scientific publications were published in this period that will contribute to the visibility of the different activities implemented. Other scientific publications (peer reviewed) are also foreseen after the EUROCLIMA project. *Please, note that the average for a scientific publication peer reviewed is 2-3 years.* +

The JRC has also contributed to the visibility and communication strategy of the EUROCLIMA project through the publication in their web-pages.

The visibility of the EUROCLIMA biophysical sciences component was guaranteed and can be assessed through the wide dissemination of the activities and products in international media, conferences, and institutional websites:

- EUROCLIMA dedicated website: http://www.euroclima.org/en/

- EUROCLIMA Biophysical Sciences web site: http://edo.jrc.ec.europa.eu/scado/php/index.php?id=3399

- EUROCLIMA DLDD Observatory for Latin America: http://edo.jrc.ec.europa.eu/scado

- *EUROCLIMA Workshop presents studies on drought, desertification and land degradation in Latin America*, Friday, November 09, 2012, National Institute for Space Research (INPE), Brazil, institutional news available on-line at: http://www.inpe.br/ingles/news/news.php?Cod_Noticia=374

- *Natal sedeia 2° Workshop Latino Americano do EUROCLIMA*, Terça-feira, 23 de Outubro de 2012, Instituto Nacional de Pesquisas Espaciais (INPE), Brazil, institutional news available on-line at: http://www.crn2.inpe.br/noticias.php#texto5

- Workshop EUROCLIMA Apresenta Estudos Sobre Desertificação, Degradação das Terras e Seca na América Latina, sexta-feira, 9 de Novembro de 2012, Brazilian Space, Brazil, news in the media available on-line: http://brazilianspace.blogspot.it/2012/11/apres-do-workshop-do-euroclima-ja-estao.html

- *EUROCLIMA publica apresentações de workshop voltado à América Latina*, in Web Portal of the Ministry of Science, Technology and Innovation of Brazil (MCTI), available on-line: http://www.mct.gov.br/index.php/content/view/343993/Euroclima_publica_apresentacoes_de_workshop_voltado_a_America_Latina.html

- *II Workshop EUROCLIMA DLDD*, Webinar MundoGEO y el Programa EUROCLIMA, presentations available on-line at: http://mundogeo.com/webinar/euroclima/archivos.html

- *Ufal representa o Brasil em evento internacional sobre Seca*, Alagoas em Tempo Real, 22 de Outubro de 2012, news in the media available on-line at: http://mundogeo.com/webinar/euroclima/archivos.html

- EUROCLIMA (2012), Publicações sobre os relatórios e apresentações de eventos EUMETCast no Brasil, Laboratório de Análise e Processamento de Imagens de Satélites (LAPIS), Universidade Federal de Alagoas (UFAL), presentations available on-line at: http://www.lapismet.com/index.php?option=com_content&view=article&id=24&Itemid=38

- UFRN promove workshop sobre desertificação e degradação das terras, Portal de Meio Ambiente da Universidade Federal do Rio Grande do Norte (UFRN), 30 de Outubro de 2012, available on-line at: http://www.meioambiente.ufrn.br/index.php/destaques-home/ufrn-promove-workshop-sobre-desertificacao-e-degradacao-das-terras/

- EUROCLIMA e-Newsletter # 4 (2012). Climate Change in Latin America: Soils, Desertification and Drought, 10pp (http://edo.jrc.ec.europa.eu/scado/php/index.php?id=3006).

- Capacity Building Training on "Regional Analysis of Precipitation Frequencies based on L-Moments", 4 – 5 April 2011, and1st Regional EUROCLIMA Workshop on DLDD, 6 – 7 April 2011 Santiago de Chile, Chile. Information and material available on-line at: http://www.cazalac.org/taller_euroclima.php

- 3rd Training Meeting of the South American Group of EUMETCast Operators, 30 August – 2 September 2011, Maceió- AL, Brazil: oral presentation entitled "The EUROCLIMA DLDD component and the possible integration with EUMETCast regional activities", by Humberto Barbosa. http://www.lapismet.com/III_Encontro/apresentacoes/Report_final_SAGEO_meeting.pdf

- COP 17 – Climate Change Conference, 6 December 2011, Durban, South Africa: poster entitled "EUROCLIMA – Desertification, Land Degradation and Drought" at the EUROCLIMA side event, by Paulo Barbosa.

- Joint ICTP-KFAS Workshop on the Cooperative Experience for Integrating Land and Water Resources Management in Latin America, 13 and 17 August 2012 in Fortaleza, Brazil: oral presentation entitled "The EUROCLIMA DLDD Observatory for Latin America", by Paulo Barbosa.

- Conference ''Understanding Risk Brasil", 12-14 November 2012, in Belo Horizonte (Brasil), organized by the World Bank and the Ministry for integration of Brasil. Paulo Barbosa participated in a plenary Session and in a Technical Session on Drought including a presentation of the EUROCLIMA DLDD project. https://understandrisk.org/URBR

- Conference "Soil Science in a Changing World", Wageningen (Netherlands), 18-22 September 2011. http://www.wageningenur.nl/en/Research-Results/Projects-and-programmes/Wageningen-Conference-on-Soil-Science-2015/2011-Wageningen-Conference-on-Soil-Science/2011-Conference-Results.htm

- Workshop 3. Buenos Aires, Argentina, on 5-6 March 2013. [presentations of AGRI4CAST available in http://agri4cast.jrc.ec.europa.eu/euroclima under "downloads"]

- XIX Congress of Soil Science Societies of Latin America, Mar del Plata, Argentina, 16-20 Aprile 2012. http://www.agrisus.org.br/arquivos/Programa_Final_congreso_suelos.pdf

- Conference ''Rio + 20", Rio de Janeiro, Brazil, 20-22 June 2012. http://www.agrisus.org.br/arquivos/Programa_Final_congreso_suelos.pdf

- Conference ''Eurosoil", Bari, Italy, 2-6 July 2012. http://rps.entecra.it/pages/PageData/allegati/FinalProgramme200612.pdf

- Conference "CIGMA 2013 Conferencia Internacional de Geografía y Medio Ambiente", Mexico City, Mexico, 6-9 October 2013. http://cigma2013.mx/es/

- On-line training courses on AquaKnow: A complete set of videos explaining how to calculate L-moments using R software: http://www.aquaknow.net/en/balance-hidrologico-regional/news/tutoriales-sobre-el-analisis-regional-de-frecuencias-basado-en-l-momentos

- On-line REFRAN-CV software: http://www.aquaknow.net/en/euroclima-agua/links/regional-frequency-analysis-climate-variables-refran-cv-software-alpha-version

- On-line Virtual Networking Tool: http://www.aquaknow.net/es
- On-line training course on AquaKnow: http://www.aquaknow.net/en/water-project-toolkit
- Soils of Latin America and the Caribbean http://www.euroclima.org/en/services/news/item/1127-soil-atlas-of-latin-america-and-the-caribbean-published
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5.1.4. Synergies with other actions

The links between the EUROCLIMA project and similar actions driven by other institutions have been very strong since the beginning. Within the frame of EUROCLIMA and the RALCEA program (Latin American Network of Centers of Excellence in Water) for example there were joint meetings were organized to create synergies between them, such as the last Regional Seminar held in Varese (Italy). They also share some of the national appointed focal points. EUROCLIMA-Water is oriented to the development of scientific activities, concretely in the Water Balance Axe for budgetary reasons, whereas the role of RALCEA is to promote scientific and technical activities at political, scientific and academia levels through seminars, workshops and online courses. Therefore EUROCLIMA-Water focuses exclusively on scientific and technical activities (such as for instance the development of a software to process climate data that will be explained later in this chapter) while RALCEA is in charge of the capacity building

processes needed to promote, disseminate and tune the use of the scientific products resulting from EUROCLIMA-Water.

The UN-ECLAC (Economic Commission for Latin America and the Caribbean), based in Santiago de Chile, implemented and coordinated the activities regarding the socio-economic aspects of climate change including improving of socio-economic knowledge of the impacts of CC in the 18 LA countries, in selected sectors; providing decision makers with analysis of costs and benefits of the different options of mitigation and adaptation, in order to facilitate decisions in implementing measures; and mainstreaming CC issues in the economic, planning and sectorial institutions of the 18 countries involved, enabling a cost efficient transition to low carbon economies.

5.1.5. Sustainability of actions

The sustainability was considered by JRC at two levels from the beginning of the project:

- Institutional sustainability: The EUROCLIMA partners of the JRC in Latin America are scientific centres of excellence in their respective domains with a very long curriculum with national and international collaborations. They are supported by the national government and international organisations and are directly involved in international networks.
- Sustainability of the EUROCLIMA activities (Soil, Water Resource Management, Food Security, Bio-Energy and Drought-Desertification): The activities being implemented in the framework of the EUROCLIMA-Scientific component were duly agreed with the LA institution partners and taking into account the relevance of the activities in the different scientific domains, the LA institutions will continue to work after the end of this EUROCLIMA project independently of any European Commission support.

5.1.6. Monitoring and evaluation

Considering that EUROCLIMA is a pioneer, learning-oriented project, monitoring and evaluation (M&E) should (i) assist on the "learning process" by all participating entities and (ii) as such, allow for a flexible assessment of all foreseen activities. Indeed, the

overriding aim of the M&E process is to reach conclusions that will lead to learning, based on a new understanding of constantly shifting circumstances and identify core CC challenges in the complex regional context of the 18 LA countries.
Consequently the selected indicators and the design of M&E procedures were all a matter of mutual understanding and agreement between all the implementing entities. Thus, a recurring monitoring of indicators devised by these entities was a prerequisite for permanent learning about project's objectives and the expected results.

From an organisational point of view AIDCO B2 is the Contracting Authority and was in charge of the operation management of the contract under the Terms of Reference. The financial management of the contract was carried out by the Finance and Contracts Unit AIDCO B3.
The different thematic areas proposed in the original Technical Annex were managed by the five JRC project managers specialized in the different domains. A JRC scientific-technical steering committee composed by the project managers coordinated the joint activities: technical middle and final reports. A "JRC contact point/coordinator" was appointed for establishing contacts with AIDCO and the other EUROCLIMA partners and for ensuring the internal coordination of the Project AIDCO communications concerning EUROCLIMA were done through the JRC focal point/coordinator. AIDCO has had the possibility to directly contact the project manager of a specific action and vice versa but always keeping informed the "JRC contact point/coordiantor" for assuring the coherence.
Reporting mechanisms ensured the monitoring of JRC activities, as well as the coordination with other components of the Initiative:

- At a first stage, (within two months after signing the Administrative Arrangement) JRC sent for approval an initial report to AIDCO/B/2. This initial report included, JRC-EUROCLIMA organization chart (including, the contact point/coordinator designated), a detailed methodology, an annual plan of activities and a monitoring system, which allowed to measure project progress based on relevant performance indicators.
- JRC sent to DG AIDCO annual reports summarizing all JRC activities in EUROCLIMA on a basis of one every twelve months. This annual report included an accurate annual

plan of activities in order to ensure coordination with the other EUROCLIMA components.

- A final report was sent after the end of the project to AIDCO.
- EUROCLIMA coordination meetings were held once or twice per year, with the participation of DG AIDCO and the principals implementing Entities of EUROCLIMA initiative (DG JRC, CEPAL and the technical assistance). DG JRC assured its attendance to the coordination meetings.
- Regular meetings of the JRC steering committee were organized regarding the EUROCLIMA Initiative implementation and coordination aspects. The minutes of such meetings will were sent to AIDCO for information.

Monitoring, evaluation and audit mechanisms were as follows; two evaluation missions (mid-term and final), and an independent audit mission to be carried out at the closure of all disbursements and/or settlement of committed monies, in accordance with EC auditing regulations. The costs linked to these monitoring and evaluation activities were not included in this Administrative Arrangement.

5.1.7. Conclusion, good practices and recommendation learnt

Despite some of the challenging activities and the difficulties encountered during the different technical implementation phases, many of the activities to be developed by the different actions were finished in due time and successfully reached, also considering the six months extension. Some processes were long and delicate, such as the creation of network and contacts. The initial lists of official contact points for every state appeared in some cases insufficient or incomplete. It is the case for data providers, which in many cases producers were from different organizations, from governmental bodies, to the universities or local communities. This could be avoided by organizing nested networks, as this kind of organization allows having a contact point in every state but also connected with all the relevant actors producing, managing and using data from different sources. In any case, the dynamic and flexible nature of the activities has helped on avoiding some of these difficulties. It is recommended that the coordination of the different pre-networks developed in this program be assured by international

organizations with the external support of JRC to avoid conflictual positions among the different countries.

Even if some defection is unavoidable, daily or at least constant contacts were in many cases a pre-requisite to make the complex organizations work properly. Collaboration agreements, good group relationship and understanding of mutual needs have been identified and stablished with some partners. It is recommended to pursue with the development of the scientific activities to increase the relationships among the partners and keep the contact among the participants.

Regarding the conception and development of the modelling tools and runs realized within the project, the time and resources were limited for a simple reason of lack of time and resource. Nonetheless, general objectives were reached even if in some cases application scales interests were different. Some institutions were interested in a more local or regional scale with a correspondingly finer granularity (higher spatiotemporal resolutions) requirements in both data layers and modelling solutions. Some Latin American institutions may currently lack the resources to invest in this next step, so a clear recommendation for the future would be to finance projects in which local institutions can work in strong collaboration with institutions such as the JRC to develop together tailored solutions to answer questions of local stakeholders.

Data acquisition to feed the models or the developed tools is always affected by some difficulties; data heterogeneity and accessibility constrained by commercial proprietary copyright issues affect the designed integration workflows. However, in some cases partners managed to put together coherent databases largely superior to those existing in other official institutions. To avoid some of these issues, raw data was not published, but derived products have been made available. JRC proposed that local partners to pre-process their own data (after a previous capacity assured by JRC and/or partners) following the methodology jointly defined (or suggested by JRC) but under condition of sharing results with the other Latin American partners. It is recommended that more emphasis should be put in developing new environmental open data and software

policies, by establishing agreements with the LA governments since the beginning of future projects, so to avoid modifications, delays or cancellations of expected results.

Facing future activities, a closer integration between the different JRC scientific groups would be an advantage. Now that the different components have produced their final products, some of those could be used to improve the data sources of the others, so to improve final quality and reliability, and to perform better or more appropriate simulations to complement the work done by the different groups. It could also be helpful and desirable to consolidate the different spatial datasets in a single database in order to integrate and harmonize the products within the same environment.

Data sharing and information dissemination activities are one of the other key elements able of highlighting the project's visibility, transparency and governance, whilst addressing the demand for more proactive and efficient dissemination of CC issues, at national and regional level.

Being a pioneer, learning-oriented project, a mutual understanding and agreement on different indicators to monitor and evaluate the project assisted on a constant "learning process" by all participating entities and allowed for a flexible assessment on all foreseen activities, so to reach conclusions leading to learning, based on a new understanding of constantly shifting circumstances and identifying core CC challenges in the complex regional context of the 18 LA countries.

5.2. SOIL ACTION

5.2.1. Main results and products

Over the last decades, increased pressure on the environment has globally led to non-adapted land management in order to keep up with food and consumption demands and in order to carry on making the best economic profit mostly neglecting that same environment counted on to provide these services. In certain already vulnerable areas this provoked over- and misuse of the land resource with land degradation as one of the direct consequences including the deterioration of soils and the many services they provide (Millennium Ecosystems Assessment, 2005; UNEP, 2007; Lal, 2009).

Soil resources from Africa and Latin America are crucial for meeting the food, feed, fiber and fuel needs of the rapidly growing human population. An outlook published in 2009

by the Food and Agriculture Organization of the United Nations (FAO) and the Organisation for Economic Co-operation and Development (OECD-FAO, 2009) noted that current cropland area could be more than doubled by adding 1.6 billion hectares — mostly from Latin America and Africa — without impinging on land needed for forests, protected areas or urbanization (Sachs et al., 2010).

A necessary starting point to achieve the objective of preserving soil resources is to reach an adequate level of knowledge on their status and to raise awareness on their importance (UNEP, 2007; Sanchez et al., 2009; Palm et al., 2010; Sachs et al., 2010). In order to improve communication and awareness among the general public, stakeholders, policy makers and other scientists about the importance of soil in Latin America, the Soil Action of the Joint Research Centre of the European Commission, together with the LAC countries, has begun a series of activities under the program EUROCLIMA.

The creation and development of the Land Agency Network of LAC was the first objective of these activities, and the publication of the Soil Atlas of LAC I established the first, and most important, this strategy of product information and awareness the importance of soil. The Atlas brings together existing information on different types of soils in easily understandable maps (both regional and continental) spanning the continent.

The preparation process of the Atlas involved the creation of an Editorial Board of Soil experts, who met several times during the entire period.

Another scientific product, requested to the Technical Assistance, was the elaboration of a thematic study on the evaluation of the impact of Climate Change on soil degradation processes in LAC. The thematic study “Guía metodológica para facilitar la evaluación y reducción de los effectos del cambio climático sobre los procesos de degradación de los suelos en América Latina”, is directed by EUROCLIMA Technical Assistance together with the national Focal Points and represents a specific deepening of knowledge on the impact of climate change in the processes of soil degradation. JRC DLDD and Soils

components suggested the research theme, reviewed the TOR for the study and reviewed and commented reports of the researcher, Mr Ontiveros. In the final publication, JRC-Soils researchers Ciro Gardi, Luca Montanarella and Maria Isabel Vara-Rodriguez present a 2-page introduction to the study.

Finally, with the aim of increasing the technical skills in the emerging technology of soil science, a series of seminars on digital soil mapping have been organized.

The map shows the most relevant soil degradation processes in Latin America and Caribbean (Chapter "Soil and Climate Change of the Atlas") (Source: Carlos Cruz Gaistardo)

Engagement of LAC partners and LAC Soil Bureau Network (RED)

One of the objectives of the Project was the active involvement of scientific partners of LAC, mainly through the establishment of the RED and to the active participation to the preparation of Soil Atlas. Since the kick-off meeting in Rio, we registered the participation of 59 soil experts from 19 LAC countries.

Other experts attended the meetings in Ispra (Italy), Mar del Plata (Argentina) and Berlin (Cf. annexe 6.5), and in occasion of international conference we had the opportunity to strengthen the collaboration with some of them.

The list of the experts involved in the activities of the soil component of EUROCLIMA Project, is reported in the Annexe 6.3.

The Project however implied a continuous collaboration based on daily contact and exchange of information and data with the group of authors actively involved in the preparation of the Atlas. These activities were relying on the very active contribution of a limited number of participants.

Summary of the results

The main results of the activities of the Soil Action within the EUROCLIMA Project are summarized in the following sections:

Research and development

Updating and harmonization of soil data

The state of the art concerning soil data and information available for the entire continent at the moment is represented by the Soterlac database V2.0. Soterlac consists of soil and terrain database for Latin America and the Caribbean, at 1:5 million scale and was compiled according to the uniform SOTER methodology.

This data set replace version 1.02. The Soil and Terrain database for Latin America and the Caribbean (SOTERLAC), version 1.02 at scale 1:5 million, was released in 1998 (FAO et al. 1998). It was the result of a joint effort of the United Nations Environmental

Programme (UNEP), the Food and Agriculture Organisation of the United Nations (FAO), ISRIC - World Soil Information, and the International Potato Centre (CIP) over the years 1993 –1997.compiled in collaboration with FAO, CIAT and many regional experts.

For the compilation of the Atlas we have updated this database, including the more detailed and updated soil maps, in digital format, received by several LAC countries such as: Cuba, USA (Porto Rico), Mexico, Guatemala, Panama, Costa Rica, Colombia, Venezuela, Peru', Ecuador, Brazil, Uruguay, Argentina. An example of the generalization process (from 1:250,000 to 1:3,000,000 scale) carried out by the Mexican colleagues is reported in the Annex.

The harmonization process consists in the translation of the Soil Classifications adopted in the various states, into a unique classification system. For this purpose it was adopted the last version of the World Reference Base for Soil Resources (WRB 2010).

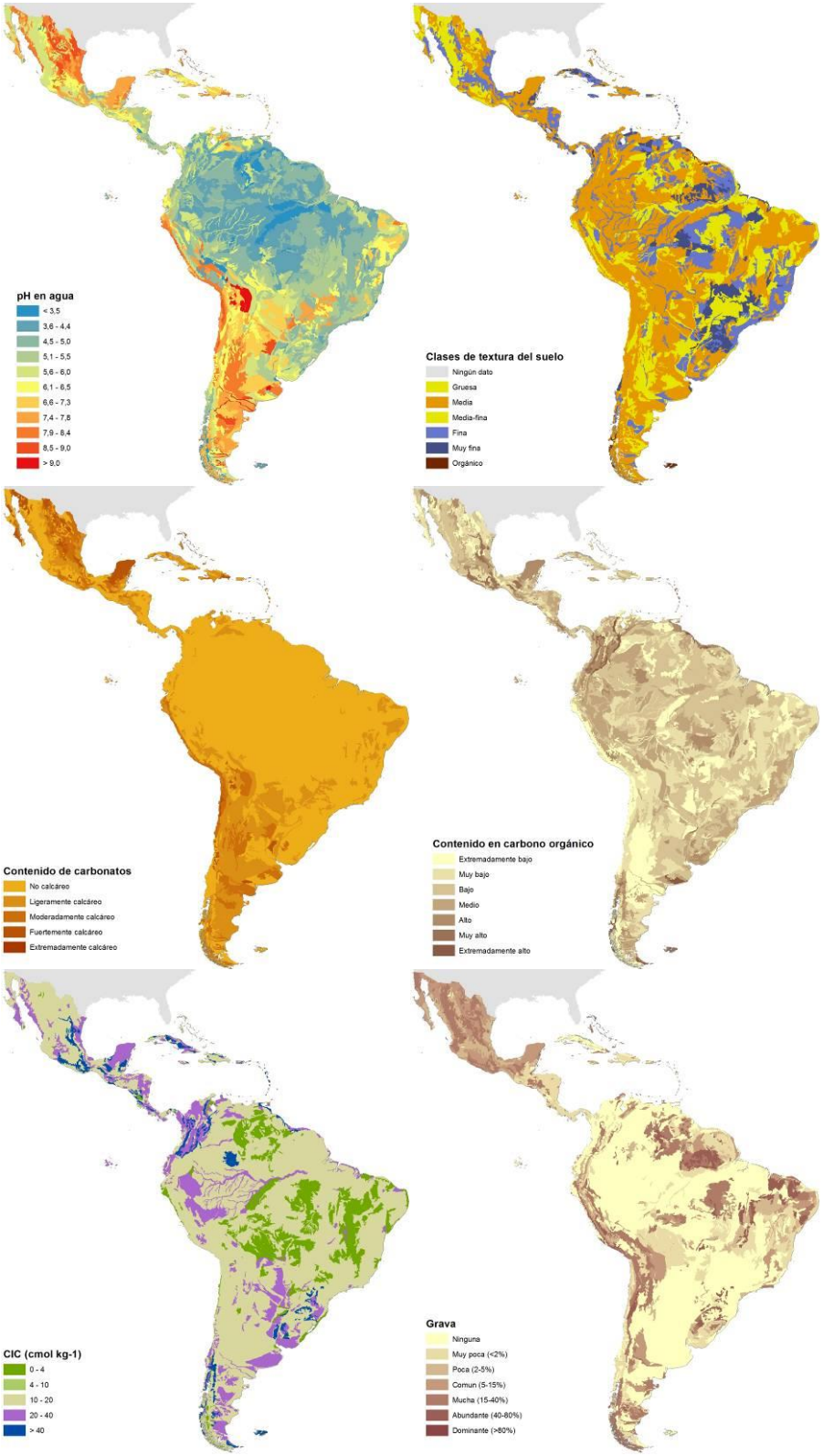
At this moment the soil map we produced for LAC represents the most detailed and updated map available for the entire continent.

Latin American and Caribbean Soil Bureau Network

This network has been formally established during the meeting held in Rio in July 2010. During this launching event, 59 people attended the meeting. Of these 22 were the official representatives of 19 Latin American and Caribbean countries.
The second meeting took place in Mar del Plata (April 2012), in the occasion of the XIX Congress of Latin American Soil Science Societies. 35 participants, in representation of 20 LAC countries, two European countries and two international organizations, attended this meeting. The activities organized in Mar del Plata gave an opportunity to present, to a wide community of soil scientists, the activities of the EUROCLIMA programme, to update on the status of the atlas and to present the Latin America and Caribbean Soil Bureau Network, which will contribute substantially, to the establishment of the regional node of the Global Soil Partnership.

Latin America and Caribbean Soil Portal

The portal is still in progress and it will be ready when all the material produced for the Atlas will be available. At the following link you could find the existing web page, on Eurosoil Portal, dedicated to EUROCLIMA:
(http://eusoils.jrc.ec.europa.eu/library/maps/LatinAmerica_Atlas/index.html)



Some of the Soil Thematic Maps published in the Latin America and Caribbean Soil Portal (Source: JRC/ISRIC)

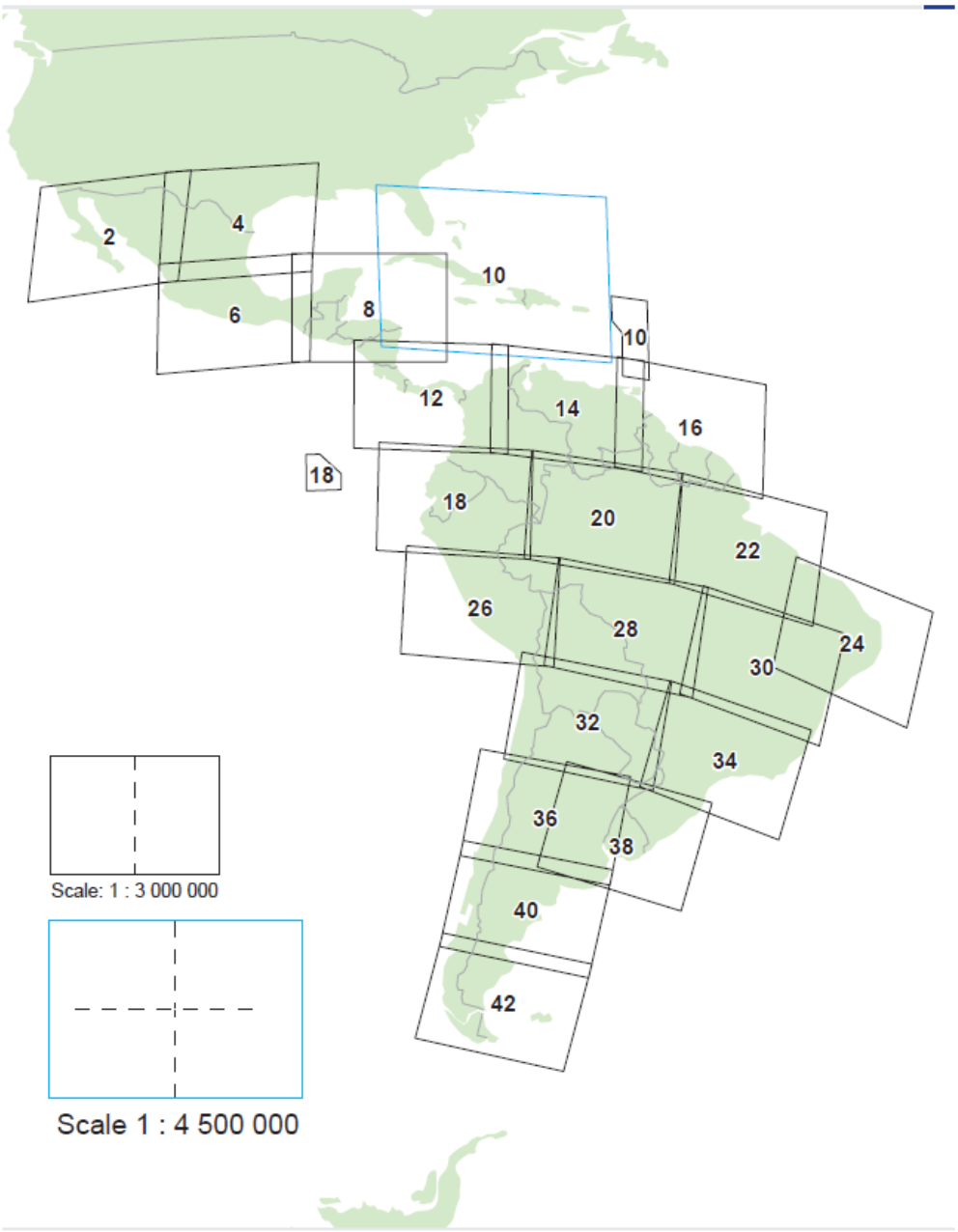
Meetings and Conferences

Rio de Janeiro (kick-off meeting), 6 -10 September 2010.

The JRC with EMBRAPA and CIAT jointly organized the kick-off meeting of this project in conjunction with the meeting of the Latin American countries participating in the Global Soil Map project (http://www.globalsoilmap.net/). EMBRAPA hosted the meeting, as node leader for Latin America of the project. CIAT co-financed the meeting organization. Ca. 60 participants from all Latin American countries attended the meeting. The meeting was highly productive and consisted in a first part focusing on the compilation of the new global soil map for Latin America, and a second part dedicated to the specific data and tasks related to the compilation of the new Soil Atlas of Latin America. Both parts of the meeting were closely interconnected, since the basic soil data needed for the global soil map will as well contribute to the Soil Atlas of LAC. The participating countries were highly supportive of both projects and a detailed work plan could be established for the Soil Atlas compilation involving all countries present as well as a number of European experts. A first layout of the Atlas was agreed including the cartographic part as illustrated in the figure below. Latin America will be covered by a total of 16 map sheets at a 1:3 million scale. All participants insisted in the need to involve as well the smaller Caribbean countries. Contacts will be made with the concerned countries by the two participants from Cuba and Santo Domingo in order to coordinate their input to the Atlas. The JRC will produce a first draft of the atlas by end of 2010 and circulate to all participants for their comments and inputs.

Details on the Soil Atlas of Latin America, as well as on the meeting are available at http://eusoils.jrc.ec.europa.eu/library/maps/LatinAmerica_Atlas/index.html

A full meeting report has been produced by the JRC by end of October and circulated for comments to all participants.



Subdivision of the Soil Map of LAC in cartographic plates

The meeting produced a final agreement by all participants to join in a permanent network, on the model of the successful European Soil Bureau Network, and to join forces for the compilation of the Soil Atlas of Latin America. A formal declaration was signed by all participants at the end of the meeting.

Ispra, 4-7 July 2011

The meeting was held in conjunction with the meeting of focal points of EUROCLIMA project. The editorial board of the Atlas attended a full day of the meeting EUROCLIMA (which presented the project and the work carried out by the other components). There were also two joint sessions in which we present the project and its status of the work of Atlas and prospects for the future. The meeting was very rich in debates and decisions, and in pursuit of a shared vision about what can and should be the Atlas and the ways and times required to achieve this.

Wageningen, 18-22 September 2011

Participation in the Conference on Applied Soil Science, aims to present the project "Soil Atlas of Latin America" as a contribution to the project EUROCLIMA JRC. This was achieved through an oral presentation entitled "Soil Atlas of Latin America and the Caribbean: Soil Science and awareness".

Mar de Plata, 16-20 April 2012

In the occasion of the XIX Congress of Soil Science Societies of Latin America, we have organized the following activities and events:
Editorial Board meeting for the Soil Atlas of LAC
Symposium “Atlas de Suelos de Latinoamérica” 17th April 2012;
Symposium “Sistema de Información de Suelos de Latinoamérica” 18th April 2012; this symposium was an important Milestone for the establishment of LAC Soil Bureau Network.
Training on Digital Soil Mapping, as a part of the Building Capacity strategy on Soil Science (see below).

Rio + 20, 20-22 June 2012
The LAC soil atlas was presented in a major event on soils organized jointly with EMBRAPA on the 18th of June 2012 in the morning and was open to the general public.

It included presentations on the on-going soil related activities relevant to the Rio+20 negotiations by EMBRAPA, European Commission and FAO. I presented a brief overview of our activities including recent developments relevant to South America within the EUROCLIMA program of DG DEVCO, especially our new Soil Atlas of Latin America, due for final publication in 2013. Details on the side event are available at http://www.cnps.embrapa.br/noticias/banco_noticias/20120619.html.

Bari, 2-6 July 2012

In the occasion of the Eurosoil conference, held in Bari in July 2012, an oral presentation with the title "Soil atlas of Latin America: an innovative tool for policy development and awareness raising", was given. The participation to the conference gave also the opportunity to meet some of the members of the Editorial Board, and to discuss of the further steps of the project.

Berlin, 18-22 November 2012

In the occasion of the Global Soil Week, on the 19th November 2012 we organize a meeting with the editorial board of the Soil Atlas of Latin America and Caribbean region (LAC). The elaboration of the Soil Atlas of Latin America and Caribbean region is framed within the EUROCLIMA programme. The aim of the programme is to improve the knowledge of Latin American decision-makers and scientists regarding the impact of climate change in the region in order to strengthen sustainable development strategies. The objective of the meeting was to discuss the current state of the Atlas and update the contributions of each country through their different representatives and contributors (most of them also members of the editorial board). The participant who contributed to the meetings were: Ricardo F. Siachoque Bernal (IGAC, Colombia), Miguel Taboada and Carla Pascale (Soil Institute, Argentina), Olegario Muñiz (Soil Institute, Cuba), Arnulfo Encina Rojas (Soil Department, Universidad Nacional de Asunción, Paraguay), Julio Alegre (Universidad Nacional Agraria, Perú), Ronald Vargas (FAO), Pedro A. Núñez Ramos (IDIAF, República Dominicana), Pavel Krasilnikov (Russia), Augusto González (Instituto Espacial Ecuatoriano, Ecuador), Marco Nocita, Ciro Gardi and María Isabel

Vara Rodríguez (JRC). The current chapters were improved and discussed and new contributions were proposed and assigned. Also, questions concerning the information processing (maps, pictures and texts) came up and were improved (communication among contributors and with the graphic designers). The meeting was very productive and provided a major boost for the final stage of the edition of the Atlas.

Mexico City, 6-9 October 2013

The congress was attended by almost 1000 participants, coming from all the continents, but with the majority of them coming from Latin America. This wide participation of Latin America geographers (sensu latu), represented an excellent opportunity to present the next coming Soil Atlas of LAC.

The presentation, as overview of the content of the Soil Atlas of LAC, was within the frame of the activities of Soil Action within the EUROCLIMA project. The presentation of the Atlas received a noticeable attention, and I received several questions, requests of contacts and information and proposal for collaboration within the activities of the Latin America Soil Bureau Network.

Scientific publications

Calendar

The calendar was a mean to highlights the diversity and richness of soil in South America and the Caribbean and should help the reader to better understand the characteristics and potential of various soil types in this part of the world. It has been published in three languages (Spanish, Portuguese and English), and distribute in more than 1000 copies in Latin America and Caribbean, Europe and in several international conferences worldwide.

Soils Atlas

The Soil Atlas of LAC illustrates the Diversity of soils from the humid tropics to the arid deserts through a series of maps supported by explanatory texts, high quality photographs and descriptive graphics. Supporting texts describe the major soil types,

together with their principal characteristics and the main soil forming processes. This Atlas, as one of the outcomes of EUROCLIMA programme, will have a strong emphasis on climate change. The soil maps presented in the Atlas are based on the Soterlac 1:5 million database, that will be updated and validated on the base of the information provided by the LAC countries. Soils will be discussed both at a regional scale, on the base of Ecozones, and at from a national perspective. A specific section will be devoted to integrating indigenous and scientific knowledge on soils (ethnopodology).

Together with the publication of the Atlas, the soil map and associated datasets on soil characteristics will be made freely available. These datasets will be useful for making broad distinction among soil types and provide general trends at the global and regional scales. The datasets will be made accessible for free downloading from the portals of the SOIL Action (http://eusoils.jrc.ec.europa.eu/).

The format of the Atlas will allows an accessible, user-friendly approach avoiding the more traditional focus on soil classification and soil survey interpretation. Furthermore other products aimed to raise awareness on soil, have also been produced, such as the Soil Calendar of Latin America and Caribbean (2012).

The Atlas links the theme of soil with rural development and, at the same time, supports the goals of the EU Thematic Strategy for Soil Protection in conserving a threatened natural resource that is vital to human existence.

Not only climate change, but also desertification and loss of biodiversity are strongly affecting soils globally, making the “Soil Atlas of Latin America” relevant to a much larger community of stakeholders involved in the implementation of the three “Rio-Conventions” and allowing possible synergies among international multilateral agreements towards global soil protection to be explored.

Alcance del Atlas/Enfoque

Antecedentes

El Atlas de Suelos de América Latina y el Caribe es una iniciativa enmarcada en el programa EUROCLIMA, el cual busca fomentar la cooperación entre América Latina y la Unión Europea (UE) en materia de cambio climático.

Objetivo del Atlas

Este Atlas tiene como objetivo apoyar el uso sostenible del suelo, proporcionando una herramienta útil para conocer su estado y llamar la atención sobre su importancia. Estos aspectos constituyen el punto de partida necesario para la conservación de este valioso recurso natural (UNEP, 2007; Sánchez et al., 2009; Palm et al., 2010; Sachs et al., 2010). Con el fin de mejorar la comunicación y concienciar al público general, políticos y científicos sobre la importancia del suelo en América Latina, el Centro Común de Investigación de la Comisión Europea (Joint Research Center) ha elaborado el primer Atlas de Suelos de América Latina y el Caribe.

El Atlas unifica la información existente sobre diferentes tipos de suelos mediante mapas fáciles de entender, tanto a escala regional (ecozonas) como continental. También ilustra la diversidad de suelos existente, desde los trópicos húmedos hasta los desiertos, a través de una serie de mapas con textos explicativos, fotografías y gráficos. Los textos describen los principales tipos de suelos, junto con sus características fundamentales y los procesos de formación de suelos más importantes. Este atlas, como uno de los resultados del programa EUROCLIMA, hace hincapié en el cambio climático. Los mapas de suelos presentados en este trabajo se fundamentan en la base de datos Soteriac 1:5.000.000, actualizada y validada en función de la información proporcionada por los países de América Latina y el Caribe. Los suelos se tratan tanto a nivel regional, basándose en las distintas ecozonas, como a nivel nacional. Una sección concreta está dedicada a la integración de los indígenas en el conocimiento científico de los suelos (Etnopedología o Etnoedafología).

Para muchas personas, los suelos típicos de América Latina son de color rojo, están muy mencionados y se asocian a bosques tropicales. Sin embargo, la realidad es muy diferente. Desde el norte hasta el sur de América Latina aparece una enorme gama de suelos que proveen numerosos bienes y servicios ambientales de vital importancia para los seres humanos y el planeta en su conjunto.

Suelos y seguridad alimentaria

En las últimas décadas, el aumento de la presión humana sobre el medio ambiente ha llevado al uso indebido y la mala gestión del territorio, especialmente en América Latina y el continente africano. Esto ha provocado la degradación de los suelos y de muchos de los servicios que se obtienen de ellos (Evaluación del Milenio de los Ecosistemas, 2005; PNUMA, 2007; Lal, 2009).

El suelo es un recurso natural crucial para satisfacer las necesidades de alimentos, forraje, fibra vegetal y combustible de una población humana que crece rápidamente. Según el pronóstico de la Organización de las Naciones Unidas para la Alimentación y la Agricultura (FAO), y la Organización para la Cooperación y el Desarrollo Económicos (OCDE-FAO, 2009), podría doblarse la superficie de cultivo existente, sumando 1,6 millones de hectáreas a las actuales - principalmente de América Latina y África - sin afectar a terrenos forestales, áreas protegidas o terrenos urbanos (Naturo, 2010). Sin embargo, varios expertos, como la Sociedad Real de Gran Bretaña (Royal Society, 2009) desaconsejan el incremento sustancial del área destinada a tierras de cultivo, por el perjuicio que supondría para los ecosistemas y la biodiversidad. Una solución intermedia sería lo que se conoce como "Intensificación sostenible", la cual se ha convertido en la prioridad de muchos organismos de investigación agrícola. Por ejemplo, la FAO (OCDE-FAO, 2010) prevé que la producción agrícola de Brasil crecerá más rápido que la de cualquier otro país del mundo en la próxima década (aumentando en un 40% en 2019). Este aumento de la presión sobre el suelo, requiere de un enfoque preventivo a la hora de gestionar este recurso clave, con el fin de evitar, o al menos mantener dentro de un umbral sostenible los procesos de degradación.

Itensificación sostenible:

La intensificación sostenible de la producción agrícola proporciona oportunidades para optimizar la producción agrícola por unidad de superficie tomando en consideración los aspectos de sostenibilidad e incluyendo el potencial y/o los impactos sociales, políticos, económicos y ambientales reales.

El color rojo de este suelo tropical indica la presencia de cantidades importantes de óxidos de hierro y la ausencia de carbonatos (Cuba).

"La Naturaleza no es frágil... los que es frágil son los servicios ecosistémicos de los cuáles dependen los humanos."

Simon A. Levin, matemático y ecólogo estadounidense.

La Región de la Pampa Húmeda de Argentina juega un importante rol como productora de de plantas forrajeras destinadas a la producción de carne y leche (Foto: CC)

Sample page of the Introduction chapter of the Atlas

Scientific papers

At the moment we published one scientific paper, on Current Opinions in Environmental Sustainability. The paper, "Soil information in support of policy making and awareness raising" (Bouma et al., 2012) presented an overview on the example of innovative ways to present soils and raise soil awareness, and among them the Soil Atlas of LAC. (http://www.sciencedirect.com/science/article/pii/S1877343512000887).

Several other contributions, in form of extended abstracts, abstracts and posters have been presented in the scientific conferences mentioned above (see point “b” of the summary of results).

Capacity building

The establishment of the Latin America and Caribbean Soil Bureau Network should be considered a capacity building activity.

Other initiative in this context, were the trainings on digital soil mapping and harmonization of soil data, the first of them was entirely organized with the support of EUROCLIMA project, and the following two, funded by FAO.

Seminars and training

Mar de Plata, April 212

As a joint activity of the EUROCLIMA programme and of the Latin America and Caribbean Soil Bureau Network, a workshop on digital soil mapping was organized during the Mar del Plata meeting. This workshop, attended by more than 40 people actively involved in soil science, was also the occasion for the participants to present case studies and examples of excellence and good practices in the domain of digital soil mapping. Interesting examples were presented for Argentina (Marcos Angelini, Federico Olmedo), Brasil (Ricardo Dart), Mexico (Carlos Cruz Gaistardo), USA (Puertorico, Thomas Reinsch) and Colombia (Ricardo de Oliveira Dart).

Cali, 9-13 July 2012

35 specialists in soil classification and mapping from 19 Latin American countries were in CIAT to participate in the workshop "Harmonization of Soil Database of Latin America and the Caribbean, under WRB2010 Classification System”. The initiative - sponsored by FAO through the Global soil Partnership - has the goal of standardizing profiles and maps of soil throughout the region. With standardized information, the analysis possibilities are multiplied.

Rio de Janeiro, 24-28 September 2012

Embrapa Solos organized a training course on digital soil mapping. Participants from 17 countries in Latin America and Caribbean (Brazil, Argentina, Bolivia, Chile, Colombia, Costa Rica, Cuba, Ecuador, El Salvador, Guatemala, Honduras, Nicaragua, Panama, Paraguay, Peru, Dominican Republic, Uruguay and Venezuela) were mainly agronomists. This course, funded by FAO, should be considered as follow-up of the activities started by the LAC Soil Bureau Network.

5.2.2. Comparison between planned and achieved results

The three expected results planned in the technical annex of EUROCLIMA as the SOIL contribution were overall successfully achieved, despite some delay in the production of the LAC Soil Atlas and in the preparation of the Web Portal related to Copyright issues. In particular some issues concerning the copyright transfer were raised by Embrapa, two months before the expected publication of the Atlas. This specific problem required the intervention of the Legal Office and the Intellectual Property and Technology Transfer Unit of JRC.

The Calendar of LAC soils was a first, intermediate result and a mean to test the activity of the working group. It was also a useful tool for raising awareness on soil in South America. The preparation of the Atlas was obviously much more complex, and caused a selection within the initial group of authors. In fact a limited number of them showed high and constant commitment, punctuality in the preparation and deliver of the requested material (geographic data, texts, photo, illustrations, etc.).

1. The first result was the compilation of the "Soil Atlas of Latin America and Caribbean". The preparation of the atlas, due also to some technical and legal problem, required more time than what it was scheduled. Contrary to our expectations, most of the contributions were provided by a restricted group of experts, very committed to the project, while for the vast majority of the authors, it was necessary to send continuous reminders, and the quantity and quality of the material produced was not extremely high. Due to this lack of contributions we had to contact other authors, or in many cases, produce internally the

material required (texts, illustrations, etc.), or collect from other sources (photos).

2. The second result was the establishment of the Latin American Soil Bureau Network As described already above, the Latin America and Caribbean Soil Bureau Network has been formally established during the meeting held in Rio in July 2010, and a second meeting took place in Mar del Plata (April 2012), in the occasion of the XIX Congress of Latin American Soil Science Societies. As training activity organized and promoted by the Network, with the financial support of FAO, during the Meeting in Mar del Plata it was organized a first workshop on digital soil mapping; a second and a third workshop on the same topic were organized respectively in Cali (July 2012), and in Rio de Janeiro (September 2012). For the prosecution of the activities and the exchange of information among the members of the network, the Soil Action of JRC made available a dedicated Web Portal.

3. The third result was the establishment of the Latin American Soil Portal. A dedicated web page, within the European Soil Portal (http://eusoils.jrc.ec.europa.eu/), was prepared since the beginning of the project. Starting from the end of May 2013 a dedicated Web Portal, accessible via European Soil Portal, was prepared. The Portal have one initial, main section, dealing with the description of EUROCLIMA project, and three sub-sections dedicated to the calendar, to the Atlas and one dedicated to the activities of the Latin American Soil Bureau Network. The website serves also as a vehicle to promote the activities of the European Soil Bureau Network. Spatial data collection and processing within this infrastructure is performed according to emerging ideas behind the INSPIRE (Infrastructure for Spatial Information in Europe) initiative. The European Soil Portal contains currently many soil data and information; most of the offered data are at European scale, while, when possible, links to national or global datasets are provided. With the term "Soil Dataset", we refer to all digital resources grouped in data, **maps** and application/services. The following resources are available:

- Data: presents an inventory of and access to the soil data that the JRC is currently holding. Some of the data found through the catalogue can also be found in other sections of the Soil Portal
- Maps: presents a library of scanned maps and a collection of prepared maps derived from the existing soil databases at JRC
- Applications/services: offers the user the possibility to interact on-line with many of the data held in soil related databases at JRC

5.2.3. Fulfilment of Objectively Verifiable Indicators

In the table reported below, for each of the actions and the expected products/outcomes indicated in the Technical Annex, the "objectively verifiable indicators" and the results achieved are listed.

Activities	Objectively Verifiable Indicators	Results
RESULT 1: Compilation of the "Soil Atlas of Latin America and Caribbean"		
Collection, updating and harmonization of the existing soil geographic database for LAC	Improvement in the thematic/geographical accuracy of soil data available for LAC	Soil Geographic Databases at national level, integrated in the existing version 2.0 of Soterlac have been provided by the following countries: Cuba, USA (Porto Rico), Mexico, Guatemala, Panama, Costa Rica, Colombia, Venezuela, Peru', Ecuador, Brazil, Uruguay, Argentina.
Collection of contributions for the compilation of the Atlas.	Compilation and publication of the Atlas	Publication of the Calendar and of the Atlas. Collection of contributions from more than 80 authors for the texts, and more than 70 authors for photos and illustrations.
RESULT 2: Establishment of the Latin American Soil Bureau Network		
Kick-off and organization of meetings of the Latin American Soil Bureau Network	Number of experts/institutions involved in the network	Up to now 71 soil experts from 19 LAC countries have been involved in the Networks
RESULT 3: Establishment of the Latin American Soil Portal		
Development and establishment of a Latin American Soil Portal	Establishment of the Portal	Use and access to the portal. The portal was established recently and for this reason we do not have any significant statistic on the number of access.

5.2.4. Conclusions, recommendations, good practices and lessons learnt

All the activities to be developed by the Soil action by the end of EUROCLIMA project (considering the six months extension) are ongoing and are expected to be finished in due time.

The first activity proposed in the Technical Annex of the EUROCLIMA 2010-2012 is the Compilation of the "Soil Atlas of Latin America and Caribbean", following the successful series including the Soil Atlas of Europe, the Atlas of Northern Circumpolar Soil and the Soil Atlas of Africa. As a intermediate product, at the beginning of 2012 the Calendar of Soils of LAC has been produced.

Another activity was related to the establishment of the Latin American Soil Bureau Network, on the same participatory model already successfully implemented in Europe (http://eusoils.jrc.ec.europa.eu/esbn/Esbn_history.html) and currently in development in Africa.

A third activity is the establishment of the Latin American Soil Portal, on the model of the European Soil Portal (http://eusoils.jrc.ec.europa.eu/)

The activities of the Soil action within the EUROCLIMA Project started with the kick off meeting of the project, held in Rio de Janeiro in 2010. The preparation of this meeting, the creation of a network of contacts with the soil science community of LAC, was quite long a delicate process. In fact, despite the availability at the beginning of the Project of a list of official contact point for every state, it appear immediately evident that the owner of the soil information were in several case, other actors. In many case the soil information is produced by different organization, from the governmental bodies, to the universities, to the local communities, etc.
For the future it should be probably foreseen the organization of a nested network, similar to the European Soil Bureau Network, or the EIONET. Adopting such type of

organization will allows to have a contact (or focal) point in every states, that in turn is connected with all the relevant actors producing, managing and using soil information.
The actual structure of the LAC Bureau Network, is still too heterogeneous and incomplete.
One possible solution in order to keep vital and active the Network, will be the creation of a web page and a newsletter to keep the contact among participants. This activity however, should be in charge of LAC members, and eventually based on the continental or international organization, such as SLCS, CIAT, FAO. It should be probably avoided the leadership of one country or national based organization, in order to avoid conflicts.

Production of the soil atlas is a challenging activity although steady progress is being achieved. The recent experience demonstrate that, despite the commitments of the authors and of the members of the Editorial Board, a continue effort in having a daily contact is required to make the complex organization working properly. Even with this effort, some defection is unavoidable.

Rio de Janeiro (kick off meeting)

Even if within the soil science community several contacts and relationships between experts were already in place, the kick-off meeting in Rio allows to enlarge this network and to formally launch the RED. The meeting in Rio had the wider participation, with 59 people attending.

Ispra meeting

One year after the kick-off meeting it was organized in Ispra (and in Varese) a global event of the EUROCLIMA project. Participation for the soil component was limited to the members of the Editorial Board of the Atlas, however thanks to the participation of the experts of the other component of the project (drought, water, agriculture, biofuels), it has been possible to have a real multidisciplinary meeting, allowing the establishment of networks with other LAC experts.
This meeting was extremely important also in order to define the structure of the Atlas and to define the attribution of tasks.

Mar del Plata

In Mar del Plata we had to check the status of the previously planned activities and unfortunately we realize that most of them were much behind the scheduled program. Being the preparation of the Atlas based on volunteering activities and contributions, it is not possible to force the participants to deliver texts, images and data, but only to commit them with a continuous networking activity. Despite the effort spent in the previous months to ensure a continuous exchange of information among the participants and the contributors of the project, several of them weren't able to respect the deadline fixed in the previous meeting. As a consequence of this in Mar del Plata it was decided to establish definitive deadlines for the delivering of the requested material (texts, photos, images, data, cartography, etc.), and to exclude from the project people who fail in respecting those deadlines.

In this meeting the table of content of the Atlas was also revised, together with the attribution of tasks.

Participation to the Conference in Mar del Plata was very useful in order to establish additional scientific contacts. Later was proved that those were extremely important for providing contributions for specific aspects of the Atlas.
The organization of this meeting in occasion of the XIX Congress of Latin America Soil Science Societies, allowed to meet the most relevant scientists and experts of soil science in Latin America.

Capacity building in LAC was enhanced through training course organized by the JRC in digital soil mapping, and this act as catalyst for the following activities and training on the same topic, organized by Embrapa and CIAT, thanks to the financial contribution of FAO.

Within this project we started a very promising activity, aimed to the collection and harmonization of the soil geographic databases existing within LAC. This exercise was far to be complete and exhaustive, due to its technical complexity, and the time constraint of the project. However a positive feedback was registered with soil experts

of several states, allowing to build the basic structure of a possible update of the Soil Information System at continental scale.

The most important result was not the exchange of data and information itself, but the network that was created and the positive and collaborative spirit of this exercise. Several obstacles remain to be solved in order to reach a complete and global update of soil information for LAC, but those are mainly related to the intellectual property right issues, and to the possible strategic value of soil information.

Recommendations

The SOIL Action of the JRC is defining the procedures for maintaining operational the Latin American Soil Bureau Network (RED). To do this the JRC recommends that:
The RED should be co-coordinated by LA or international institutions (e.g. CIAT, SLCS, FAO) with the external support of JRC. It should be probably avoided the leadership of one country or national based organization, in order to avoid conflicts.
The establishment of the Latin American Soil Portal, and a newsletter to keep the contact among participants.

In order to fully exploit the potential of awareness raising of the Atlas, this book should be not only translated in Portuguese and English, but also made available to a wider audience through the web, also using the latest approaches of eBooks and digital publishing

The effort made in updating the actual soil maps of Latin America and Caribbean (represented by Soterlac V.2.0), should be continued by the Latin American Soil Bureau Network, with the catalyst action of JRC, and possibly within the frame of international activities, such as the Global Soil Partnership (FAO), or the Global Soil Map project.

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5.3. AGRI4CAST ACTION

5.3.1. Main results and products

Summary

In the face of projected changes in climate, the long-term sustainability of agro-ecosystems and associated livelihoods is unattainable without the development of adaptation strategies that incorporate enhanced environmental, social, and economic resilience. Robust and quantitative assessment tools that estimate climate change risks and vulnerabilities, and a range of adaptation actions for a portfolio of development projects are crucial to decision-makers, from stakeholders to policy advisors, in the context of assessing trade-offs and synergies and priorities for resource allocation at macro and micro scales.

The objective of this activity has been to provide a common platform for sharing and further developing data and model tools that can be used by Latin American institutions as a basis to test, assess and develop science-based questions relevant to climate change impact and risk response strategies in the region.

To respond to this objective, this project delivers a realization of the BioMA (Biophysical Models Applications) platform for Latin America, dedicated to enable the analysis of the impact of climate change on agricultural production. BioMA is an extensible platform for running biophysical models on generic spatial units. It is based on discrete conceptual units codified in software components (both for simulation engines and user's interface). The guidelines followed during its development aim at maximizing: (1) expansion and adaptation with new modelling solutions; (2) ease of customization in new environments and (3) ease of deployment (at national and local research and academic facilities). Simulations are carried out via modelling solutions, which are discrete simulation engines where different models are selected and integrated in order to carry out simulations for a specific goal. Each modelling solution makes use of extensible components. BioMA can be extended autonomously by third parties by adding new modelling solutions, making use of components already used by the application or using new ones. Customers of this platform may access data, modelling tools (operable via web and desktop applications), and results, to be used in their own

projects, seamlessly integrating other data layers and autonomously extending model tools and data layers.

Beyond the actual deployment of the BioMA platform for Latin America (schematically represented in Figure 1), the contribution of the AGRI4CAST action within the EUROCLIMA project is articulated around two specific results:

- A consolidated and geo-referenced dataset over the entire continent with data layers including crop masks, soil properties and weather (under both past and future climates), that can be used to realize crop simulations.
- A continental scale demonstration exercise of the capacity to use this dataset with the BioMA platform to calculate agro-climatic indices and perform crop yield simulations under future climate conditions. This required implementing specific modelling solutions to model crop growth and calculating agro-climatic indices that can be used for short to medium-term climate change impact and response analysis.

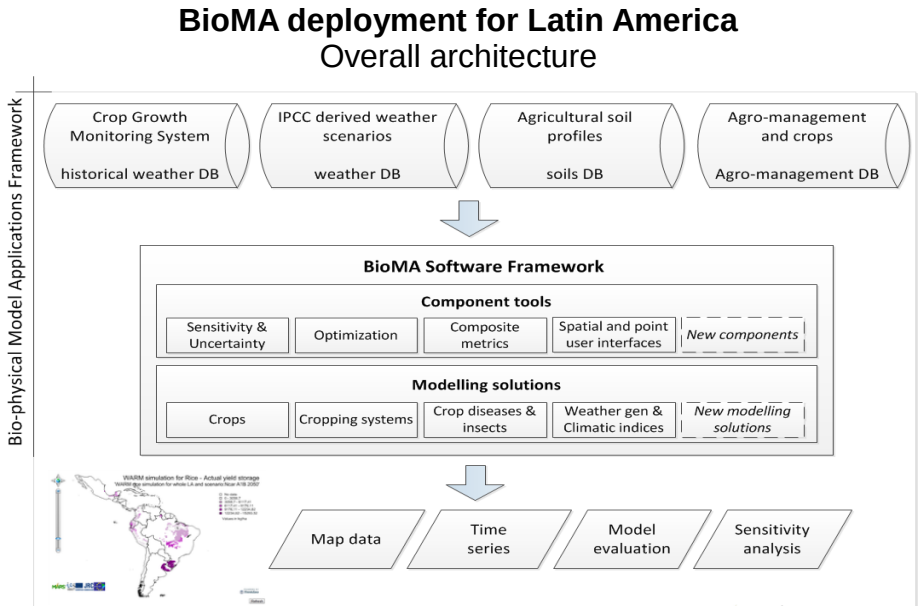

Figure 1 Schematic overview of the overall architecture of the BioMA platform deployment for Latin America.

In addition, a set of comprehensive web resources has been compiled explaining in greater detail how these results have been achieved. These also include information of how to visualize the data, and how to download, install and use the BioMA platform.

Further outcomes include capacity building and technology transfer outcomes with 3 dedicated training and information workshops realized within the project.

Result 1[1]: Development of a consistent agro-climatic database

The first step to use BioMA was to create a consistent land resource database capable to serve as inputs for performing climate change impact analyses. The types of data layers come in three categories: crop mask layers, soil information and weather data.

Crop masks

The crops considered within the study are maize, wheat, soybean and rice. These are fundamental crops to both food security and economic trade for Latin America and globally. Crop masks for maize, wheat, soybean and rice were derived from the SAGE Center for Sustainability and the Global Environment – Nelson Institute of Environmental Studies, University of Wisconsin-Madison (SAGE, http://www.sage.wisc.edu/index.html). These maps provide an estimated percentage of crop presence at a 5 min by 5 min grid scale (~10 by 10 km) and are described by Monfreda et al. (2008).

Soil data

The soil data set (Hoogenboom et al., 2009) is derived from the updated version of the "World Inventory of Soil Emission Potentials" (WISE version 1.1, Batjes, 2002). The WISE 1.1 database was created to provide a basic set of uniform soil data for a wide range of global and regional environmental studies (e.g., agro-ecological zoning and assessments of crop production). It is important to note that for crop growth modelling limited to soil water (and not considering any nitrogen modelling), the simulation are sensitive to basic soil parameters derived from texture, and soil depth, as they determine the hydraulic (water flow) characteristics. In other terms, while a more detailed database that would better represent actual soil depths and per cent of presence in a given cell could improve the representativeness of simulations for that cell, the differences in the output would not differ markedly except for extremely shallow soils.

[1] Which was denoted RESULT II.i in the Administrative Arrangement

Weather data:

For the weather, two separate issues must be done: (1) obtaining a consistent historical dataset over the entire continent and (2) generating future weather under different climate change projections. A schematic representation of the steps taken to produce this weather data is presented in Figure 2.

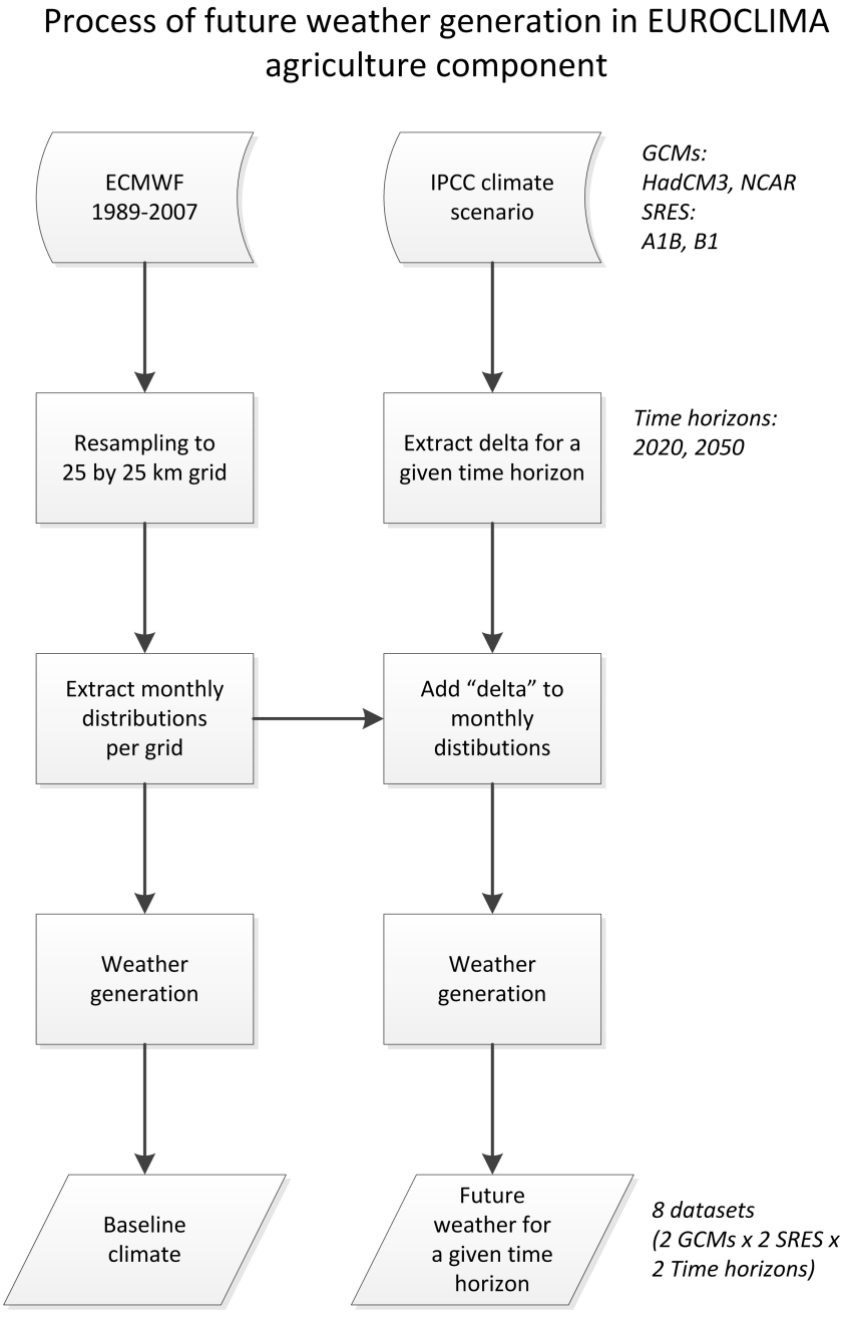

Figure 2. Flowchart of the steps taken to generate the weather datasets

The historical dataset that was chosen is that produced by the European Centre for Medium-Range Weather Forecasts (ECMWF), an intergovernmental organization

supported by thirty-two countries. Among the main activities carried out by ECMWF, the re-analysis of multi-decadal series of past observations plays a major role. Data used within this project come from the ECMWF ERA-Interim, which is a global reanalysis of the data-rich period since 1989 (http://www.ecmwf.int/research/era/do/get/era-interim). For the present purposes, the ERA-Interim data were re-sampled to 0.25 degree grid cells (25 km at the horizon). Available variables are average surface air temperature, maximum and minimum surface air temperature, precipitation, evapotranspiration (over water, bare soil, and based on the Penman-Monteith method), global solar radiation, snow depth, average wind speed, and water vapor pressure. Other variables, including hourly values, are derived using the CLIMA libraries (Donatelli et al., 2009; Bregaglio et al., 2011).

Future weather time series are generated based on a statistical analysis combining the "observed" historical weather time series of ECMWF ERA-Interim data and future climate change projections obtained from global circulation models (GCMs). Two different GCMs employed in the IPCC Fourth Assessment Report (AR4) are here used: Hadley3 (Gordon et al., 2000) and NCAR (Collins et al., 2004). For each, two different climate projections are used, each based on a different SRES (Special Report on Emission Scenarios, Nakićenović et al. 2000) considered in the AR4, namely A1B (business as usual) and B1 (rapid changes in the economic structure that reduces material and carbon intensity, introducing clean and resource-efficient technologies). Without being the most extreme, the two emission scenarios selected represent most of the range of projected increase of temperate in the coming decades. Finally, two different time horizons have been considered, 2020 and 2050, and results based on these data are to be compared with those obtained with a baseline running from 1989 to 2007. Examples of the obtained datasets can be found in Figure 3.

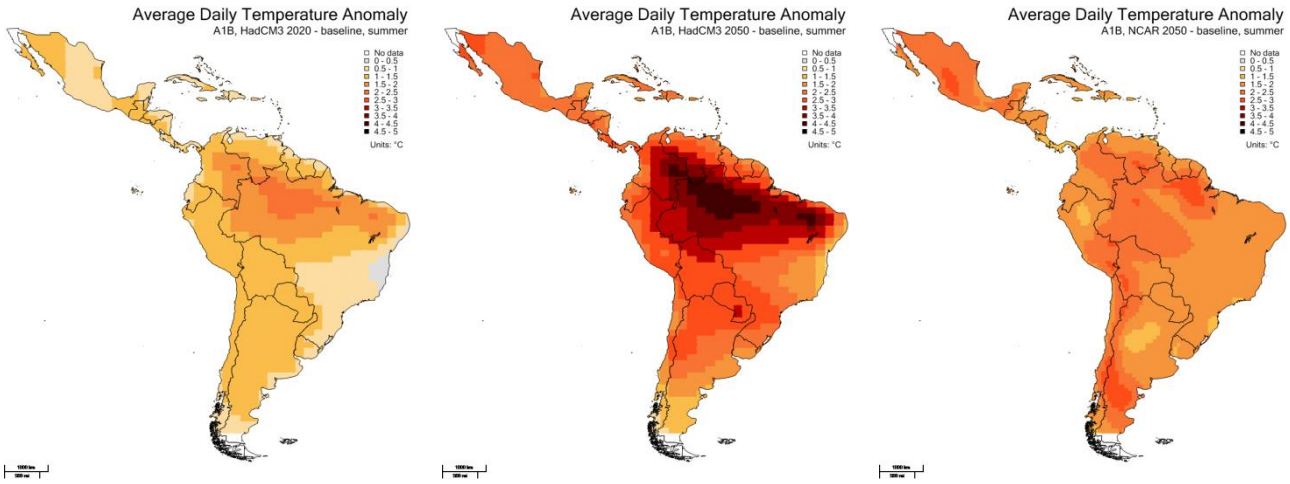

Figure 3 Example of generated weather for future climate: average daily temperature anomalies in summer between future weather (under a A1B emission scenario) and the baseline. From left to right, the maps display results for (1) the 2020 and (2) 2050 time horizon using the HadCM3 global circulation model, and (3) the 2050 time horizon with another model, namely NCAR.

Result 2[2]: Demonstration of BioMA for Latin America

The demonstration of BioMA was realized by implementing and running, over the entire continent, three different modelling solutions. The first calculates a vast array of basic agro-climatic indices that can serve to indicate how the climate is changing. The other two modelling solutions consist of two different crop growth models that have been used to simulate changes in yield for four major crops.

Agro-climatic indices

The ClimIndices software package (Confalonieri et al. 2010) was implemented within BioMA to calculate agro-climatic indices. This modelling solution contains a large collection of indices grouped into 6 broad categories of dates, counts, thermal sums, water, waves and indices (see online help of the package for more information: http://www.apesimulator.org/public/downloads/climindices/climindices.asp).

With this modelling solution, two different demonstrations were done. First, to illustrate all the possible indicators available in ClimIndices, the entire set of indicators was applied on a single scenario and considering a single yearly time window. This was done for the NCAR A1B scenario at the 2020, 2050 and baseline time horizons. They can be

[2] Which was denoted RESULT II.ii in the Administrative Arrangement

visualized from the AGRI4CAST EUROCLIMA and displayed either for a single year or as a combination of multiple years within a multi-annual period. It must be noted that this dataset is a broad overview with an essentially illustrative purpose. Several indicators have only a limited meaning when considered over the entire continent and with a yearly time window.

A finer assessment was also done for two specific indices that where calculated over finer temporal windows and for all available combinations of weather data (2 GCMs, 2 emission scenarios and 2 time horizons), all compared with their respective baselines. The first is an aridity index, computed based on precipitation and evapotranspiration, and is defined as:

$$AridityIndex = \frac{\sum rain - \sum ET_0}{\sum rain + \sum ET_0}$$

Positive values indicate water availability in theory greater than demand; 0 indicates that rainfall and evapotranspiration balance. It has been calculated under a monthly and a seasonal basis, i.e. for the 3 main months corresponding to the austral season of winter, spring, summer and autumn. Figure 4 illustrates the monthly differences of the Aridity Index for one dataset (a combination of emission scenario, GCM and time horizon) with respect to the common baseline. Such information can serve make an assessment of how the impacts of climate change are different depending on the season.

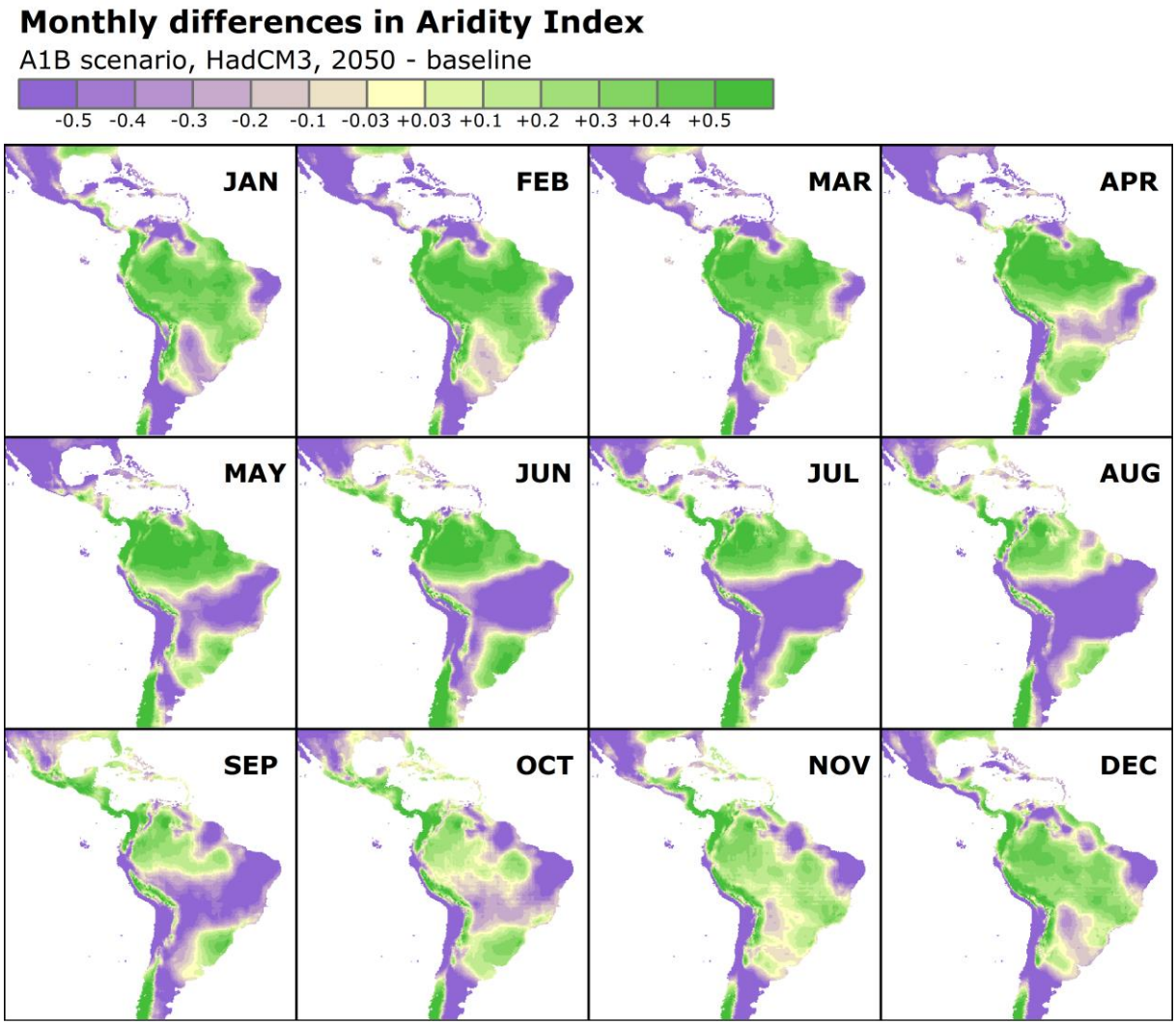

Figure 4. Evolution of the monthly difference in Aridity Index between conditions in 2050 under a A1B scenario, as simulated by the HadCM3 global circulation model, and the baseline (1989-2007). Areas in purple indicate an increase in aridity while green areas represent places where there is more water availability than what is evapotranspirated.

The second index is cumulated temperature, which is calculated over a given period from t1 to t2, based on maximum and minimum temperatures, with a base temperature as a reference, as follows:

$$tt = \sum_{i=t_1}^{t_2} \left[\frac{(T_{max,i} + T_{min,i})}{2} - T_{base} \right]$$

The index was calculated for the same periods as the Aridity index (austral seasons, and at monthly time steps) and using two different base temperatures, either Tbase = 0°C or 10°C.

Crop growth simulation

The second demonstration exercise consists in running crop growth simulations for four different crops (wheat, soybean, maize and rice) under future climate conditions using the weather database generated in this project (AGRI4CAST result 1). The crop models used are CropSyst (Stöckle et al. 2002) for soybean, maize and wheat and WARM (Confalonieri et al. 2009) for rice, each consisting in a different modelling solution implemented in the BioMA for Latin America platform.

This analysis was done in synergy with the Agro Zones Simulator (AZS) project, a World Bank project in which AGRI4CAST was also involved and that aimed at making climate change impacts on agriculture for Latin America. Given the compatible goals of, in the one hand for EUROCLIMA, to generate the future weather, implement the models in a platform and demonstrate its use, and on the other hand for AZS, to make a detailed study on climate change, efforts were combined in this crop simulation exercise. In essence, the WorldBank with its AZS project became the first customer of the BioMA platform for Latin America.

The aim is to assess changes in yield between baseline and future time horizons for various production levels (potential yield, water-limited yield and yield limited by diseases). In a second step, several adaptation strategies were explored by: (1) changing the crop varieties considered with respect to crop cycle length (early vs. late maturing varieties), (2) modulating the planting dates and (3) altering the rules defined for using irrigation.

A preliminary step required to perform this work included doing a relative model calibration on some key areas based on parameters obtained from a literature review. The crop calendars and agro-management rules had also to be established to obtain realistic simulations. For this calibration purpose, different areas were chosen for each crop, aiming at simulating crop development and growth:

(i) in the grid cells where the fraction of crop coverage is highest and
(ii) trying to maximize the spatial heterogeneity in terms of latitude and climatic conditions.

The selected areas for the four crops are circled in Figure 5. For each area, six grid cells were extracted from the climate database with weather series of ten years (1990-1999). Before running the modelling solutions, the meteorological files were analyzed in order to obtain information about the climatic variability of these sample cells. Then, an extensive literature review was undertaken in order to understand the agricultural management practices in the selected areas, in order to acquire knowledge about mean values of yield, leaf area index, sowing and harvest dates for each simulated crop. For more details on this calibration procedure, the reader is redirected to the website.

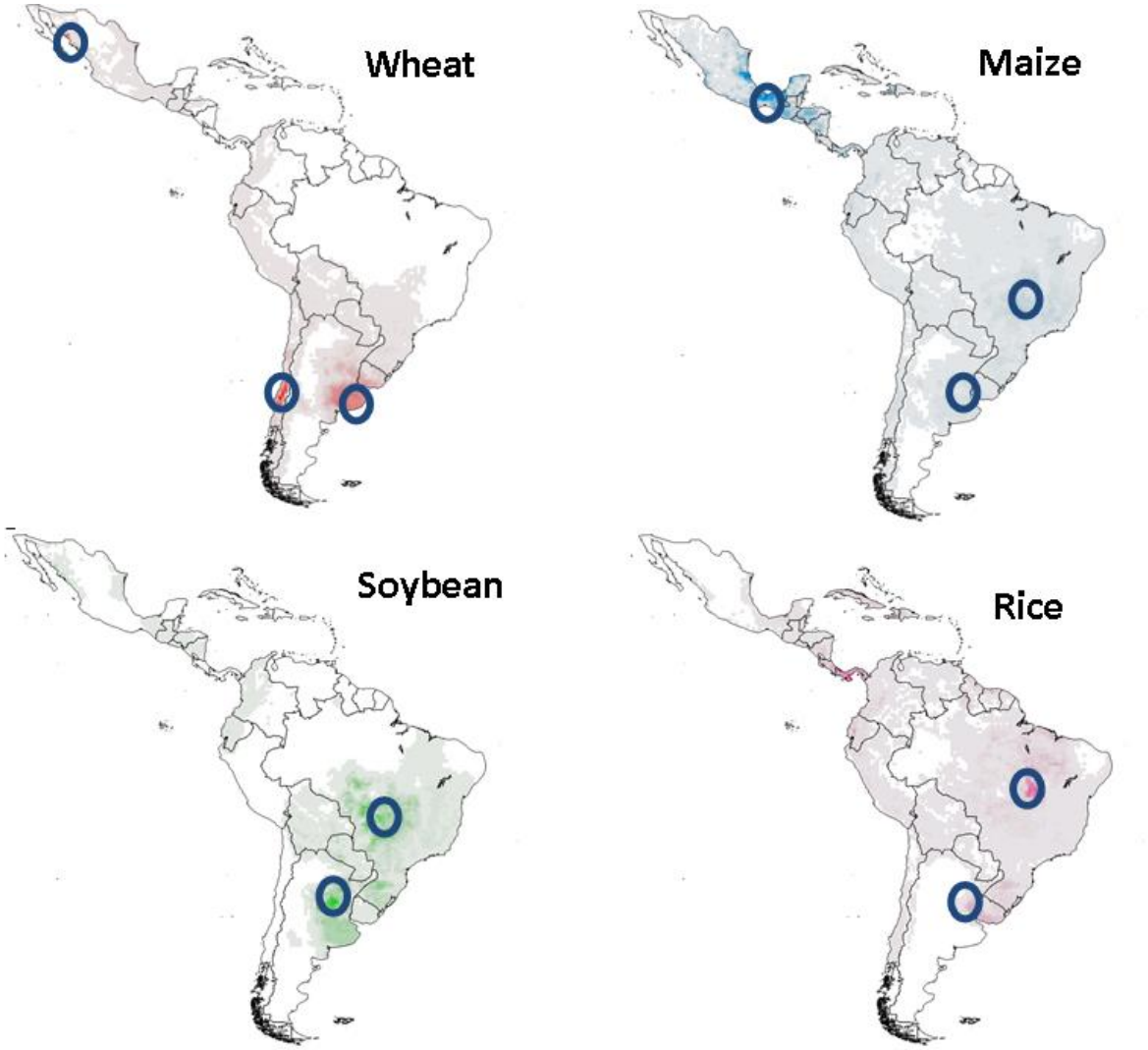

Figure 5. Areas over which the model calibration were focused for each crop.

An example of the results is shown in Figure 6 in which potential yields without any adaptation are displayed. For more maps covering the other conditions explored, the reader is redirected to the website (http://agri4cast.jrc.ec.europa.eu/euroclima/), while

a more detailed description of the outcomes of this study can be found in the documents realized within the AZS project and which are cited further under publications.

It should be emphasized that the exercise in the context of EUROCLIMA is destined primarily for illustration purposes. The greater objective of this EUROCLIMA component was to make the BioMA platform available to Latin American users so that they can complement and extend it in order to make finer simulations and impact assessments analyses based on their better knowledge of local to regional conditions.

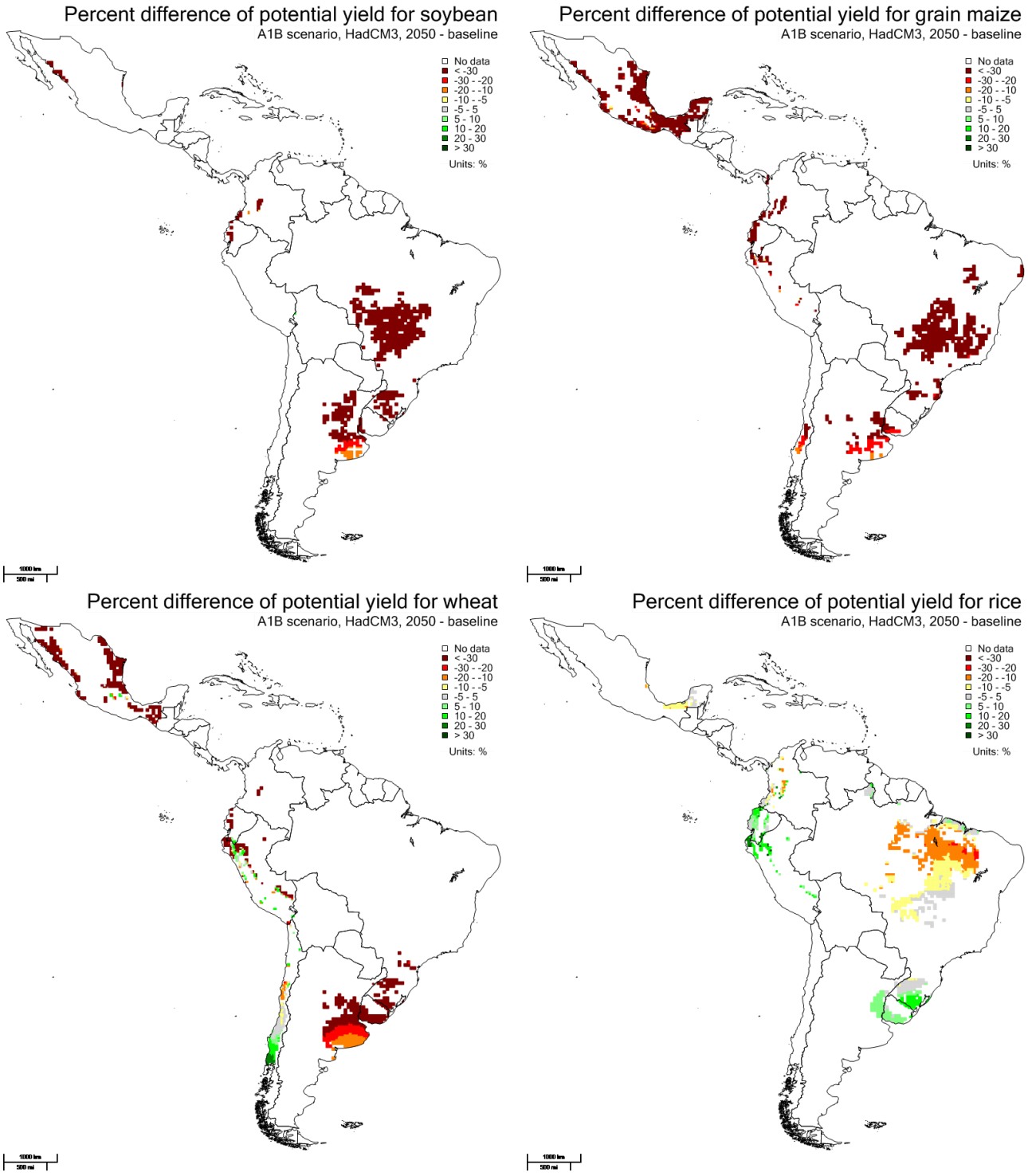

Figure 6 Examples of estimated future change in yield realized with the BioMA platform. In this case, the percentage yield change for four crops (soybean, maize, wheat and rice) is displayed between the time horizon 2050 and the baseline (1989-2007) under the A1B emission scenario as modelled by the HadCM3 global circulation model of the IPCC AR4. No adaptation strategies have been considered in this case.

Documentation and web resources

Beyond the specific results of the AGRI4CAST component of EUROCLIMA, another output is the dedicated website (see Figure 7 http://agri4cast.jrc.ec.europa.eu/euroclima/) where the reader can find much information regarding the BioMA platform, the consolidated input datasets and the crop model runs. More information of the general BioMA packages and ongoing developments, help guides and downloads is available from the general BioMA website (http://bioma.jrc.ec.europa.eu/)

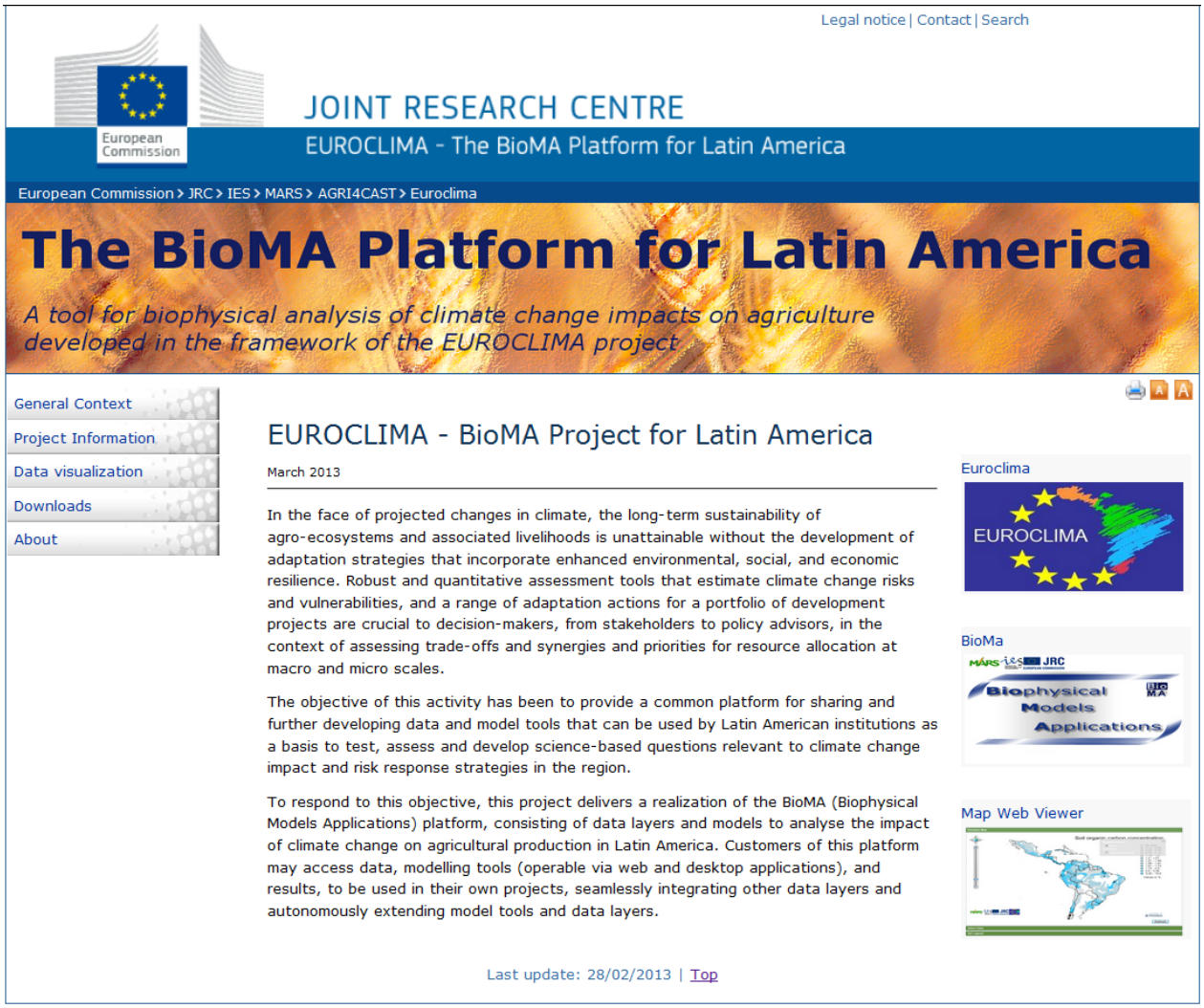

Figure 7 Webpage of the EUROCLIMA agri4cast contribution (http://agri4cast.jrc.ec.europa.eu/euroclima/)

Engagement of Latin American partners

In the framework of this project, a strong collaboration was possible with the World Bank under a project they financed, which is called Agro Zones Simulator (AZS) and which aimed at making climate change impacts on agriculture for Latin America. In essence, the WorldBank with its AZS project became the first customer of the BioMA platform for Latin America.

There has been a solid collaboration with the Instituto Nacional de Tecnología Agropecuaria (INTA) of Argentina during the whole extent of the project. INTA was a valuable partner to give feedback and advice from the biophysical modelling point of view, but also to help and co-organise the first and third workshops realized within the project.

Positive contacts have been established with institutions from Brazil (namely EMBRAPA and UNICAMP) and Uruguay (INIA) who have expressed strong interest in the results of the projects and who assisted to the third Agri4cast EUROCLIMA workshop in Buenos Aires in March 2013. The International Centre for Tropical Agriculture (CIAT) based in Colombia has also expressed strong interest in the BioMA platform. They were already indirectly involved by being in the steering committee of the AZS project and plan to attend and contribute to the third EUROCLIMA workshop.

Publications (cf. Annexe 6.4)

- M. Donatelli, G. Duveiller, S. Niemeyer (2011). The EUROCLIMA Agriculture component. Poster presented at the COP2011 in Durban.
- R. Confalonieri, M. Donatelli, S. Bregaglio, F.N. Tubiello, E. Fernandes (2012). Agroecological Zones Simulator (AZS): A component based, open-access, transparent platform for climate change – Crop productivity impact assessment in Latin America. In: R. Seppelt, A.A. Voinov, S. Lange, D. Bankamp (Eds.) International Environmental Modelling and Software Society (iEMSs) 2012 International Congress on Environmental Modelling and Software. Managing Resources of a Limited Planet, Sixth Biennial Meeting, Leipzig, Germany. 8 pp.

- E. Fernandes, A. Soliman, R. Confalonieri, M. Donatelli, F. Tubiello. (2013) Climate Change and Agriculture in Latin America, 2020-2050: Projected Impacts and Response to Adaptation Strategies. Directions in Development. World Bank Report. Published July 1, 2013 by World Bank. ISBN: 978-0-8213-9653-7; SKU: 19653. 88 pp.

Capacity Building

Capacity building and technology transfer were addressed within the three information and training workshops planned within the timeframe of the project (cf. Annexe 6.5.). Beyond these workshops, it is expected that the final website and the resources made available online will foster autonomous capacity building by third parties.

The first workshop was held in Buenos Aires, Argentina, on 25-26 October 2010. It was co-organized with INTA. This first meeting had two objectives: i) present the specific action to potential Latin America partners, ii) establish a link with technical stakeholders. Around 15 participants from 4 different countries were present.

The second workshop was organized within the AgMIP international symposium, held in Campinas, Brazil, on 1-5 August, 2011. This meeting had an international attendance with over 70 participants from around the world. The EUROCLIMA contribution had first an informative purpose, but also included a dedicated interactive session to illustrate the code behind BioMA, and how to build upon it to make new modelling solutions.

The third and final workshop was held in Buenos Aires, Argentina, on 5-6 March 2013. Around 15 participants from 4 different Latin American countries participated to learn what has been done within EUROCLIMA, but also to have a small training on how to use BioMA. A survey of satisfaction of the participants was done after the workshop. Although only 5 participants responded, their responses help to indicate future steps that could be taken in the future to make BioMA more adapted to Latin American users' needs. The questions and answers of the survey are available in the annex on the statistics of participation in the workshops/seminars.

5.3.2. Comparison between planned and achieved results

The two expected results planned in the technical annex of EUROCLIMA as the AGRI4CAST contribution were overall successfully achieved as planned.

The first result, the development of a consistent agro-climatic database, was achieved as planned. At an initial state, it was considered that the soil information for this agro-climatic database could be obtained from the results of the SOIL Action EUROCLIMA contribution. However, it was quickly realized that this could create an undesirable dependency, since the outcome of the SOIL action would arrive at the end of the project while the AGRI4CAST action needed to start work before. Therefore another source of soil data was used in the agro-climatic database in AGRI4CAST.

The second result, the BioMA demonstration by implementing and running modelling solutions for crop growth and agro-climatic indicators, was also largely achieved as planned. The only minor change was that one of the 4 example crops that were initially proposed had to be changed. The crop in question, sugarcane, required to implement an entirely different modelling solution in BioMA than the other crops (wheat, maize and soybean) because of its semi-permanent nature. The initial intention was to collaborate with Australian modelers to develop this new solution, but this proved to be unfeasible. It was therefore decided to propose rice as the fourth demonstration crop, which also required a different modelling solution, but for which past expertise in AGRI4CAST was available.

5.3.3. Fulfilment of Objectively Verifiable Indicators

The table below summarizes how the "objectively verifiable indicators" were fulfilled. It must be noted that one particular indicator, the number of web access to the dedicated web page, is more intended as a measure of the project's impact in the long run. This is because the webpage, being a final outcome of the project, was finalized and publicized only in the end of the project resulting in a relatively low number of visitors (109 form 1 November 2012 to 24 April 2013).

Activities	Objectively Verifiable Indicators	Results
RESULT 1: Development of consistent agro-climatic database (weather, soils, crop and management)		
Collection of regional datasets (climate, soil, crop calendars, field and crop management) and implementation within an agro-climatic database.	Data schemas included in the database The distribution of data to LA stakeholders via web services: number of accesses to the web pages containing the distributed data Production of crop simulation results in RESULT 2 which depend on the outcome of RESULT 1	Data layers produced as expected. They can be visualized on the web site and accessed via the BioMA platform that can be installed from the website. The crop simulation results that were produced using these data layers result in plausible results, thereby confirming the validity of the data. Number of visitors to the website from November 2012 to April 2013: 109
RESULT 2: Implementation of crop models and agro-climatic indexes for short to medium-term climate change impact and response analysis		
Calibration of crop models over LA	Simulation of crop yield results when simulating with baseline climate	The crop simulation results that were produced using this calibration yields plausible results as determined by expert knowledge.
Development and implementation of agro-climatic indices based on the collected climatic data for analysis of trends, thresholds, etc.	Generation of valid values for indices when applied to baseline climate The distribution of the indices to LA stakeholders via Web services: number of accesses to the web pages containing the distributed data	The results of the calculated indices yield plausible valid as determined by expert knowledge Number of visitors to the website from November 2012 to April 2013: 109
Crop growth simulations under future climate scenarios for a series of crops (wheat, maize, soybean, rice)	Distribution of the results of the crop simulations to the LA stakeholders via web services: number of accesses to the web pages containing the distributed data	The crop simulation results that were produced provide plausible results as determined by expert knowledge. Number of visitors to the website from November 2012 to April 2013: 109

5.3.4. Conclusions, recommendations, good practices and lessons learnt

The objective of the EUROCLIMA agriculture component was successfully reached: the BioMA platform for Latin America was developed and made available, thereby allowing the possibility to Latin American institutions to use it and extend it to tackle questions regarding climate change impact and risk for agriculture.

While the modelling platform has generated much interest by Latin American partners, their direct involvement in the conception and development of the modelling tools and runs realized within the project was limited for a simple reason of lack of time and resources. Indeed, the efforts that were done to develop of BioMA within EUROCLIMA were a prerequisite before a full interactive collaboration in new design could be envisaged. Also, for such collaboration to be successful, a good relationship needs to be established to understand mutual needs. Such relationships have been established within EUROCLIMA with some partners.

There is the hope that third parties will spontaneously start using BioMA for Latin America thanks to its free availability and online resources, the best example being the World Bank project. However, the available tools and data layers currently address the continental scale, while many institutions will likely be interested in a more local or regional scale, with a correspondingly finer granularity in both data layers and modelling solutions. Latin American institutions may currently lack the resources to invest in this next step. Therefore a clear recommendation for the future would be to finance projects in which local institutions can work in strong collaboration with institutions such as the JRC, in which both parties would receive funding to improve the current BioMA platform and develop together tailored solutions to answer the questions of local stakeholders. In this context, better calibration of all crop models could be envisaged by benefiting from local Latin American know-how. Models for new crops could be integrated, such as for sugarcane, one of the most economically important crop of Latin America. The knowledge regarding sugarcane cultivation is not currently present in JRC but readily available with Brazilian institutions for instance.

Further recommendations include a closer integration between the different JRC scientific groups that have been involved in EUROCLIMA. Now that it is finalized, the soil atlas data gathered by the soil group could be used to improve the soil information data layers necessary to run the crop growth simulations. The desertification and drought group could extend their work by applying their methods to the future weather generated within BioMA for various climate scenarios, GCMs and time horizons. The BioMA platform could also be used to perform appropriate simulations to complement the work done by the JRC EUROCLIMA groups dealing with water resources and biofuels. Further perspectives could even include combining these with an economic analysis, although such economic analysis is beyond the current competences of the JRC Agri4cast group.

If there is a demand in the future, it might be desirable that the different spatial datasets produced within JRC for EUROCLIMA (such as this soil data) could be consolidated in a single database, but this would require dedicated time and budget to harmonize it all.

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5.4. WATER RESOURCES MANAGEMENT ACTION

5.4.1. Main results and products

As defined in the EUROCLIMA Technical Annex, the objective of EUROCLIMA-Water is to establish and define standardised methodologies, information management, and data processing in the water resource sector in LAC region. Effectively, sharing data, information and methodologies in the region among the scientific and technical institutions are the first steps for establishing regional coherent analysis that will be used in a second step by the decision makers in the water sector.

Therefore, the implementation of the EUROCLIMA-Water component was oriented since the beginning to the development of scientific and capacity building activities around the Water sector in Latin America to strengthen research and technical institutions by pushing a South-to-South cooperation. Although the EUROCLIMA-Water component has a very strong link with another existing EC project in the region (The Latin American network of Knowledge Centres in the Water Sector (RALCEA)), jointly meetings were organized to create important synergies between both regional projects by identifying joint objectives, sharing activities and Latin America policy maker needs (also described in section 5.1.4). RALCEA Focal Points participated to the EUROCLIMA-Water's Kick-off meeting where the thematic Regional Water Balance was identified as a priority sector in Latin America.

Whereas the role of RALCEA is to promote scientific and technical activities at political, scientific and academia levels through seminars, workshops and online courses to directly support LA policy makers, the EUROCLIMA-Water component was more focused to reinforce scientific and technical collaboration and activities (such as for instance the development of a software to process climate data) implemented directly by LA institutions involved in the project with the support of the Joint Research Centre (JRC). RALCEA is therefore in charge of the capacity building processes needed to promote among the policy makers, disseminate and tune among other activities the use of the scientific products resulting from the EUROCLIMA-Water.

EUROCLIMA was meant to improve south to south cooperation and capacity building between research institutions, which was indeed successfully achieved throughout the engagement of Latin American institutions along the project. The work was organized following a participatory process in which all Latin American Partners were actively involved with the JRC and CAZALAC acting as coordinators. Annex 6.3 presents the name of the Latin American experts that actively participated in the implementation of the EUROCLIMA-Water.

Research and development

During the Project Kick-off meeting held in Quito (October 2010, cf. Annexe 6.5.) and the meeting held in Panama (May 2011, cf. Annexe 6.5.) participants agreed to work together towards a Regional Hydrological Balance, specifically analyzing the variability on the components that influence the Water Balance (precipitation, evapotranspiration and temperature, etc.), for improving climate knowledge. The decision of working in the variability of such component was taken in view of development complementary activities to those developed by UNESCO-PHI. This international institution has the mandate of develop and implement at regional and country levels studies about the Regional Water Balance. The analysis of the variability of the Regional Water Balance proposed by the EUROCLIMA-Water component is complementary and a concrete added-value to the UNESCO-PHI studies.

In Latin America, although most countries have good meteorological data infrastructure and excellent research institutions, a weak data sharing strategy among countries is still a barrier for improving climate knowledge. In this context, the EUROCLIMA-Water network established during the implementation of this project contributed for improving the spatial coverage of meteorological observations in Latin America. The project complemented already existing international climate observation networks, such as the Global Historical Climatology Network (GHCN) providing new information for improving climate knowledge.

Moreover, policy makers had the opportunity to have a better understanding of the variability and frequency of the precipitation which is a major contributor to the Water Balance. This parameter is fundamental for computing the availability of the fresh water and also for the development of infrastructures in the water sector in Latin America.

Because of some proprietary and copyright issues when sharing the meteorological data, the JRC proposed that every institution should process its own data, making the results available to the EUROCLIMA-Water group for joint analysis. The JRC organized a workshop in Guayaquil (Ecuador, October 2011) to process precipitation data from CAZALAC, CIIFEN, CAALCA, University of Colombia and Cuban databases together with the LA institutions mentioned in section 2.

A programming tool was developed by CAZALAC to process meteorological data using R (open source statistical software). This tool was used and improved during the different meetings and trainings organized by the project. In a later step, each Latin-American institution participating in EUROCLIMA-Water adapted the tool to their specific needs.

A number of trainings on the use of this tool were organized jointly by CAZALAC and the JRC, including a training of trainers for members of the group to be able to train other technicians in their respectively organizations Ispra (Italy, July 2011).

However during the trainings some difficulties were found when using the tool because of its complexity, oriented for people with programming skills, the need of optimization the processes, etc. Therefore, Latin American Institutions together with the RALCEA Focal Points and the JRC decided to develop the Regional Frequency analysis of Climate Variables (REFRAN-CV) software, with the purpose of facilitating data processing and avoiding having to change manually the source code.

REFRAN-CV was developed by the JRC in close collaboration with CAZALAC (Chile), CIIFEN (Equator), UNAL-IDEA (Colombia) and INSMET (Cuba).

These Latin-American institutions largely contributed to the detailed specification of the software, the design phase, the user validation phase and the in-site implementation. This is a good example of the LA international collaboration established during the EUROCLIMA project. From the definition of the different software functional elements, the JRC wrote a software specification document to capture all the specific needs and requirements from LA institutions.

The latest Open Source Software technologies were used to develop REFRAN-CV, ensuring open access to all the future LA institutions potentially interested. REFRAN-CV has as general objective to process time series of data coming from ground stations (initially precipitation and temperature) in order to generate products in the form of spatially-explicit maps (*Figure 1*). The main aspect characterizing REFRAN-CV is the use of a statistical package called L-moments to estimate the probability distribution function of climate variables. The L-moments are similar to other statistical moments, but with the advantage of being less susceptible to the presence of outliers and performing better with smaller sample sizes.

For a random variable X, the first four L-moments are given by the following equations:

$$\Lambda_1 = E[X]$$

$$\Lambda_2 = E[X_{2:2} - X_{1:2}]/2$$

$$\Lambda_3 = E[X_{3:3} - 2X_{2:3} + X_{1:3}]/3$$

$$\Lambda_4 = E[X_{4:4} - 3X_{3:4} + 3X_{2:4} - X_{1:4}]/4$$

For convenience, the second, third and fourth L-moments are often presented as L-moments ratios: $T_{2=} \Lambda_{2/} \Lambda_1$

$T_{3=} \Lambda_{3/} \Lambda_2$

$T_{4=} \Lambda_{4/} \Lambda_2$

The 1st L-moment (L-mean) is identical to the conventional statistical mean. The 2nd L-moment (L-cv) measures a variable‟s dispersion or the expected difference between two random samples. The 3rd and 4th L-moment (L-skewness and L-kurtosis) are measures relating to the shape of the samples distribution. The L-

skewness quantifies the asymmetry of the samples distribution and the L-kurtosis measures whether the samples are peaked or flat relative to a normal distribution.

The data processing is functionally divided in six modules. The outputs of each module are partially or entirely used as input for the following module. The modules are an integrated part of the software, but those can also be run independently, that is to say, the users have the possibility of running any module at any time, as long as the users have the necessary input dataset.

The REFRAN-CV software and associated documents are freely available for downloading at the AQUAKNOW web-site. (http://www.aquaknow.net/es/news/regional-frequency-analysis-climate-variables-refran-cv-software-version-10)

The Latin-American institutions used REFRAN-CV to generate regional precipitation frequency analysis maps (Return periods maps at 5, 10, 50 and 100 years). At present there are 6 national maps from Chile, Colombia, Cuba, México, Uruguay and Venezuela (*Figure 2*). In the next coming months it is expected to have 6 countries more: Perú, Honduras, Brazil, Argentina, Ecuador and Panamá as part of the work that is being carried out under RALCEA project. These return period maps are fundamental for addressing water resources management and the design of hydraulic infrastructures.

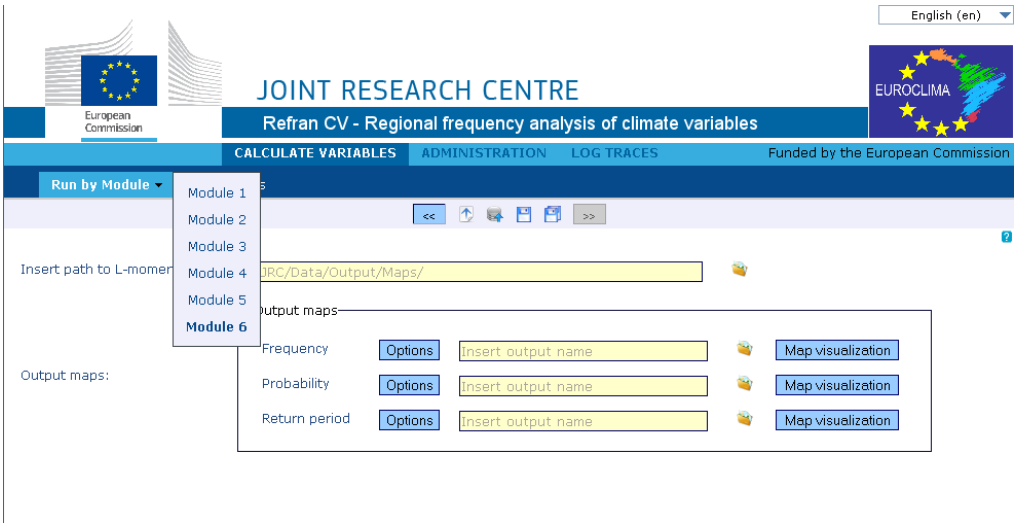

Figure Water1. Overview window for Module 6 using REFRAN CV. Frequency, Probability and Return Period maps can be generated using this module with the possibility of changing the quantil, probability factor among other parameters.

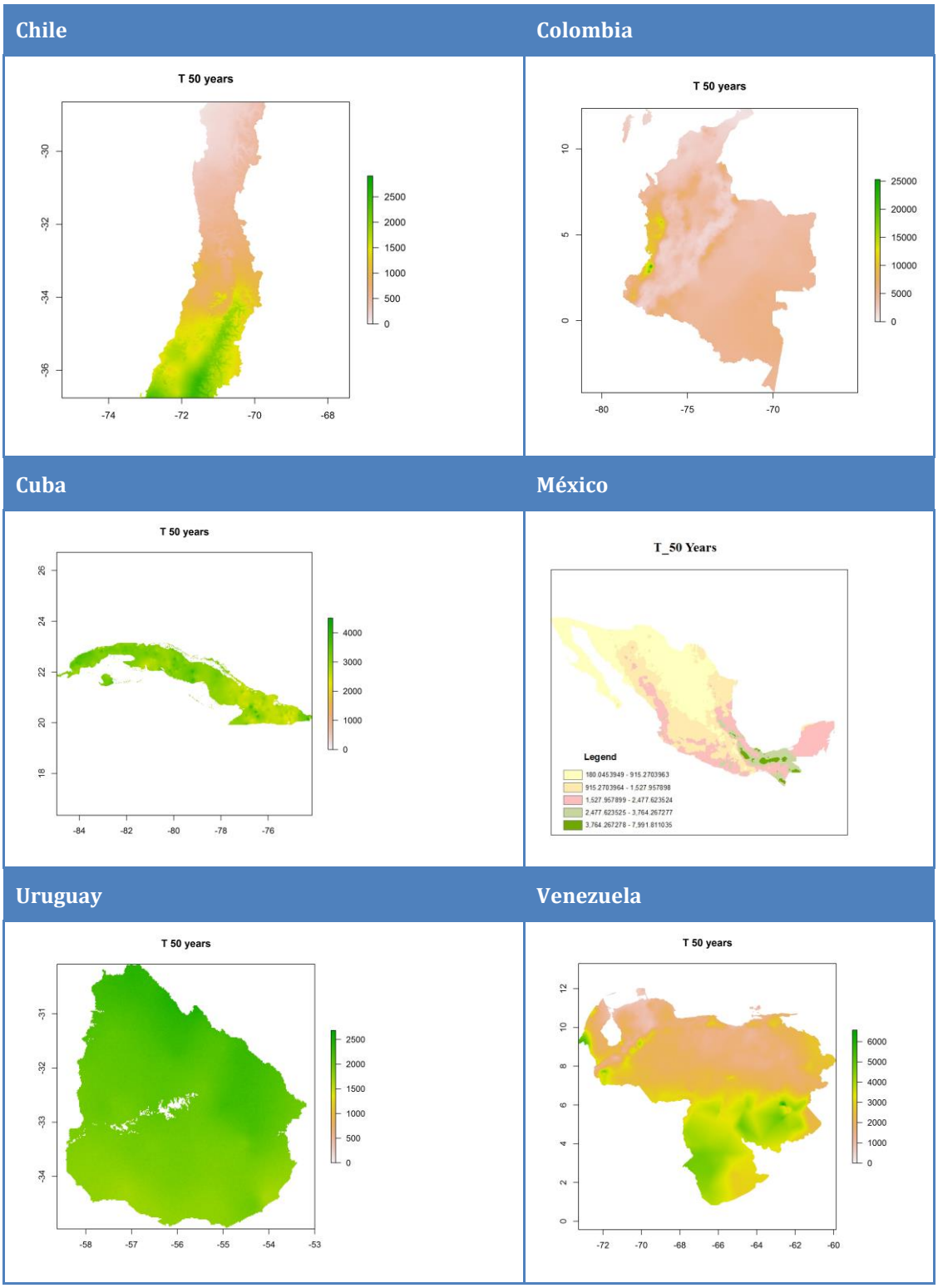

Figure Water2. Overview of 50 Years returns period maps as generated by REFRAN CV.

In addition to this, the JRC also processed the data coming from the Global Historical Climatology Network (GHCN) with the purpose of having the possibility to compare the results from the different databases. Complementarities and coherence of both

datasets can in this way be established. The number of meteorological stations coming from the LA institutions are significantly bigger (number of stations: 7412) and better spatially distributed than those stations of the GHCN (number of stations: 6487) dataset. *Figure Water2* clearly illustrates the spatial distribution of both datasets. A homogenous spatial distribution of the precipitation stations is important for computing a representative and more accurate frequency precipitation maps. The variability of this important variable will be also more representative at continental scale. Therefore, an increased number of stations at regional level will contribute to have a better model of the spatiotemporal behavior of the precipitation in the region. The GHCN dataset together with the data coming from the LA institutions participating to the EUROCLIMA-Water project has indeed the potential of contributing to a better modelization and better understanding of the precipitation variability at continental scale.

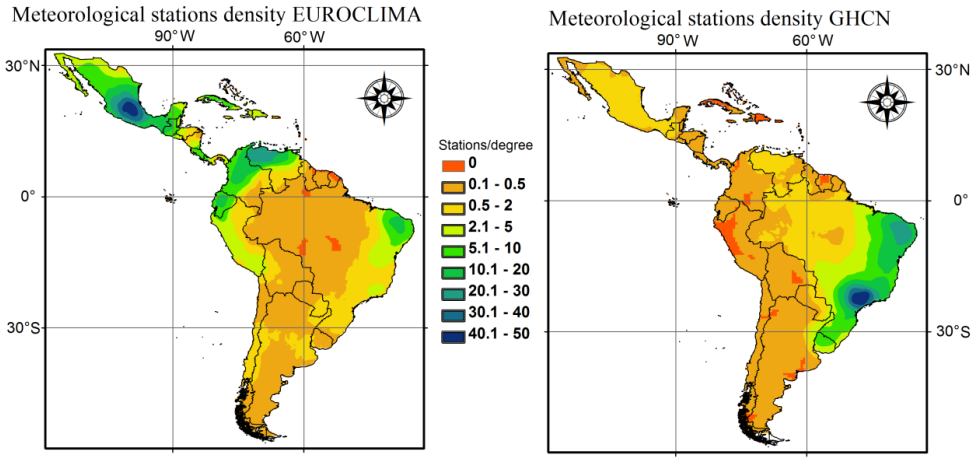

Figure Water3. Density of meteorological stations in Latin America, calculated using a radius search of 2.5 degrees.

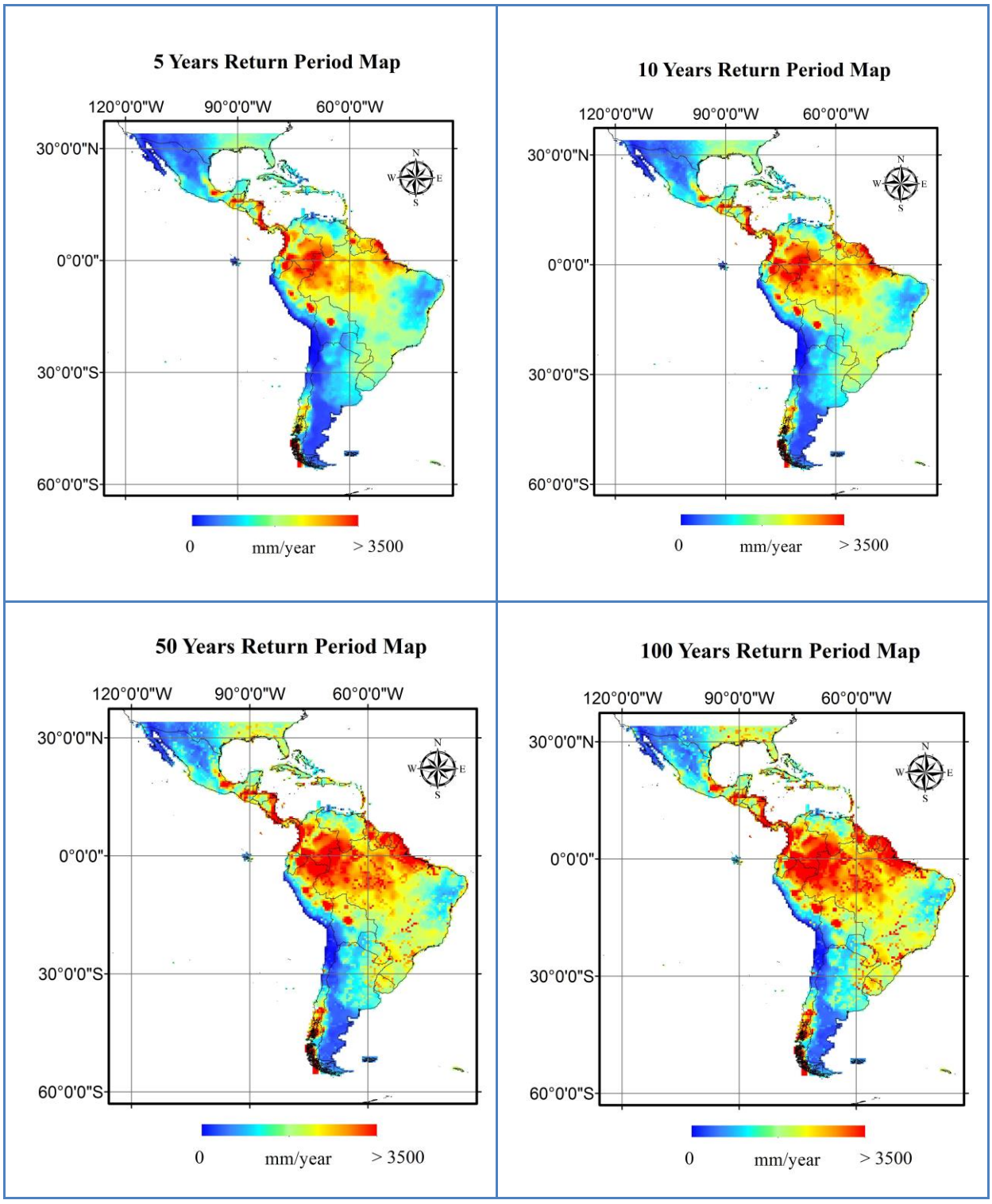

Figure Water4. Latin America Return Period Maps based on GHCN dataset.

As part of the project results a Web-based Geographic Information System (GIS) module containing data coming from the LA institutions was also developed and integrated within the Aquaknow platform (http://www.aquaknow.net/en/data/geo/wms).

This module allows non GIS users to perform common spatial operations for data analysis such as buffers, intersections, etc., facilitates geographic data sharing, and provides a database with reference layers in the water domain as well as tools for uploading data and customizing your own maps and graphs. The on-line database contains the LA Meteorological Stations provided by EUROCLIMA-Water partners.

For each station the L-moments statistics method was applied to produce a precipitation frequency analysis, as calculated during the different workshops organized throughout the project. The results can be explored and analyzed by the international scientific community thanks to the Aquaknow GIS module.

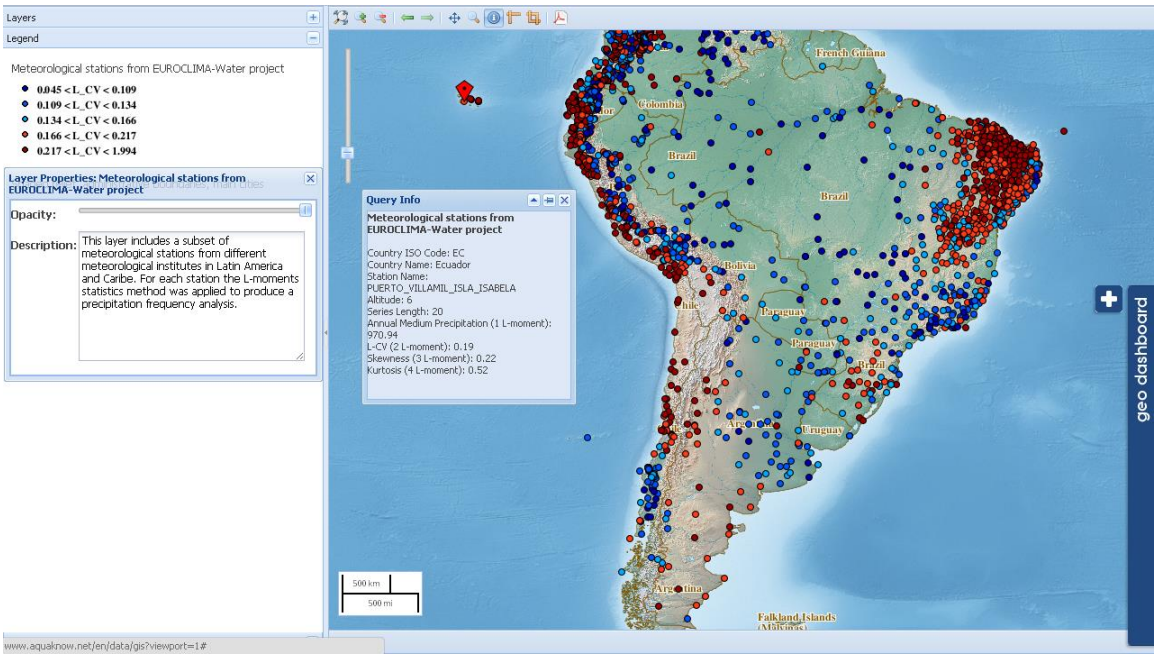

Figure Water5. Overview map showing the calculated L-moments for each LA meteorological station within the AquaKnow Map Tool.

Additionally, the work was organized virtually using the AquaKnow platform. All the documents related to EUROCLIMA-Water project have been published using the AquaKnow working group: "EUROCLIMA-Agua". The group has more than 100 members, sharing about 30 documents (http://www.aquaknow.net/en/euroclima-agua/).

Finally, the main features of AquaKnow were translated into Spanish and Portuguese to facilitate the comprehension of the platform by LA institutions.

Publications

During the project lifetime two scientific papers were published in peer reviewed journals, one abstract was presented at a Scientific International Conference and another paper is currently under preparation (cf. Annexe 6.4):

- Maeda, E.E., Arévalo, J., Carmona-Moreno, C., "Effects of time-series length and gauge network density on rainfall climatology estimates in Latin America". In: European Geosciences Union General Assembly 22-27 April, 2012, Vienna. JRC 68521. http://adsabs.harvard.edu/abs/2012EGUGA..14.4010M
- Maeda, E.E., Arévalo, J., Carmona-Moreno, C. (2012) "Characterization of global precipitation frequency through the L-moments approach". Area-Royal Geographical Society. doi: 10.1111/j.1475-4762.2012.01127.x JRC66941 http://onlinelibrary.wiley.com/doi/10.1111/j.1475-4762.2012.01127.x/abstract
- Maeda, E.E., Arévalo, J. (2012) "Open environmental data in developing countries: who benefits?" AMBIO, 41 (4) 410-412, doi: 10.1007/s13280-012-0283-4. JRC 69596. http://link.springer.com/article/10.1007%2Fs13280-012-0283-4
- Arévalo, J., Carmona-Moreno, C., Nuñez, J., Romero, C., Ycaza, P., Aroche, R., Brito., L. (2013) "Improving climate knowledge in Latin America through international cooperation." *Paper under preparation*.

List of presentations in international events during the Project (cf. Annexe 6.6.):

- COP 17- Climate Change Conference. Durban, South Africa, December 2011
- World Water Week Stockholm August 2011, 2012, 2013.
- World Water Forum Marseille, March 2012.
- COP 18 - Climate Change Conference. Doha, Qatar, December 2012.
- Green Week May, Brussels, Belgium May 2012.
- 1st International EUROCLIMA Seminar, Varese, Italy July 2011
- 2nd International EUROCLIMA Seminar, Tela, Honduras, May 2012
- Coordination meeting with UNESCO-PHI and IAI. Montevideo, Uruguay March 2013.

- EUROCLIMA-Water Final Meeting, Bogota, Colombia March 2013

Capacity Building (cf. Annexe 6.5.)

A number of training seminars on the use of the Regional Frequency Analysis methodology for computing L-moments were organized:

a. Panama City (Panama) – May 2011, 25 participants, 12 LAC countries.
b. Ispra (Italia) – July 2011, 15 participants from 12 LAC countries -> Training of Trainers.
c. Guayaquil (Ecuador) October 2011, 30 participants from 12 LAC countries -> Training LA Institutions.
d. Santiago de Chile (Chile) March 2013, 10 participants from 7 LAC countries -) Production of 7 national Maps of RFA of Precipitation.
e. On-line training courses on AquaKnow: A complete set of videos explaining how to calculate L-moments using R software: http://www.aquaknow.net/en/balance-hidrologico-regional/news/tutoriales-sobre-el-analisis-regional-de-frecuencias-basado-en-l-momentos

Training Seminars on Virtual Water Networking tool (AQUAKNOW) (cf. Annexe 6.5.):

a. Quito (Ecuador) October 2010, 35 participants, 12 LAC countries
b. Panama City (Panama) – May 2011, 25 participants, 12 LAC countries.
c. Ispra (Italia) – July 2011, 57 participants, 14 LAC countries.
d. Guayaquil (Ecuador) October 2011, 30 participants from 12 LAC countries
e. On-line Virtual Networking Tool: http://www.aquaknow.net/es

Training Seminars on the Water Project Toolkit (cf. Annexe 6.5.):

a. Quito (Ecuador) October 2010, 35 participants, 12 LAC countries
b. Panama City (Panama) – May 2011, 25 participants, 12 LAC countries.
c. Ispra (Italia) – July 2011, 57 participants, 14 LAC countries.
d. Guayaquil (Ecuador) October 2011, 30 participants from 12 LAC countries
e. On-line training course on AquaKnow: http://www.aquaknow.net/en/water-project-toolkit

5.4.2. Comparison between planned and achieved results

The expected results of the Water component according to the Technical Annex were:
Result III.i Latin America & Caribbean (LAC) Water Resources Management database.
Result III.ii Water Resources Management Monitoring System.

The following deliverables were completed on time without any delays:

Deliverables	Current Status
1. Latin America & Caribbean Working group in the AQUAKNOW.NET for on-line training courses, data, information and knowledge management tools.	Completed
2. Capacity building, data and information exchange across the AQUAKNOW.NET and LA member countries and transfer of the system to LA.	Completed
3. Scientific publications on water resources issues related with climate change in LA	Completed

Table Water2 – *List of EUROCLIMA-Water deliverables and their project status.*

5.4.3. Fulfilment of Objectively Verifiable Indicators

The indicators of the project showed that results were successfully achieved:

- The number of participants to the meeting are representative of the number of countries (average 18 participants from 12 LA average countries);
- Several international publications were prepared (2 international publications are already published in different international journals + 1 international paper is under preparation);
- REFRAN-CV, a Web-based open software tool was developed (1 software specification document published + manual). http://www.aquaknow.net/es/euroclima-agua/links/regional-frequency-analysis-climate-variables-refran-cv-software-alpha-version.
- AQUAKNOW.NET was the main tool for communication among the LA community of users;
- The LA water data base of LA experts was published at the AQUAKNOW.NET platform;

- The EC improved its visibility by getting directly involved as facilitator through the JRC and obtaining a previously unseen level of exchange of information building the most complete international database in the field.
- As a consequence of the EUROCLIMA-Water result dissemination, the Western African Centres of Excellence adopted the L-moments methodology (see section 5.4.1. "Research and Development") developed in the frame of the EUROCLIMA project for Regional Water Balance studies. Some regional capacity building and trainings have been recently organized in Abuja (Nigeria, February 2013) and Accra (Ghana, April 2013) using REFRAN-CV software.
- Specific requests from African and Neighboring countries during the EUWI coordination meeting have emerged to implement similar projects in their regions.

5.4.4. Conclusions, recommendations, good practices and lessons learnt

EUROCLIMA-Water project has been successfully implemented following a participatory planning process by ensuring full ownership of project's results by all the Latin American Institutions involved.

EUROCLIMA National Focal Points were duly informed and consulted about project progress. They had also the opportunity to actively participate in the definition of the project activities during the different Annual Regional Seminars organized in cooperation with RALCEA project.

A series of trainings, on-line courses and other capacity building activities were organized in the context of the project, by ensuring the knowledge transfer on the methodology and the software developed. Thanks to the synergies established with the RALCEA project, some of the activities of EUROCLIMA-Water were enlarged for achieving better results (i.e. the full development of the REFRAN-CV software). Other complementary efforts will be continued by the RALCEA project in the frame of the RALCEA Regional Water Balance thematic axe.

It is important to highlight that despite the difficulties of sharing meteorological data in the region, due to commercial proprietary copyright issues, EUROCLIMA-Water partners managed to put together a coherent database largely superior to the existing Global Historical Climatology Network (GHCN) database from the NOAA (USA). The GHCN is the most well-known database containing world meteorological observation stations available for the international scientific community. However a vast amount of data that is internally produced in some Latin American countries does not reach NOAA and the international community in general. Although it was not possible to publish the raw data, the publication of the EUROCLIMA results in terms of variability analysis are of great benefit to understand patterns and trends related with climate issues and generate knowledge around for example natural disasters (e.g. mapping drought frequency). Data gathered and the creation of a harmonized database also helped reducing the uncertainties related to the spatial distribution of meteorological stations and time-series length and certainly, all those aspects contribute to a better understanding of matters related to Climate Change and its effects. This is one of the strongest points showing the added value of the involvement of the European Commission in this field in LA and the success of the of the JRC participative approach.

The scientific network established by EUROCLIMA-Water has the potential of assuming a leading role in the development of climate products for Latin American. In addition to data obtained by meteorological stations, further negotiations should be carried out by the partners to incorporate other biophysical measurements to be used for calibration and validation of spatially-explicit products. These efforts should contribute to the establishment of a whole methodology for estimating the LA National Water Balances being implemented by UNESCO-PHI.

It is recommended that in the case of a second phase of the EUROCLIMA-Scientific component more emphasis should be put in developing new environmental open data and software policies, by establishing an agreement with the LA governments since the beginning of the project.

5.5. BIOENERGY ACTION

The main objective of the EUROCLIMA Bioenergy component was to develop a Scientific & Technical network of Latin American and European experts in the field of bioenergy.

Scientific and Technical networking in the field of bioenergy is essential, for Europe and Latin America as well, since there is now a global market for biomass, with various degrees of exports/imports, depending on the geographical zone considered. The main players in the field of bioenergy are at this stage the European Union, USA, Latin America, South East Asia (especially Malaysia & Indonesia for palm oil), Canada (pellets). For the future, Russia (huge forest resources) and Africa (uncultivated land resources) are often mentioned. Africa is considered mainly due to its perspectives in crop yield improvement but also in relation to land expansion. The option of an increased use of organic waste for energy production is valid in all regions, including Europe and Latin America, and in this case there is no problem of competition for food or for new land and environmental benefits.

Bioenergy does not refer only to biomass or biofuels export but also corresponds to domestic and in some cases local use of biomass, which is very important in some developing countries. By bioenergy, we intend the production of energy from 3 main feedstock categories (agriculture, forest & waste) for 3 main uses (transport, heat & electricity). Even if there is an ongoing controversy about biofuels (agrofuels) for transport, the contribution from bio-heat and bio-electricity is much larger in energy terms in most EU countries. Sustainability schemes have been prepared for transport biofuels further to the EU renewable Energy Directive (RED) of 2009 and sustainability schemes are under discussion for solid biomass. The world market for biofuels is presently about ¾ bioethanol (with large contributions from US corn ethanol and Brazil sugar cane ethanol) and ¼ biodiesel (with large contribution from EU rape seed biodiesel and imports to the EU from Argentina and South East Asia).

Scientific & Technical networking is essential, for LA institutions as well as for EU institutions, since bioenergy is multi-disciplinary and relates always to:

- Feedstock production/harvesting/mobilisation,
- Conversion of biomass to energy,
- Policies, markets & sustainability.

No institution in the world can cover simultaneously all these topics (very high number of pathways and feedstock options) and exchange of data/expertise/information is thus absolutely necessary in order to cover topics related to a wide range of policy instruments in the fields of agriculture, rural development, energy, security of supply, public support mechanisms, innovation, technology development, sustainability assessment, competition of uses…

Europe has a strong operational experience in bioenergy, for example with countries such as Finland (integrated use of wood & integration of forest industries with bioenergy), Sweden (decarbonisation of the economy, public support to renewables, Research & Development on Short Rotation Coppice), Denmark (use of straw for heat & electricity), Germany (biogas and rapeseed biodiesel production), France (biorefinery), Austria (local bioenergy and boilers technology)… In Latin America, Brazil is leading at world-wide level for sugar cane bioethanol, Argentina is a key exporter of soybean and other countries develop different potentials, sometimes with high investment in research. There are other positive activities, either at R&D or operational levels as well, in other LA countries.

The objective of EUROCLIMA Bioenergy component was defined including the realisation of 3 specialised Workshops to be held in Latin America. The EUROCLIMA Scientific Network is now a reality and the 3 Workshops initially planned in the project document did take place (Buenos Aires & Campinas, 2011, Santiago de Chile, 2013).

The activities from EUROCLIMA were defined as:
- Identify key institutions and their needs concerning scientific assistance and research tools (including support for virtual networks and printed material);
- Produce environmental data in close association with Latin American national and regional scientific and research institutions;

- Enable key institutions in having better access to data and models.

Among the results, we can mention:

- Identification of relevant stakeholders that require strengthening scientific resources, namely on climate change and socio-economic issues, to achieve higher efficiency in the development of policies;
- Identify thematic training needs and the necessary material of key regional and sub-regional public and private institutions.

5.5.1. Main results and products

Workshops (cf. Annexe 6.5.)

The first EUROCLIMA Bioenergy Workshop was organised in Buenos Aires. This Workshop was organised by the JRC (Institute for Energy, Renewable Energies Unit, BioS Action on the Sustainability of bioenergy) in cooperation with INTA and the Ministry of Agriculture, Livestock and Fisheries of Argentina (MINAGRI). The main topics addressed were the quantification of GHG emissions from biofuels & bioenergy and the possible land use change resulting from bioenergy development.

It was decided to limit the participation to the Workshop (29-30 March 2011) to 30 Participants maximum in order to allow interactive in depth technical discussions. An "open" Workshop of one day was organised on 31 March on a wider topic, and this time not restricted to invited experts only (In Spanish and English).

This mission and the Workshops were prepared in close cooperation and with the support of the EU Delegation. A preparatory meeting took place at the EU Delegation on 28 March 2011. The opening of Both Workshops included a statement from Mr Gimeno Verdejo, Head of Trade & Economy Section. Mrs Sosa Zamarbide from the EU Delegation participated in the 31 March Meeting.

These meetings were followed by a technical visit to Rosario/Santa Fe region which is the leading region in Argentina in the field of soy bean production, processing and export. The technical visit included visits to no tillage fields and soya processing plants (including harbour facilities for export). The 2 plants visited were Terminal 6 at Puerto

General San Martin (Parana River, San Lorenzo) and Dreyfus in Lagos. They have respective capacities of 480.000 tons + 720.000 tons (2 companies) and 300.000 tons (biodiesel, with enlargement to 600.000 tons.

The Programme, objective description document, agenda, list of participants, summary of the sessions, power point presentations are available on JRC REMA website (http://iet.jrc.ec.europa.eu/remea).

The meetings were attended by a strong Argentinean expert group (INTA, MINAGRI, CARBIO, University of Buenos Aires, AAPRESID, University of La Pampa), European institutions (Imperial College of London, CIEMAT Spain, OEKO Institute Germany, etc) and UN FAO.

The Argentinean colleagues made well prepared presentations on issues such as soya cultivation, no till farming practices, Life Cycle Analysis and GHG emissions balance, IPCC GHG inventories, biofuels certification schemes.

Mexico, Nicaragua, Costa Rica, Colombia did send participants identified through the EUROCLIMA National Focal Points. The Mexico participant was a Mexico Country Delegate to the IPCC. The Costa Rica participant designated by the Ministry of Environment is employed by the Oil Company REPCO which has an interest in renewables. The International Energy Agency (Paris) and the Institute for Environment (IFEU, Heidelberg, Germany) were interested in participating but did not manage to attend.

The choice of Buenos Aires as location for this activity was made further to a visit of an Argentinean Delegation to the JRC-Ispra on 14 and 15 June 2010.

A technical input was provided through the presentation of JRC work of the Biofuels Thematic Programme and on the topics of GHG emissions savings quantification and N_2O emissions assessment.

This meeting has been an opportunity to exchange data and information on Life Cycle Analysis of biofuels which is a complex issue and not a field of consensus at worldwide level. The contributions were positive and transparent. This meeting has also been an opportunity to discuss the important progress made in the field of biofuels/bioenergy voluntary certification (for example with CARBIO Argentinean system) or in relation to GBEP (Global Bioenergy Partnership) activities and Latin America input to GBEP. It has been an opportunity to strengthen EU-Latin-American scientific networks on bioenergy. Contacts were developed with BIOPACT Project. Mr. Idigoras, formerly working on agriculture at the Argentina Embassy in Brussels provided a critical but stimulating presentation on problems related to international trade & bioenergy.

The field trip was rather impressive and gave the possibility to see the mills in operation during the harvesting period.

From 30 November to 2 December 2011, the second EUROCLIMA Bioenergy workshop took place in Campinas (Brazil). The topic of this second EUROCLIMA Workshop was the Agro-Environmental Impact of Biofuels and Bioenergy. The Campinas Workshop was organised by the European Commission Joint Research Centre (EC JRC) in cooperation with the University of Campinas (UNICAMP, Brazil) and the CTBE (National Laboratory of Bioethanol Science and Technology) also based in Campinas (Sao Paulo State).

The Brazilian Bioethanol Science and Technology Laboratory (CTBE) is a national laboratory with focus on innovative and sustainable production of ethanol from sugarcane. To accomplish this goal, CTBE invests internally and through strategic partnerships in basic research (science) and technological innovation. CTBE is operated by CNPEM (Brazilian Center of Research in Energy and Materials) for the Ministry of Science and Technology (MCT-CNPq). CTBE's main goal is on studying the ethanol production cycle, focused on industrial technologies for cellulosic ethanol. Moreover, CTBE intends to help the implementation of no-till farming of sugarcane and create sustainability models for the sector.
The Brazilian Bioethanol Science and Technology Laboratory has five research programs: Basic Science, Pilot Plant for Process Development (PPDP), Low Impact

Mechanization for No-Till Farming of Sugarcane, Sugarcane Virtual Biorefinery and Sustainability.

Due to the fact that sustainability is a wide concept, three priority aspects were defined by CTBE taking into account both the national and the international agenda (e.g., Cramer et al., 2006, EC, 2009, GBEP, 2008, RSB, 2008). The three priority aspects are:
- energy balance and balance of greenhouse gas emissions;
- socio-economic impacts;
- impacts on the availability and on the quality of water resources.

Taking the above mentioned three aspects as priorities, CTBE's activities on Sustainability of Bioethanol from Sugarcane are organized in five research projects that are conducted simultaneously: (a) energy and GHG emission balances; (b) land use change (LUC); (c) soil carbon stock changes and gaseous emissions (nitrous oxide and methane); (d) socio-economic impacts; (e) water use and its impacts on water resources.

In all these five research projects, CTBE works together with national and international research groups in order to catalyze the research process, to make more effective the use of resources and to disseminate information.

CTBE is a partner of BIOPACT Project supported by DG Research http://www.globalbiopact.eu and also a member of International Energy Agency (IEA) Bioenergy Task 40 on Biomass Trade.

This EUROCLIMA Bioenergy Workshop lasted 2 days, followed by an additional day of technical visit. A large part of the presentations/discussions dealt with sugar cane but other feedstock categories such as jatropha, soya, palm, sweet sorghum were also discussed (Data requirements, Life Cycle Analysis, Modelling, footprint quantification…).

About 30 participants attended the meeting (invitation only). In addition to the Latin American participants and to the 2 participants from JRC (F.Monforti and JF Dallemand),

European experts came from IFEU Heidelberg, CIEMAT Madrid, CENER Spain, and Utrecht University (presentation of IPCC Bioenergy Report).

The full meeting documentation is available on the web (http://iet.jrc.ec.europa.eu/remea/past-events%20) and paper proceedings will be prepared as well.

A visit was paid to Amyris Company in Campinas. Total and Amyris are partners to produce Renewable Fuels, their strategic partnership being expanded to accelerate the development and marketing of renewable fuels. In December 2011, they announced the signing of agreements to expand their current R&D partnership and form a joint venture to develop, produce and commercialize a range of renewable fuels and products. Total and Amyris have agreed to expand their ongoing research and development collaboration to develop renewable diesel based on molecules produced from plant sugars. Their R&D program, launched in 2010 and managed jointly by researchers from both companies, aims to develop the necessary stages to bring the next generation renewable fuels to market at commercial scale. Total has committed to contribute $105 million in funding for an existing $180 million program.

In addition, Total and Amyris have agreed to form a 50-50 joint venture company that will have exclusive rights to produce and market renewable diesel and jet fuel worldwide, as well as non-exclusive rights to other renewable products such as drilling fluids, solvents, polymers and specific biolubricants.

A few points regarding the Campinas EUROCLIMA Bioenergy Workshop:
- Technical visit to CTC (Centre of Sugar Cane Technology) of Piracicaba, the leading research centre on sugar cane at worldwide level.
- IEA Bioenergy Task presentation, with growing trade of biofuels but also pellets. The pellets production is now mainly from Canada but there are perspectives of development in Latin America.
- Presentations from CTBE but also from other Brazilian institutions such as INPE, ICONE, EMBRAPA, Reporter Brazil (NGO active on social issues)

- Technical presentations from colleagues from Argentina, Cuba, Colombia, Mexico,
- Netherlands participation through Utrecht University but also Delft Technical University and Wageningen University.
- Twente University, active on water footprint quantification for bioenergy, had to cancel its participation at the meeting due to unforeseen problems,
- 2 short Group discussions were organised on bioenergy in Latin America and the evaluation of the CTBE Sustainability Programme
- Contacts were made with R.Lamparelli (UNICAMP, Precision farming in agriculture) and Jansle Vieira Rocha (UNICAMP, Geoprocessing, former Detached National Expert at JRC Ispra).

The Third EUROCLIMA Workshop was held in Santiago de Chile in March 2013, and it was about International Cooperation in the field of Bioenergy and Technology.
The meeting was organised further to the first EUROCLIMA Bioenergy Workshop of Buenos Aires (Argentina, March 2011, cooperation with INTA) which focused on GHG emissions from biofuels and bioenergy and to the second EUROCLIMA Bioenergy Workshop (Campinas, Brazil, cooperation with the Brazilian Centre of Bioethanol & Technology, CTBE.

Proceedings can be found on:
http://re.jrc.ec.europa.eu/biof/html/euroclima_brazil.htm and
http://re.jrc.ec.europa.eu/biof/html/ghg_argentina.htm

The objective of CER is to ensure an optimal participation of Renewable Energies in the energy mix of Chile, in order to contribute to the country sustainable development.
CER is active in:
- Promotion and formulation of projects,
- Specialised information supply,
- Training & Capacity building,
- Promotion of stakeholder participation and cooperation stimulation.

This is achieved mainly through the CER Regional Programme, initiative of cross sectorial coordination, which intends to support the development of renewable energy

projects at small & medium scale, with CER support and participation of the relevant players in the country.

In relation to large projects preparation, CER has created a dedicated Unit to speed up projects implementation. This Unit (*Unidad de Aceleración de Proyectos***)** aims to identify and support at national level large projects at an advanced stage of implementation, with difficulties related to funding, energy sale, permits delivery by local authorities and in some cases criticism from local actors. For this purpose, this Unit produces an Action Plan incorporating a strategy of support as well as concrete accompanying measures to reduce or eliminate barriers facing renewable energies development.

The CER web site is quite informative and among other publishes monthly a report with updated information about renewable energy projects (*Energías Renovables no Convencionales,* ERNC) and an analysis of their input to the main national electric systems.
(See http://cer.gob.cl/boletin/febrero2013/Feb%202013%20Reporte%20CER%20VF.pdf)

According to IRENA (International Renewable Energy Agency), Chile has a population of 17.1 Million (2010), a GDP per capita of 12.431 US$ (2010), higher than average South America (9304 US$) or Latin America (8816 US$). From the Energy Profile 2009, Renewables correspond to 25.1% of Total Primary Energy, with an energy self-sufficiency of 32.3%, 48.8% of renewables in energy generation, 36.8% of renewables in the electrical capacity and an electricity access of 98.5%. The target is 8% of electricity generation from renewables (excluding large hydro) by 2020. In 2009, solid biofuels corresponded to 18% of the total primary energy, with biogas 0.02%, wind 0.02%, hydro 8% and oil 54%, natural gas 8%. As in many other countries, in terms of quantity of energy produced, bioenergy is thus an essential component for the present and the future.

According to IRENA, in relation to renewables, Chile is a country with high potential in wind, solar, hydro, biomass, geothermal and ocean. Regarding World Bank Ease of Doing Business Index for 2012, Chile is ranked 39 out of 183.

CER acted in relation to this EUROCLIMA Bioenergy Meeting as co-organiser and provided a high level input, both in terms of organisation standard and scientific content for the Meeting. Mrs. M.P De la Cruz Sepúlveda, Chief Executive of CER, opened the Meeting with also Mr. F.Duhart (Bioenergy Coordinator, FAO Regional Office). This EUROCLIMA Meeting organisation was supported by the FAO Regional Office of Santiago and by FLACSO (*Facultade Latinoamericana de Ciencias Sociales*). CER made the link with other Chilean institutions (both private & public) which contributed significantly to the meeting through technical presentations and input to the group discussions. The logistics part benefited from a contract with Mondial AT (Vienna, Austria), experienced company in the field of event organisation. Mondial AT provided air tickets to the participants before the meeting. The Meeting Proceedings can be found on http://cer.gob.cl/presentaciones-seminario-euroclima/ and on the JRC REMM (Renewable Energy Mapping & Monitoring) Action web site as well (http://iet.jrc.ec.europa.eu/remea/past-events%20)

Despite the World Biofuels Congress of Rotterdam in the same period, the Santiago meeting counted on the participation of European experts from Spain (CIEMAT and CENER), Austria (JS Consulting), France (CEA Grenoble), Germany (IFEU Heidleberg & INAAS), see list of participants (link available on Annex 6.5). In addition to a strong Chilean participation, this Meeting also benefited from the participation of other Latin American experts (Honduras, Colombia, Mexico, Brazil, Argentina, Costa Rica).

Due to the specificity of Chile (limited arable land without constraints, parts of desert or mountains, oil or gas reserves), there is a strong interest in R&D on algae use. Chile is key player at world-wide level in the field of fish farming, e.g. for salmon in the South of the country.

A technical visit was paid to Clean Energy Company, with about 20 participants from Europe, Latin America but also Chile. Clean Energy Company is growing algae for biodiesel production through sequestration of CO_2 emissions from a thermal power plant. Such a plant is experimental but this experience raises much interest in Chile and

elsewhere. A very convincing presentation was given by Mr. Bas from the Ministry of Agriculture on Biogas demonstrators in Chile, as well as by Mrs. Avalos (Ministry of Energy) on Renewables in Chile.

FAO participated actively to the Meeting and is contributing to the preparation of an International Latin American Centre on Biogas (Itaipu, Brazil), this is an important initiative due to the available feedstock in the region, especially animal waste, and thus largely out of the food versus fuel debate.

CENER is taking the lead in the coordination of formulation of proposals for future projects. This Workshop took place at the same date as the Latin American Water Week at Viña del Mar. The issue of Energy & Water and Bioenergy & Water are important issues to be dealt in the future (short term, mid & long term).

The JRC was represented by N. Scarlat (IET Renewable Energy Unit) and the author of this Report. All presentations raised interest from the participants. J. Spitzer presented the IEA (International Energy Agency) Technology Maps on Biofuels and Bioenergy. IEA is collaborating with Chile about the preparation of the Chilean Bioenergy Road Map (presented during the meeting).

In addition to the web Proceedings, paper proceedings will be prepared as well, with papers from Buenos Aires, Campinas and Santiago EUROCLIMA Bioenergy Meetings.

Positive contacts were established with IICA and cooperation will be hopefully developed in the field of use of animal & crop residues (rice husks, coffee residues…) in Central American conditions where there is much interest on local bioenergy.

An important input on technology issues was provided by the French CEA (Centre de l' Energie Atomique et des Energies Renouvelables) active in the field of biomass conversion and with strong cooperation with China.

Positive contacts were also developed with the Centre for Scientific Research and Energy Technology of Bucaramanga (Colombia), www.uis.edu.co, as well as the Interdisciplinary Center of Energy Planning (NIPE, Campinas, Brazil) and Cambridge University (Department of Land Economy). CEPAL also made a presentation on poverty in agriculture.

Engagement of Latin American partners

We have had a strong engagement of LA partners in this bioenergy networking activity (Annex 6.3), with participation of high level technical experts from a large number of countries, especially Argentina, Brazil, Chile, Mexico, Cuba, Honduras, Colombia, Costa Rica, Nicaragua, Honduras…

Some of these experts are collaborating with the JRC through activities within the International Energy Agency Bioenergy Tasks. A proposal of common research project has been formulated (CENER Spain coordination) and unfortunately not approved by the European Commission, but a new project proposal is being prepared by CENER under ALTENER Programme, again with LA participation. A possible collaboration between the University of Santo Tomas (Bogota, Colombia) and JRC was proposed (visit of a Colombian expert to JRC in January 2013), with a Conference planned in Bogota November 2013 on Clean Energy. A possible hosting of one Renewable Energy expert from Brazil at JRC is under discussion. A paper on Renewables in Mexico (for submission to a peer reviewed Journal) is in preparation with Technology Monterrey (Mexico) and Imperial College (London).

In relation to networking, a strong link has been established with International Energy Agency Bioenergy Task on Trade (Task 40) to which CTBE Campinas (Brazil) is contributing, JRC being a partner of IEA Bioenergy Task 43 on biomass feedstock for energy. For the first time, Mr Hilbert from INTA Argentina has been contributing as paper reviewer to the preparation of the 20th European Biomass Conference to be held in June 2012 (Milan, Italy), further to JRC suggestion. Colleagues from Brazil (CTBE) and Argentina (INTA) are now associated at JRC activities on water & bioenergy and a joint publication will be issued in 2012 (with other input from Europe, USA, India, Australia).

Wageningen, Utrecht and Delft Universities (Netherlands) participated at the Brazil EUROCLIMA Workshop on their own budget. CTBE participated (on its own budget) at the June 2012 European Biomass Conference of Milan, with presentations on biodiversity and sugar cane straw for bioenergy. Several EUROCLIMA partners from the EU and Latin America are presently looking for possibilities to develop research cooperation at short term.

In order to ensure a strong link with policy definition and implementation in Latin America, it was decided for each workshop to associate a co-organiser being part of a Ministry/or with very strong links with a Ministry/or with multi-sectorial mandate. This was achieved by working with INTA Argentina/Ministry of Agriculture, Bioethanol Science and Technology Laboratory, Brazil/Ministry of Science & Technology and Centre for Renewable Energy, Chile/Ministry of Energy. The country participants were invited through the EUROCLIMA National Focal Points as requested.

The main institutions which contributed to EUROCLIMA Bioenergy activities are:

- Latin America

Ministry of Agriculture of Argentina, INTA Argentina, RECOPE (Costa Rica), Ministry of Environment of Mexico, Technology Monterrey (Mexico), Ministry of Environment of Colombia, Corn Chain Chamber of Argentina, No Till Farming Association of Argentina, University of Campinas, EMBRAPA Brazil, University of Sao Paulo, ICONE, University of La Pampa (Argentina), University of Mendoza, Ecology University of Buenos Aires, INAI Foundation of Argentina, UNICA (Brazil), Delta CO_2, Reporter Brazil, CITNIA (Cuba), Ministry of Mines & Energy of Colombia, Ministry of Environment of Nicaragua, INPE Brazil, Centre for Renewable Energy of Chile, Ministry of Energy of Chile, Unit of Technological Development of Concepcion, Foundation for Agriculture Innovation of Chile, Desert Biofuels Consortium, AlgaeFuels Consortium, Bioenercel Consortium, Interdisciplinary Center of Energy Planning (NIPE, Campinas), University of Bucaramanga (Colombia).

- Europe and International

CIEMAT Spain, CENER Spain, IFEU Germany, Oeko Institute Germany, Utrecht University (Netherlands), Pennsylvania University (USA), Delft University (Netherlands), Wageningen University (Netherlands), Swedish University of Agricultural Sciences, United Nations Food & Agriculture Organisation (FAO), CEPAL, International Energy Agency (IEA), Inter-American Institute for Cooperation on Agriculture IICA, International Institute for Sustainability Analysis & Strategy (INAAS), Centre for Renewable Energy & Renewables (CEA France), Imperial College London.

Regarding EC JRC participation, the staff members contributing to EUROCLIMA Project were:

JF Dallemand, bioenergy expert, F. Monforti, Action Leader of the activity on Renewable Energy Mapping and Monitoring and N. Scarlat (all within the Renewable Energy Unit of the Institute for Transport & Energy and located in Ispra, Italy).

The following table is derived from the list of participants:

	Buenos Aires 2011	**Campinas Brazil 2011**	**Santiago de Chile 2013**	**Total**
Argentina	18	1	1	20
Brazil		23	3	26
Chile			23	23
Colombia	1	1	1	3
Mexico	1	1	2	4
Nicaragua	1			1
Honduras			1	1
Costa Rica	1		1	2
Cuba		1		1
Romania			1	1
Sweden		1		1
Italy	1	1		2
Netherlands		4		4
United Kingdom	3			3
France	1	1	2	4
Spain	3	2	3	8
Germany	2	1	1	4
USA		1		1
Austria			1	1
Total	**32**	**38**	**40**	**110**

It can be noticed that 9 LA countries did send participants to the Workshops. All the countries were invited to send one participant through an invitation sent to the EUROCLIMA National Focal Point. All the participating countries sent experts with a high level of technical/scientific expertise. The countries with the higher number of participants were the three countries where the Bioenergy Workshops were held (Argentina, Brazil & Chile). Colombia & Mexico were present with an expert for each workshop. Nicaragua, Honduras, Costa Rica & Cuba did not participate at all the workshops but did provide a high level input to the workshops. For each workshop, the co-organiser performed a very convincing work of organisation, networking and technical input.

About practical issues, for the first 2 workshops, the experts (with travel expenses) were reimbursed by JRC after the workshops. For the last Workshop, travel expenses were pre-paid within a contract with an event organiser. This practical change did not modify substantially the LA participation. Several LA experts had their participation expenses covered by their own institution.
On the non LA side, participants came from Romania, Sweden, Italy, Netherlands, United Kingdom, France, Spain, Germany, USA and Austria (several of them non sponsored by EUROCLIMA).

5.5.2. Comparison between planned and achieved results

Activities were performed according to planning, but serious difficulties were encountered in the preparation of the third Workshop. The JRC staff contributing to the EUROCLIMA Bioenergy component participated at the Ispra meetings (19-20 September 2012) with Mrs. N. Bello O'Shanahan (Results Oriented Monitoring).

5.5.3. Fulfilment of Objectively Verifiable Indicators

The full documentation of the 3 EUROCLIMA Bioenergy Workshops (Buenos Aires, Campinas and Santiago de Chile) is available on http://iet.jrc.ec.europa.eu/remea/.
Each of these web pages includes the description of the Workshop scientific objective, the programme, list of participants and full presentations.

5.5.4. Conclusions, recommendations, good practices and lessons learnt

EUROCLIMA is giving a significant contribution to technical networking in the field of bioenergy and allows exchange of data/expertise between leading countries at worldwide level (Brazil on bioethanol, Argentina on biodiesel…), other LA countries with a biomass resource potential and the EU.

For the future, at short, mid or long term, there are important issues of mutual interest for EU and Latin America in the field of bioenergy such as sugar cane bioethanol, cellulosic bioethanol, biodiesel, algae, biorefineries, competition of uses, land expansion assessment, pellets production for heat & electricity, biogas & energy from waste but also aviation fuels, green chemistry and biomaterials.... Biomass trade and certification are important issues to ensure sustainability both in Europe and Latin America. Follow up activities addressing statistically bioenergy and other uses in LA countries should be considered.

Regarding the conclusions from the bioenergy meetings, it appears that especially in relation to biofuels, Brazil for bioethanol and Argentina for biodiesel are in leading positions at LA level but also at worldwide level. In the case of Argentina, the development of biodiesel is performed with soya, i.e. an agricultural crop mainly used for animal feed and for export and only partly for bioenergy. The Argentinean agriculture, at least for soya, is export oriented. In the case of Brazil, the development of bioethanol from sugar cane was based on the internal market and now addresses the export market as well. In these two countries, there is a land area expansion, to a certain degree related to bioenergy, but associated simultaneously to cattle intensification which results in land availability for other uses than cattle. The future use of GMO sugar cane is an open question, soya presently used in Brazil and Argentina being GMO based. The exchange of views and experiences on biofuels certification, GHG emissions and land use change has been extremely useful.

The second group of countries corresponds to a variety of experiences, with different potentials, and less operational experience at large scale than Brazil or Argentina: e.g Chile with biogas and algae, Uruguay with animal residues, Colombia with oil palm, Cuba

with experience on sugar cane and jatropha. For Colombia and Central American countries, more studies are needed to better understand the food versus fuel situation in the specific conditions of the country, or region, the biogas and waste to energy potentials, as well as local bioenergy and valorization of residues (for example from coffee or rice). At this stage, jatropha is not associated to large scale operational use in Latin America.

CENER is taking the lead in the coordination of formulation of proposals for future projects. This Third EUROCLIMA Bioenergy Workshop took place at the same date as the Latin American Water Week at Viña del Mar (Chile). The issue of Energy & Water and Bioenergy & Water are important issues to be dealt in the future (short term, mid-term & long-term).

For the future, at short, mid or long term, there are important issues of mutual interest for EU and Latin America in the field of bioenergy such as sugar cane bioethanol or biodiesel, but also aviation fuels, cellulosic bioethanol, green chemistry and biomaterials. Competition of uses for biomass, biomass trade and certification issues are important issues that are being addressed. The future development of innovative green biotechnology, the implementation of bioenergy options (including the use of waste and residues and waste to energy pathways) are important. Latin America in the field of bioenergy is different from other countries due to the Brazilian experience with sugar cane. Efficient bioenergy is an important issue for all countries, independently of their resource availability (agriculture, forestry & waste). Second generation cellulosic bioethanol is not operational but many other options are operational. With experience in Europe, for example in Austria, Germany, Denmark, Finland and other countries, there is a clear need to cooperate with LA countries. The recent experience in the EU with Renewable Energy Action Plans (Formulation, Implementation, Monitoring) and the experience in Strategic Energy Technologies or Energy Technology Road maps (at international or national levels) are also important. The part of analysis/comparison of public support schemes or comparison of Public-Private Partnership Instruments is also a hot topic from countries with innovation goals, both in Latin America and Europe. If Chile has a clear focus on local bioenergy, Argentina is presently considering further

development of its domestic use of biodiesel in order to avoid an extreme dependence on the uncertain European market.

In terms of budget, the Bioenergy component was the smallest thematic part of EUROCLIMA Project aiming only at networking activities. The EUROCLIMA Workshops have been attended by about 100 participants. Of special interest, in addition to specific scientific issues, is the exchange which took place with the LA institutions regarding National Renewable Energy Action Plans (identification, formulation, implementation, monitoring), targets and strategies definitions, role of institutions. The issues of the place of bioenergy in the future energy mix (at global, national, regional levels) and the role of bioenergy in innovation policies are also key elements.

In terms of recommendations, based on EUOCLIMA Bioenergy experience, we do recommend support to Research & Development or Implementation in the following fields:

- Public Support schemes and Public: Private Partnership
- Institutional set up
- Conversion of waste & residues to energy
- Preparation of Bioenergy Road Maps and Renewable Energy Action Plans
- Production of biogas from agricultural residues, cattle waste or households organic wastes
- Local bioenergy at community level
- Sustainability schemes
- R&D on bioenergy from algae, pellets and cellulosic ethanol
- R &D on competitive uses of biomass, including biomaterials and green chemistry.

Recommendations

The EUROCLIMA Bioenergy component supported the scientific networking activities between LA & EU, with active participation of institutions from Brazil, Chile, Argentina, Colombia, Cuba, Costa Rica, Nicaragua, Mexico…

It appeared that in the case of bioenergy (intended as use of feedstock from agriculture, forestry & waste for applications in transport, heat & electricity), there is a need to

cooperate at multi-country level support the quantification of the impact of future bioenergy policies on water resources, considering both issues of water quantity & quality. Even if other environmental impacts are important (eg GHG emissions, biodiversity…), it is essential for bioenergy, as well as for other agriculture or energy options, to address the water issue in a sustainable way. For this reason, it is proposed to investigate options of identification, formulation & funding activities in the field of bioenergy & water.

Possible components of such project could be:

- Definition of a multi-year structured process to foster knowledge sharing and peer learning among countries in the field of definition of Renewable Energy Action Plans (Hydro, Mini hydro, Solar Photo Voltaic, Solar thermal, Geothermal, Bioenergy….) on how to best use the natural resources for renewable energy development and have a multiplier effect on the local economy, in order to tackle development challenges. This can be achieved by sharing experience from Latin America, the European Union and International Energy Agency, starting from the present energy mix and perspectives, for example about energy import dependency, energy poverty and split between local renewables & exports,

- Identification of policy drivers, analysis of the existing legislative framework and possible formulation of Bioenergy Roadmaps with quantitative targets in the field of transport, heat & electricity (through multi-stakeholder consultation with public sector, private sector, research community and NGOs),

- Identification & quantification of energy requirements, translation into feedstock requirements (eg from agriculture, forestry & waste, including agriculture & forestry residues) expressed in tons and subsequently in land acreage (hectares), depending on land availability, land suitability and feedstock categories selected (i.e. forestry residues, crop residues, municipal waste, used cooking oil, sugar cane, oil palm, soya, jatropha, energy grasses, Short Rotation Coppice and Short Rotation Forestry…)

- GIS mapping of possible areas of extension for bioenergy, including marginal areas and no go areas (protected areas),

- Quantification of biomass uses per sector (present & future planned),

- Analysis of the possible impact of future bioenergy development on water resources availability (quantity), taking into account the bioenergy options selected, the present use of water in agriculture, the competitive uses of biomass (for food, feed, fiber, fuel, bio-materials and green chemistry) and the competitive uses of water (industry, residential, tourism, agriculture…). This can be performed with several methodologies such as Water Footprint quantification, Life Cycle Analysis, Virtual Water approach…

- Analysis and discussion of present & future irrigation in agriculture, with or without bioenergy,

- Analysis of the possible impact of future bioenergy development on water resources quality, especially considering the fate of the liquid effluents further to the conversion of biomass into energy or the possible constraints faced to increase agricultural production (i.e. fertilizers and pesticides, if applicable).

- Discussion, analysis & formulation of recommendations related to Public support mechanisms or Public Private Partnership in the field of bioenergy, as well as in the field of water policy, including water access and pricing

Such a project of cooperation between the EU & Latin America is to be considered in the context of the emergence of new drivers of growth and new classes of consumers, the rising demand for natural resources and the need to improve resource efficiency at local, regional, national and global levels. There is also a need to escape the vicious cycle of poverty by including the development benefits of local bioenergy to promote more inclusive and broad-based development.

Participating countries could benefit from the thematic cooperation on the following areas: (i) shared value creation and local development; (ii) revenue spending and design of bioenergy promotion mechanisms and funds; (iii) comparative analysis of fiscal and financial aspects related to renewables & bioenergy, iv) water policies definition, implementation & monitoring.

5.6. DESERTIFICATION, LAND DEGRADATION AND DROUGHT (DLDD) ACTION

The Desertification, Land Degradation and Drought (DLDD) component of EUROCLIMA aimed at increasing and improving south-to-south cooperation, knowledge transfer, decision support on drought mitigation and preparedness on the problems of land degradation and desertification in Latin America. Improved understanding of the different types of drought, their connection to multi-scale land degradation phenomena and the strategic management of DLDD impacts on environmental and socio-economical sustainability, requires the development of standards and multiple indicators that are appropriate to various sectors of activity, different applications and geographical regions. The main objectives of the EUROCLIMA DLDD component, depicted in Figure DLDD1, were the following:

- To allow for the coordinated collection, harmonisation, analysis, and distribution of relevant data and products for assessing and monitoring DLDD in Latin America – **Research and Development (R&D) activity**;
- To improve the knowledge of the Latin American decision makers and the scientific community on the problems and consequences of DLDD – **Capacity Building (CB) activity**;
- To contribute to a long-term regional and continental Information System on drought and desertification – **from R&D to CB activities**.

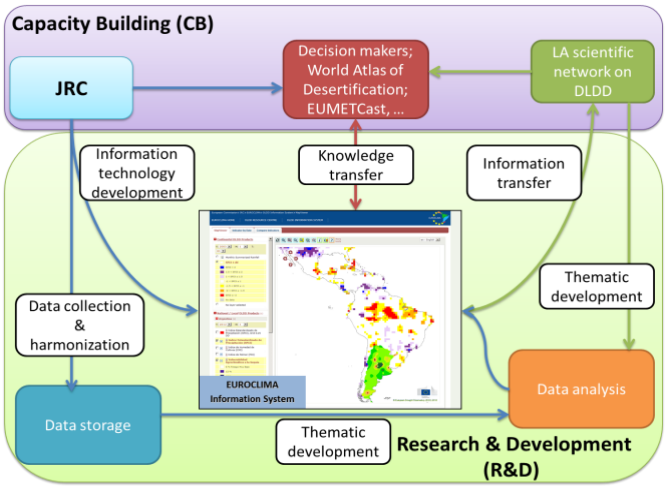

Figure DLDD1

5.6.1. Main results and products

Latin America is mostly associated with tropical and sub-tropical climates, but about a quarter of its surface actually belongs to dry-lands, having hyper-arid, arid, semi-arid, and dry sub-humid climates. Over the whole continent, land use changes have intensified the use of natural resources and exacerbated land degradation processes in these already vulnerable areas. Extreme events, such as severe droughts, worsen this situation. Non-adapted land use combined with increased drought recurrence, resulting from climate change, can affect the resilience of ecosystems tipping them into a less productive state. Indeed, it is known that some regions have greater exposure to drought than others and we do not have the capacity to alter such exposure. However, we can collect and analyze multiple data, such as rainfall, soil moisture, vegetation stress, groundwater levels or socioeconomic data on a variety of time and geographical scales, and provide the information necessary for identifying droughts and estimating their frequencies. To identify land management priorities and to monitor the consequences of droughts and mitigate their impacts on human activities, further knowledge on the trends of land degradation processes and their spatial inventory is necessary and essential for their combating.

Substantial progress has been reached on the definition and implementation of land degradation indicators. Data and information is casually available for quite some indicators, hence the desertification related activities under the EUROCLIMA Programme aim at inventorying these regional data sets and compiling adapted products to be freely accessible through the dedicated EUROCLIMA DLDD Information System. The Programme develops and produces relevant and spatial continuous baseline information layers for addressing land degradation issues based on innovative satellite remote sensing approaches. Vegetation phenology and productivity metrics are compiled for the whole continent using satellite based time-series imagery. The monitoring of change in land surface phenology and productivity is an important and widely used approach to quantify degradation of ecosystems due to climatic or human influences.

Because a deficiency of rainfall is always the driver of a drought, practically all drought indices use precipitation either alone or in combination with other meteorological variables, depending on the type of requirements. For example, agricultural drought starts only when the duration and intensity of meteorological drought increases and disturbs the expected development of vegetation, which can be measured by soil moisture conditions or vegetation greenness state from remote sensing images. Hence, drought indicators computed on a monthly or weekly basis seem to be the most appropriate for monitoring the effects of a drought in situations related to agriculture, fresh water supply and ground water abstractions. A combined time series of different drought indicators provides a framework for evaluating the drought parameters of interest. Thus, for regular and near-real time monitoring and assessing of drought events in their distinct typologies and for mapping characteristic drought frequencies for the Latin America region, the Standardized Precipitation Index (SPI), a Standardized Vegetation Index (SVI) and a Drought Frequency Index (DFI) are computed at the continental level on monthly, ten-daily and yearly basis, respectively, and made available through the EUROCLIMA DLDD Information System.

The Desertification, Land Degradation and Drought (DLDD) component of EUROCLIMA aims to increase and improve south-to-south cooperation, knowledge transfer, decision support on drought mitigation and preparedness on the problems of land degradation and desertification in Latin America. Three main results were expected to be obtained by the end of the Programme (see Annex 6.1 and 6.2), as well as a set of verifiable products that allows for their dissemination and guarantees the sustainability of the project.

Result 1. Provide access to regional wide fundamental bio-physical and socio-economic datasets including remote sensing based phenology metrics and derived higher level indices that are essential as baseline layers for addressing specific DLDD issues

Activity 1. 1. Data collection and harmonisation

Data collection and harmonization was a continuous activity, because new data could at any moment be added to and updated in the Information System. The EUROCLIMA DLDD Observatory includes data provided by national institutions as well as the continental scale products developed by JRC. Drought indices derived at the national scale from high spatial resolution datasets can be used as reference for the validation of information derived at continental scale, as well as to improve the whole geospatial database that is available to the Latin America community. Currently, several regional and national precipitation datasets on vector and raster format are already available for the region, as well as local to national products on land degradation, desertification and drought (some examples are presented in figure DLDD1).

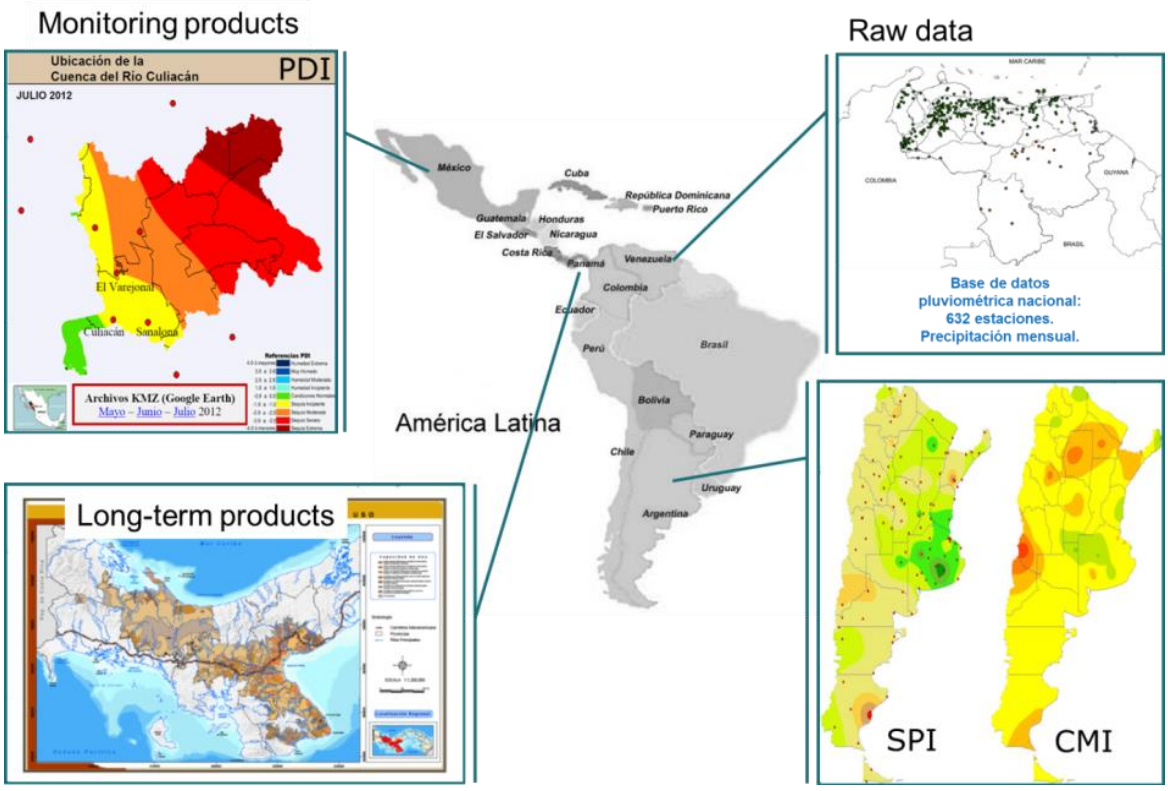

Figure DLDD1 – *Examples of data and products provided by Latin American partners*

A Metadata Catalogue was prepared to describe and organize the data and products collected and developed. Figure DLDD2 shows the several parameters describing the data that must be provided by the owner institutions before their information can be included in the EUROCLIMA map-based Web viewer. The BLUE section is used to describe the products available in the owner institution. These products may or may not be available on institutional web pages, but are made available to EUROCLIMA. The GREEN section is used to describe the products available on institutional websites. Some of the products described in the green section may have not an online connection for download. The ORANGE section is used to describe the institution that holds the data and the contact person at the respective institution.

DLDD PRODUCTS METADATA	Partner_EUROCLIMA	Name and address of the owner institution
	Country	Name of the country
	Title	Name of the geographic theme
	Data_type	Vector, raster, table, TIN, hardcopy, …
	Spatial_coverage	Bounding box coordinates, total surface, administrative unit, …
	Spatial_resolution	Spatial scale (if applicable); Pixel size (if applicable)
	Reference _date	Reference date
	Temporal_resolution	10-daily, monthly, annual, …
	File_format	File format (Shapefile, TIFF, DXF, Excel, MS Word, …)
	Georeference_system	Detailed description of the georeference system – if applicable
	Unit	Thematic units of the map variable (e.g. ºC, m, %) – if applicable
	Degree_availabilty	Free and full; full, with added costs; partial; availability on demand; needs approval by owner; time estimated for acquisition
	Brief_description	Brief description of data set contents (e.g. Soil, land cover,
	Current_status	Operational; last produced in …; production to restart in …; …
	Additional_notes	Additional information about the dataset
ONLINE PREVIEW OF DLDD PRODUCTS	Temporal_coverage	Time period covered by the product available online (from January 1970; Between January 1970 and December 1999; …)
	Download_format	pdf, jpeg, png, shp, tiff, …
	Link_product	Web link to the product
	Link_product_description	Web link to product description
	Additional_notes	Additional information about the online preview of dataset
SOURCE / OWNER / INSTITUTION	Partner_EUROCLIMA	Name and address of the owner institution
	Country	Name of the country
	Institutional_information	Brief description of the owner institution
	Institutional_webpage	Web link to the owner institution
	Contact_person	Contact person for questions about the dataset
	e-mail (contact person)	e-mail of the contact person
	Additional_notes	Additional information about the owner institution

Figure DLDD2 – *Metadata Catalogue for the description of DLDD data and products*

It is important to mention that this catalogue is also used to describe resources other than geospatial, namely reports, theses, newsletters, articles, studies, etc. During the project lifetime, the Metadata Catalogue was updated regularly with the data and products (geographic and other resources) related to land degradation, desertification and drought provided by the Latin American Institutional partners and other organizations in the framework of EUROCLIMA.

The products to be distributed to the Latin American community were defined in common agreement with a scientific network of Latin American institutions (see Annex 6.3 for a complete list of the Latin American stakeholders involved in EUROCLIMA DLDD activities) that was supporting the implementation of the EUROCLIMA map-based Web viewer (http://edo.jrc.ec.europa.eu/scado, see Result 3 of current section). The map-based Web viewer is based on similar work currently being developed by the JRC for the European Drought Observatory (EDO, http://edo.jrc.ec.europa.eu) and for the New World Atlas of Desertification (WAD, http://wad.jrc.ec.europa.eu). Because EUROCLIMA activities connect intrinsically to the work being developed in the framework of WAD, a parallel research on the economic evaluation of land degradation is being made with the contribution of the United Nations Economic Commission for Latin America and the Caribbean (UN-ECLAC). The results of this cooperation are expected also to be part of the Web Information System platform for data visualization and analysis through the map-based Web viewer. The products to be distributed through the map-based Web viewer are expected to be the basis for retrieving added value information on DLDD from local to continental scales in Latin America addressing the user requirements for the region. Multi-scale data and information are provided both by the Latin American institutional partners and the JRC.

Activity 1. 2. Phenological metrics will be calculated based on satellite time series data

Land use transitions as well as long term trends of the dynamics of e.g. agricultural and rangeland ecosystems can be understood by combining satellite based phenology and productivity variables. Within the EUROCLIMA Programme such variables are being calculated from the NOAA satellite vegetation index time series extending from 1982 until now. The dynamics of the ecosystems is reflected by a change index: the steadiness index which addresses both the long-term trend and the net change of e.g. primary production as calculated from satellite time series. Figure DLDD3A presents examples for the Latin American continent of the assessed dynamics of the ecosystem respective to its total net production capacity (NPP) in which the brown coloured areas suggest regions where the 1982-2010 dynamics have resulted in an observable loss of total productivity. Figure DLDD3B illustrates

the dynamics specific to only the permanent fraction of the observable vegetation, i.e. the part of the vegetative cover that remains on the soil from year to year; while the Figure DLDD3C illustrates the long term trends of the yearly dynamic production. Combination of these variables can be indicative for land use changes that are crucial to land degradation: e.g. in central Argentina a decrease of permanent fraction and increase of annual dynamism can be related to change of semi-natural vegetation into agricultural land use. A long term negative dynamics in both permanent and cyclic vegetation fractions can indicate an overall loss of productive capacity of a system, as can be observed over some part of NE Brazil. The calculation of these variables was improved during the EUROCLIMA Programme and more understanding in their combined meaning was retrieved. Other ancillary data layers compiled and collected by the EUROCLIMA partners were needed to accomplish this complex endeavour of understanding land degradation trends in the region required to outline adapted strategies. Final results include 6 different metrics, namely the Day of Maximum Biomass Productivity, Maximum Vegetation Index Value, Yearly Biomass Productivity, Standing Biomass Classification Levels in 1982, Biomass Steadiness Index from 1982 to 2010 and the Biomass Steadiness Index from 1982 to 2010. These metrics can be explored through the map viewer of the

Observatory.

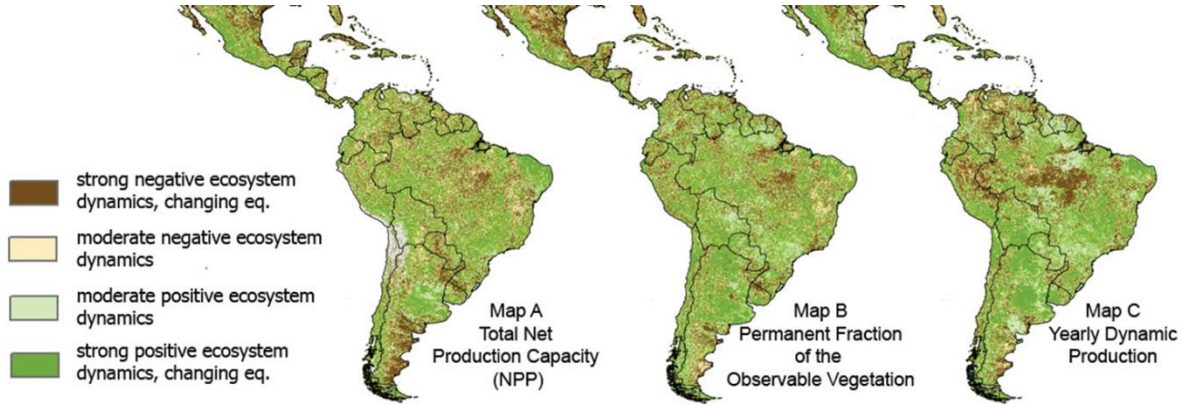

Figure DLDD3 – *Trends in Land Degradation in Latin America*

Activity 1. 3. Special Issue on International Scientific/ Academic Journal on DLDD topic in LA: EUROCLIMA Programme.

A special issue on Land Degradation and Desertification started being prepared in July 2012, in the framework of the EUROCLIMA DLDD component, and will be published on the Journal of Land Degradation & Development with several contributions from Latin American partners. More than 20 papers were submitted and 11 are currently are under review by the Journal (Table DLDD1).

Table DLDD1 – *Authors and provisional titles of manuscripts to be published in the Journal of Land Degradation & Development – special EUROCLIMA DLDD issue.*

Authors	Title
1.Paulo Barbosa, Hugo Carrão, Michael Cherlet	Introduction: the EUROCLIMA project
2.E.M. Abraham, J.C. Guevara, R.A Distel, R.J. Candia, and N.D. Soria	Desertification in the southwest of Buenos Aires province, Argentina
3.Humberto Barbosa and Carolien Tote	The current situation of the arid and semi-arid lands in South America: Satellite remote-sensing offering new perspectives to climatic research?
4.Cherlet M., Ivits E., Carrao H., Abraham E., Dascal G., Sommer, S.	Assessing Land Degradation in Latin America Using Satellite Derived Phenology and Productive variables
5.Patricia Figuerola, Emanuel Luna Toledo y Andrés C. Ravelo	Meteorological Indices Of Land Cover Degradation Caused By Intensive Grazing In The Arid Chaco Of La Rioja (Argentina)
6.C.L. Garcia, A. Kindgard and A.C. Ravelo	Desertification status in the Argentine Puna region: Comparing expert knowledge vs. satellite-derived information for desertification mapping
7.José Pedro Castaño y Agustín Giménez	Monitoring Natural Pastures Status in Uruguay using Satellite Images and a Soil Water Balance Model
8.Agustín Giménez y José Pedro Castaño	Information and Decision Support System for Climate Risk Management in Uruguay: Monitoring natural pastures status in Uruguay using satellite images and a soil water balance model
9.César Morales and Guillermo Dascal	Economic value of land degradation considering the effects of climate change in Central America
10.A.C. Ravelo, P.E.C. Boletta and A.M.R. Planchuelo	Modeling the dynamics of deforestation and agriculture expansion in the Argentine Dry Chaco
11. A.C. Ravelo, R.E. Zanvettor and P.E.C. Boletta	Assessing desertification vulnerability in rural regions of Argentina
12.Silvio Jorge C. Simoes	GIS and hydrological modeling as tools for mapping and monitoring of degradation processes. A case study for the Paraiba do Sul Basin, Southeastern Brazil

Result 2. Provide access to indicators through the integration of existing information at national and regional level and the development of a continental drought mapping tool in the Latin America Region

Activity 2. 1. Computation of the Standardized Precipitation Index (SPI) using monthly precipitation based on the Global Precipitation Climatology Centre (GPCC) dataset and/or alternatively on existing Continental datasets of precipitation for South America

The SPI was designed to be a relatively simple, spatially invariant and probabilistic year-round index applicable to water supply conditions. The SPI is based on precipitation alone and is defined as the number of standard deviations that the observed accumulated rainfall at a given location and timescale deviates from the long-term normal conditions. Positive SPI values indicate greater than the median precipitation, and negative values indicate less than median precipitation. The fundamental strength of the SPI is that it can be calculated for a variety of timescales, enabling water supply anomalies relevant to a range of end users to be readily identified and monitored. For example, SPI to monitor short-term water supplies, such as soil moisture, is important for agricultural production, and SPI for longer timescales is important for, amongst others, groundwater supplies and reservoir levels. For Latin America, at the continental level, the SPI is computed with the GPCC (Global Precipitation Climatology Centre) monthly gridded precipitation from the DWD (Deutscher Wetterdienst) at 1° spatial resolution (Figure DLDD4). It can be explored in the map viewer of the Observatory for all months after January 1950 at the accumulation scales of 1,3,6,9,12,24 and 48 months.

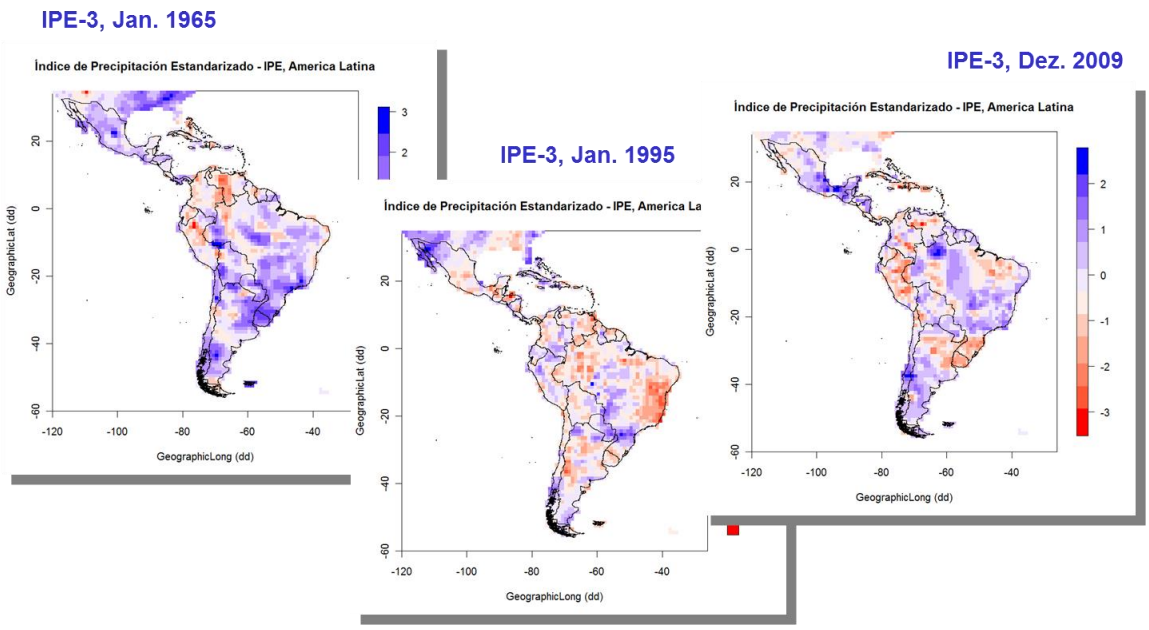

Figure DLDD4 – *The Standardized Precipitation Index for Latin America*

Activity 2. 2. Computation of regional standardized vegetation indices anomalies to follow agricultural drought

The Standardized Vegetation Index (SVI) is designed to show the impacts of drought on the living conditions (hereafter greenness) of vegetation cover over short-time periods of time, usually a week or 10 days. Intuitively, the SVI is an estimate of the "probability of occurrence" of vegetation greenness. SVI is based on Vegetation Indices (VI) alone, such as the fraction of Absorbed Photosynthetically Active Radiation (fAPAR), Normalized Difference Water Index (NDWI) or Normalized Difference Vegetation Index (NDVI), and computed as the z-score for each VI image pixel location. The z-score is a deviation of the current vegetation greenness from the long-term mean in units of standard deviation, calculated from the VI values for each pixel location and short-time period. Low SVI values indicate poor vegetation conditions that could be the result of insufficient rainfall supplies; high SVI values might reflect ideal climate growing conditions, so that vegetation greenness is higher than encountered in other years. For Latin America, at the continental level, the SVI is computed from 10-daily fAPAR image composites derived from the SPOT-VEGETATION satellite data at 1/112° spatial resolution (Figure DLDD5). It can be explored in the map viewer of the DLDD Observatory for every ten-daily period after 1st of April 1998.

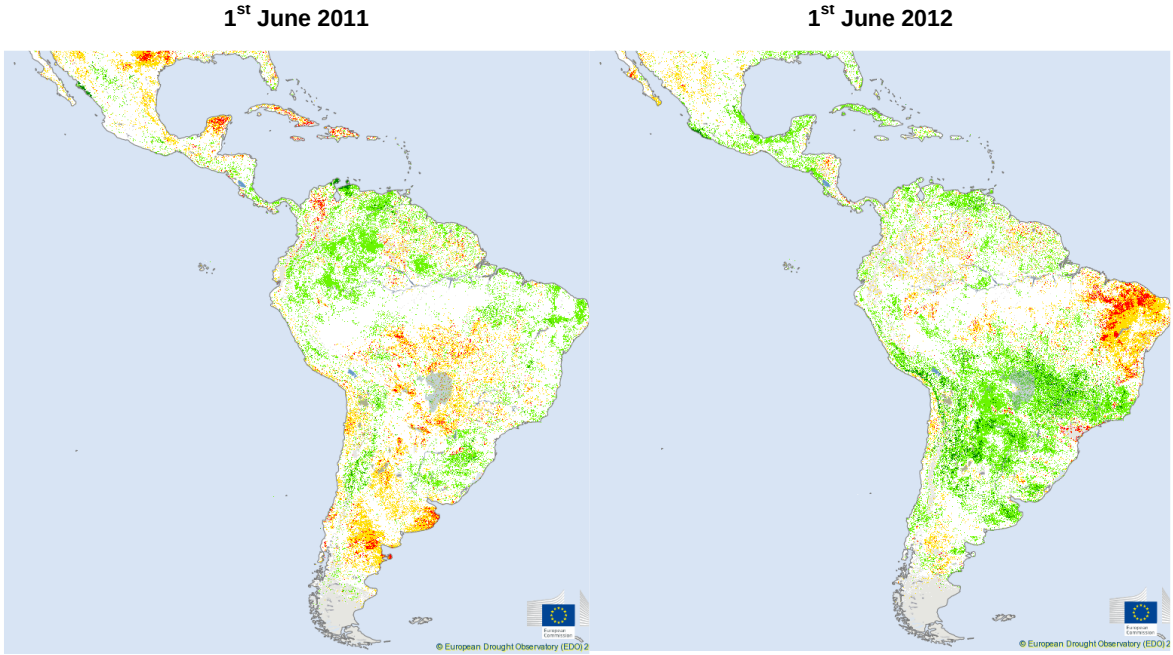

Figure DLDD5 – *The Standardized Vegetation Index (SVI) for Latin America*

Activity 2. 3. Drought frequency map

The JRC Climate Risk Management Unit is developing new indices to estimate the long-range likelihood trends of drought occurrences and their spatial and temporal persistency. The duration and frequency of meteorological droughts give important structural information that can be used as a basis for regional long-term risk assessment and prediction. To compute frequency and duration maps, historical low rainfall regimes are first computed for each location based on the empirical cumulative distribution of multi-monthly precipitation totals and the nonparametric Fisher-Jenks optimal classification algorithm. The time-series of water supply deficiencies is then used to compute Markov Chains of historical monthly drought events and the marginal distributions of the respective probability transition matrices are used to derive long-term drought frequencies and durations. A complete scientific description of the process can be found on-line at: http://edo.jrc.ec.europa.eu/gisdata/scado/continental/ProbabMeteoDroughtEvents.pdf. At the continental level, the frequency and duration indices are computed with the GPCC (Global Precipitation Climatology Centre) monthly gridded precipitation from the DWD (Deutscher Wetterdienst) at 0.5° spatial resolution. The maps can be

found in the map server of the DLDD Observatory that is described in the next section and an example is given in Figure DLDD6.

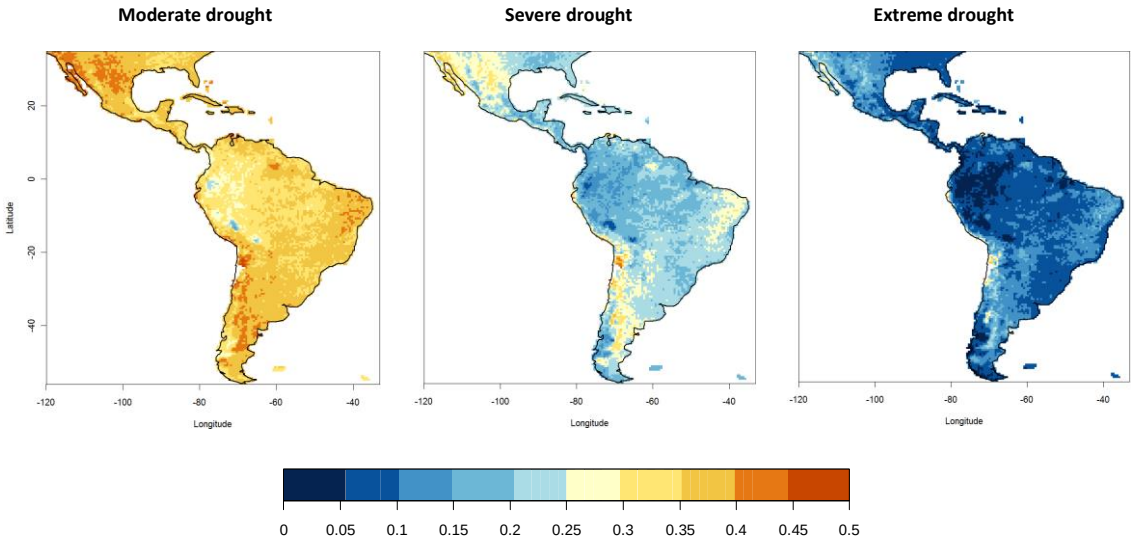

Figure DLDD6 – *Unconditional frequency for different meteorological drought intensities over Latin America*

Activity 2. 4. Research and development of innovative approaches to monitor different types of drought and their publication on Journals and Scientific Seminars/Workshops

Several scientific papers, technical reports and newsletters describing the advances, contributions and results of EUROCLIMA DLDD for the Latin America community were already published or are to be published, namely:

- Horion S., Hugo Carrão, A. Singleton, P. Barbosa and J. Vogt (2012). JRC experience on the development of Drought Information Systems. Europe, Africa and Latin America. EUR – Scientific and Technical Research Reports, Publications Office of the European Union, Luxembourg (Luxembourg): JRC68769. Available on-line at: http://publications.jrc.ec.europa.eu/repository/bitstream/111111111/23582/1/lbna25235enn.pdf
- EUROCLIMA e-Newsletter # 4 (2012). Climate Change in Latin America: Soils, Desertification and Drought, 10pp (http://edo.jrc.ec.europa.eu/scado/php/index.php?id=3006).
- Hugo Carrão, G. Sepulcre, S. Horion and Paulo Barbosa (2013). A multitemporal and non-parametric approach for assessing the impacts of drought on vegetation greenness: A case study for Latin America. *EARSeL*

eProceedings, 12(1): 8-24. Available on-line at: http://www.eproceedings.org/static/vol12_1/12_1_carrao1.html.

- Hugo Carrão, A. Singleton, G. Naumann, P. Barbosa and J. Vogt (2013). An Optimized System for the Classification of Meteorological Drought Intensity with Applications in Frequency Analysis. *Journal of Applied Meteorology and Climatology*, peer-reviewed journal paper to be submitted.
- Michael Cherlet, E. Ivits, H. Carrão, E. Abraham, G. Dascal and S. Sommer (2013). Assessing Land Degradation in Latin America Using Satellite Derived Phenology and Productive variables. *Land Degradation and Development*, peer-reviewed journal paper to be submitted.

Result 3. Development of a Desertification Land Degradation and Drought Map Server for Latin America

Activity 3. 1. Web map server development for Latin America

The EUROCLIMA Information System on DLDD is a map-based Web service that provides programmatic access to the necessary data, information and tools for a comprehensive analysis of the drought phenomenon and the problem of land degradation and desertification in Latin America. The Internet web-mapping server is designed to serve as a knowledge transfer platform for capacity building in Latin America and as a preliminary decision support system regarding the problems of DLDD for the region.

The web-mapping server platform is built upon three languages (i.e. English, Spanish and Portuguese) and two complementary windows for displaying the thematic geographic maps, namely the Contents Map Viewer (Figure DLDD7) and the Side-by-Side Maps (Figure DLDD8). These distinct tools can be used as a simple interface for retrieving uniform access to the whole geospatial data rendered by the EUROCLIMA web-mapping server over the Internet or to make query requests on the geospatial data and associated metadata available in the server for identifying the information that dynamically responds to some particular user needs. The main differences between these two tools are on the core Geographical Information Systems (GIS) technology that is used for their development and on the arrangement of graphical

windows used for displaying the thematic geospatial data. The Contents Map Viewer is based on UMN MapServer technology, while Side-by-Side Maps makes use of OpenLayers functionalities. The former has only one map viewer window with many layers and functionalities; it was designed for detailed desktop GIS analyses over the Internet. The latter is constituted by four map viewer windows with simple displaying functionalities that aim at providing a quick comparison of the content between the four maps being displayed. These tools can be found in the "INFORMATION SYSTEM" submenu of the EUROCLIMA DLDD Observatory for Latin America (http://edo.jrc.ec.europa.eu/scado/php/index.php?id=3120).

There are three Tables of Contents (TOCs) used for displaying the thematic geographic layers in EUROCLIMA DLDD Contents Map Viewer (Figure DLDD9):

i. *Continental DLDD Products* – contains indicators of Drought, Land Degradation, and Desertification that are developed by the JRC and focus on the whole geographical extent of the Programme, i.e. Central and South America;

ii. *National / Local DLDD Products* – contains indicators of Drought, Land Degradation, and Desertification that are provided by Latin American partners and focus on a specific country or area that determines a thematic group. There are three thematic groups at the moment: Argentina, Mexico, and Panama. The first two have a subdivision in "Layers with time series" and "Layers without time series";

iii. *Geographic Background:* contains useful background information that can be used for exploratory analysis of DLDD problems in the region, such as generic background layers like "Surface Water Bodies", "Towns" or "Countries", and thematic layers like "Köppen Climate Classification" or "Life Zones".

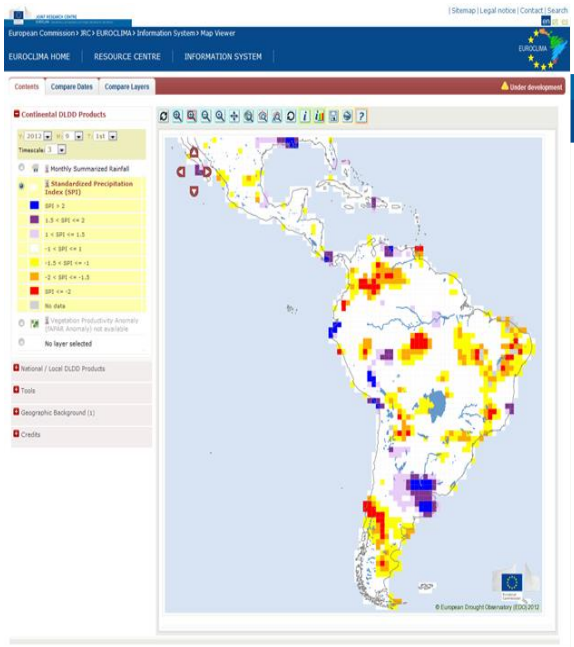

Figure DLDD7 *EUROCLIMA DLDD MapViewer*

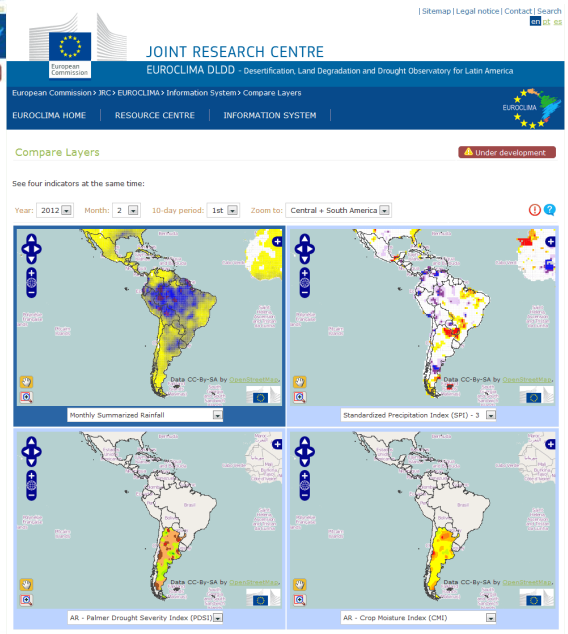

Figure DLDD8 *EUROCLIMA DLDD Side-by-Side Maps*

There are two Side-by-Side Maps' windows available in the EUROCLIMA Information System on DLDD: "Compare Layers" and "Compare Dates". Each of these windows has four coordinated viewers and the same functionalities, such as instantaneous synchronization of pan and zoom on the four maps being displayed, and identification of regions of interest that are automatically drawn on the whole maps (Figure DLDD10). The differences between those two tools are in the content displayed within the four maps, namely: "Compare Layers" (http://edo.jrc.ec.europa.eu/scado/php/index.php?id=3145) displays four different indicators at the same time, while "Compare Dates" (http://edo.jrc.ec.europa.eu/scado/php/index.php?id=3146) displays snapshots of the same indicator at four different moments in time.

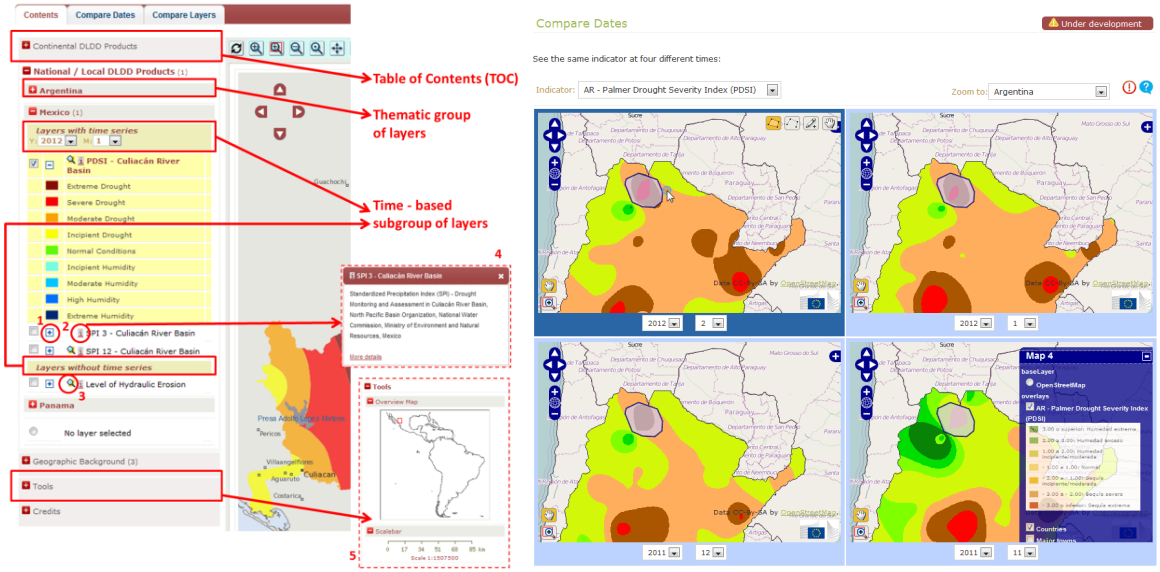

Figure DLDD9 *Tables of Contents in SCADO (1: display/hide legend; 2: layer description;3: Zoom to Layer; 4: layer description; 5: Tools) and MapViewer*
Figure DLDD10 *Synchronization and sketch functions of Side-by-Side Maps*

5.6.2. Comparison between planned and achieved results

All the results and activities foreseen in the framework for the DLDD component of EUROCLIMA Programme were successfully achieved, namely:

- Establishment of a Latin American scientific network on DLDD – 37 Latin American institutions were contacted by the DLDD component and 14 are providing data to the DLDD web-based map viewer; this contributed to a better dissemination of information amongst LA countries.
- A Kick-off and Final meetings of DLDD component were organized in Latin America with the collaboration of local partners from Chile and Brazil and participation of most of the Latin American countries;
- 2 Capacity building workshops were organized in Latin America and provided to Latin American Institutions; training was provided by Latin American experts contributing to the appropriation of EUROCLIMA by Latin Americans.
- Compilation and harmonization of socio-economic and biophysical fundamental datasets covering Latin America (LA) – More than 50 national, regional and continental datasets were introduced in the Metadata Catalogue;

- Time-series of phenological metrics from vegetation indices (NDVI), derived from medium spatial resolution satellite images (NOAA-AVHRR), for the assessment and monitoring of land degradation are available in map viewer;
- Time-series of drought indices (SPI) based on meteorological data for Latin America is available in the map viewer;
- Assessing and monitoring drought events on LA based on time-series of vegetation indices anomalies – datasets are available in map viewer;
- Development of drought frequency and duration maps for LA based on regional stratification of long-term likelihood of precipitation anomalies;
- Implementation of a web-based information system for decision support on DLDD – map viewer online in three languages (English, Portuguese and Spanish); a particular effort was done in order to provide the information also in Spanish and Portuguese to assure a wider dissemination and interest by Latin American.
- Scientific publications – done, 1 manuscript published, 1 submitted, 2 in final preparation;
- Special Issue on International Scientific/ Academic Journal on DLDD topic in LA – process launched in July 2012 and on-going, more than 20 manuscripts submitted.

Although the topic of climate change itself was not directly addressed in the activities developed during the project, the bases for a better understanding of the past and current situation has been achieved and it will allow for further analysis of climate change impactsb in the future under different climate scenarios.

5.6.3. Fulfilment of Objectively Verifiable Indicators

The JRC in agreement with DG DEVCO defined a set of indicators to evaluate the outcomes of the EUROCLIMA Programme and its prominence among the scientific community, stakeholders and users in Latin America. A set of Objectively Verifiable Indicators are presented In Table DLDD2. These Indicators

evaluate the results and activities of DLDD component of EUROCLIMA during the period November 2010-March 2013.

Table DLDD2 *– Performance indicators and results accomplished by the DLDD component of EUROCLIMA Programme during the period November 2010-March 2013.*

<table>
<tr><th>Performance Indicators</th><th>Results accomplished</th></tr>
<tr><td>Number of geographic data sets collected in the database</td><td>More than 50 national, regional and continental datasets were introduced in the Metadata Catalogue.</td></tr>
<tr><td>Maximum time period covered by the geographic data sets</td><td>1901 – Current date.</td></tr>
<tr><td>Number of Latin American Institutions contacted</td><td>37 Latin American institutions were contacted by the DLDD component (see Annex 6.3)</td></tr>
<tr><td>Number of Latin American Institutions collaborating</td><td>14 Latin American institutions are providing data to the DLDD web-based map viewer (see Annex 6.3)</td></tr>
<tr><td>Number of Latin American experts attending the meetings</td><td>More than 30 experts attended to the 1st EUROCLIMA LA regional meeting on DLDD and capacity building workshop in Santiago de Chile, Chile, April 2011.

More than 30 experts attended the 2nd EUROCLIMA LA regional meeting on DLDD and capacity building workshop in Natal, Brazil, October 2012.</td></tr>
<tr><td>Statistics on accesses to the Web map server</td><td>
<table>
<tr><th>WEBPAGE</th><th>NUMBER OF HITS</th><th>FIRST HIT</th><th>LAST HIT</th></tr>
<tr><td>3000 - EUROCLIMA Home</td><td>792</td><td>2012-07-18</td><td>2013-04-30, 09:48:29 (8 hours ago)</td></tr>
<tr><td>3100 - Information System</td><td>340</td><td>2012-07-31</td><td>2013-04-29, 17:02:19 (1 days ago)</td></tr>
<tr><td>3120 - Map Viewer</td><td>210</td><td>2012-10-19</td><td>2013-04-29, 20:49:49 (21 hours ago)</td></tr>
<tr><td>3119 - Map Viewer</td><td>182</td><td>2013-03-12</td><td>2013-04-29, 20:49:40 (21 hours ago)</td></tr>
<tr><td>3006 - News & Events</td><td>130</td><td>2012-07-18</td><td>2013-04-23, 18:28:43 (6 days ago)</td></tr>
<tr><td>3003 - Partners in Latin America</td><td>75</td><td>2012-07-18</td><td>2013-04-26, 19:32:49 (3 days ago)</td></tr>
<tr><td>3070 - Geodata and Reports</td><td>74</td><td>2012-07-31</td><td>2013-04-16, 15:13:23 (14 days ago)</td></tr>
<tr><td>3001 - Background</td><td>67</td><td>2012-07-18</td><td>2013-04-28, 21:45:05 (1 days ago)</td></tr>
<tr><td>3002 - Activities</td><td>60</td><td>2012-07-18</td><td>2013-04-28, 21:50:51 (1 days ago)</td></tr>
<tr><td>3045 - Contacts</td><td>52</td><td>2012-07-18</td><td>2013-04-28, 21:46:16 (1 days ago)</td></tr>
<tr><td>3090 - Related data and information</td><td>40</td><td>2012-08-07</td><td>2013-04-10, 02:27:30 (20 days ago)</td></tr>
<tr><td>3041 - How to reach us</td><td>34</td><td>2012-07-18</td><td>2013-04-13, 17:23:46 (17 days ago)</td></tr>
<tr><td>3060 - DLDD in the Media</td><td>29</td><td>2012-07-18</td><td>2013-04-10, 02:08:35 (20 days ago)</td></tr>
<tr><td>3050 - Resource Centre</td><td>27</td><td>2012-08-13</td><td>2013-04-24, 03:50:24 (6 days ago)</td></tr>
<tr><td>3004 - Sitemap</td><td>14</td><td>2012-08-13</td><td>2013-04-23, 05:24:30 (7 days ago)</td></tr>
<tr><td>3145 - Compare Layers</td><td>13</td><td>2012-10-23</td><td>2013-04-30, 05:31:35 (12 hours ago)</td></tr>
<tr><td>3125 - Map Viewer Help</td><td>4</td><td>2013-01-31</td><td>2013-04-23, 18:37:57 (6 days ago)</td></tr>
<tr><td>3147 - Help of side-by-side maps</td><td>3</td><td>2013-01-28</td><td>2013-04-08, 10:23:52 (22 days ago)</td></tr>
<tr><td>3146 - Compare Dates</td><td>2</td><td>2013-04-09</td><td>2013-04-16, 15:12:57 (14 days ago)</td></tr>
<tr><td>TOTAL</td><td>2148</td><td>2012-07-18</td><td>2013-04-30, 09:48:29 (8 hours ago)</td></tr>
</table>
</td></tr>
</table>

5.6.4. Conclusions, recommendations, good practices and lessons learnt

The results of the DLDD Component of the EUROCLIMA Programme exceeded the initial expectations. Besides the technical success on the implementation of the DLDD Observatory and map-based Information System, we also guaranteed the informal involvement of more than thirty important Latin American national and regional institutions (Annex 6.3), such as the *Centro del Agua para Zonas Áridas y Semiáridas de América Latina y El Caribe* (CAZALAC), *Instituto Nacional de Pesquisas Espaciais - Centro Regional do Nordeste* (INPE/CRN), *Instituto Argentino de Investigaciones de las Zonas Áridas* (IADIZA), *Oficina Regional de Educación de la UNESCO para América Latina y el Caribe* (OREALC/UNESCO Santiago) and *Comisión Económica para América Latina y el Caribe* (CEPAL, Naciones Unidas). In fact, the regional cooperation framework was easily established, because the climatological and biophysical processes of interest leading to DLDD problems in the region are not only occurring at national level but may also happen at larger scales. The EUROCLIMA Observatory on DLDD is already an integrated and interoperable Web-based platform that successfully resulted from an effective joint effort of many countries and organizations working in synergy for the survey, collection and harmonization of available data, information and dedicated tools for DLDD monitoring and assessing in Latin America.

As foreseen by the Programme, the proposed regional indicators on DLDD prepared by the JRC and some national products collected by Latin American institutions are already available through the map-based Web viewer (http://edo.jrc.ec.europa.eu/scado/php/index.php?id=3120) in three languages, i.e. English, Spanish and Portuguese. To improve the System and retrieve full performance of its services, it would be interesting to establish standard protocols with the partners' databases for serving geospatial map images over the Internet (Web Map Services – WMS). However, most of the partners are not technologically equipped for making this type of connections over the Internet. There is a necessity for more capacity building activities in the region, namely technical workshops on open source software and statistical analysis of environmental data. Indeed, we reinforce the necessity for developing technical

competencies among local partners, and it would be appreciated to stimulate the training of partners and increase the partnership between local institutions and persons.

Based on current experiences, it sounds that many countries and institutions in Latin America region do not have human and/ or economic resources to process data and provide derived information, such as drought indicators computed from raw precipitation data and/ or satellite data. Indeed, many institutions contributed valuably with raw precipitation data to the EUROCLIMA Programme, but the expected drought indicators at the national scale could not be derived for many countries. Similarly, it seems to exist a gap between the products provided by different countries, i.e. some countries provide land use/ cover maps, others soil erosion maps, others biophysical data, and others socio-economic data. This suggests that the methodological approaches explored by different countries and the available datasets for assessing and monitoring drought and the problem of land degradation and desertification in the region is diverse, at different stages of technical development and that a regional output cannot be yet fully consistent from a thematic viewpoint.

We strongly believe that the EUROCLIMA Information System and Observatory on DLDD for Latin America will certainly be an important and reference platform for sharing experiences in the region and bridge the methodological gap between countries and organizations. Indeed, regional institutions and researchers can easily find up-to-date models and know-how setups in the Web-based repository of the Observatory that can help them improving their own national products. It is not about proposing the final products to national organizations, but augmenting and facilitating the access of involved persons to knowledge.

The main recommendation is to try to transfer the EUROCLIMA Information System and Observatory on DLDD to one or more Latin American institution and to further develop the system including drought forescating and vulnerability tools. It would also be important to analyze what the impact of the foreseen

climate change under different scenarios will be on drought and land degradation in Latin America.

6. *ANNEXES*

6.1. Logical framework for each action

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6.1. Logical framework for each action

EUROCLIMA-JRC Component SOIL

LOGICAL FRAMEWORK	Project name: **EUROCLIMA SOIL COMPONENT** Country: 19 Latin American Countries	Project duration: 3 years

Intervention logic	Objectively verifiable indicators	Sources of verification	Hypothesis
Overall objectives • Improve knowledge of EU-LAC decision makers, as well as the scientific community on problems and consequences related to impacts of climate change on the soil resource in LAC • Raise awareness on Soil related issues in LAC • Improve the institutional capacity and knowledge transfer in the Latin America and Caribbean soil sector	Number of countries involved in the Soil Atlas of LAC project Number of participants and institutions Number of training courses, seminars and meetings organized	Project activity reports	Appropriation by LAC national decision makers and scientific community of project overall objectives

Specific objectives 1. Publication and distribution of the Soil Atlas of LAC 2. Establishement of Scientific Network of LAC Soil Scentists and define standardized methodologies, information management, data and data processing in the water resource sector in the LAC region. 3. Update and harmonize the existing Soil Map of Latin America and Caribbean (Soterlac v2.0) 4. Capacity building on soil science emerging techniques and methodologies	Number of LCA Institutions and Experts participating to the Soil Atlas project Number of LAC Institutions and Experts attending the meetings Numbers of participants attending seminars	Project activity reports Publication and distribution of the Soil Atlas of LAC	Appropriation by national decision makers and scientific community of project objectives
RESULT 1 Publication of Soil Atlas of LAC		Delivery of LAC Soil Atlas to DG DEVCO LAC Soil Atlas available on EU Bookshop	The diffusion of the Atlas, not only among decision makers, but also within the educational system, with the final result of raising awareness on soil at different levels
Activity 1.1 Establishment LAC Atlas Editorial Board ***Activity 1.2*** Collection and harmonization of soil maps received within a given deadline (15/12/2011).	Number of experts actively involved in the Editorial Board and number of the meetings Number of datasets included in the database	Editorial Board meeting reports	. .
Activity 1.3 Preparation and publication of the Atlas	Publication and distribution of the Atlas	Number of LAC Soil Atlas distributed Number of access/download of the pdf version of the Atlas	

RESULT 2 Establishment of Scientific Network of LAC Soil Scientists (Latin America Soil Bureau Network)			Reinforcement of scientific cooperation among soil scientist within LAC and between LAC and Europe
Activity 2.1 Establishment of the scientific network	Number of experts institution involved	Reports of the meeting	
Activity 2.2 Management and activities of the network	Number of meetings, seminars, congresses organized or attended with joint activities	Reports of the Meetings, joint publications	
Activity 2.3 Courses, seminars, trainings	Number of trainings and seminars organized Number of participants attending the training courses and meetings	Project activity reports Training materials Tools developed	Creation of virtuous cycle, with a cascade effect on the improvement of the technical skills of the largest part of Soil Science LCA scientific community
RESULT 3 Establishment of the Latin American Soil Portal		Project activity reports Training materials Tools developed	Promote and facilitate the communication on soil related issues among LAC stakeholders
Activity 3.1 Collection and publication of data, information on the Latin American Soil Portal	Number of accesses to the web pages	Reports of the meeting	

LOGICAL FRAMEWORK	Project name: **EUROCLIMA-WATER COMPONENT** Country: Latin American Countries + Cuba	Project duration: 3 years

Intervention logic	Objectively verifiable indicators	Sources of verification	Hypothesis
Overall objectives 1. Improve knowledge of EU-LA decision makers, as well as the scientific community on problems and consequences related to impacts of climate change on the water resource in LA 2. Improve the institutional capacity and knowledge transfer in the Latin America water sector.			
Specific objectives – Water Component 1. Establish and define standardized methodologies, information management, data and data processing in the water resource sector in the LAC region. 2. Share data, information and methodologies in the region for establishing regional coherent analysis that will be used of the decision makers in the water sector.			
RESULT 1 Latin America & Caribbean (LAC) Water			

Resources Management Data Base.			
Activity 1.1 Development of geographical database of Water Resources	Spatial data uploaded in the AQUAKNOW platform with access to the LA Experts Geographical tools and spatial functionalities developed	Data Base of LA Institutions implemented in the AquaKnow platform AQUAKNOW platform – GIS tool available	EUROCLIMA partners are wiling to share data using the AquaKnow platform and/or other Open platform.
Activity 1.2 Virtual support to the Network for inter-institutional scientific & technological dialogue on water resource management	Number of users registered in the "EUROCLIMA-Agua" working group (AquaKnow) Number of accesses to EUROCLIMA-Water pages Number of documents published by EUROCLIMA partners in the AquaKnow Platform.	AquaKnow platform statistics	Appropriation by the EUROCLIMA partners of the AquaKnow platform.
RESULT 2 Water Resources Management Monitoring System			
Activity 2.1 Exchange of information and preparation and holding of Regional Seminar			Relevant endorsement by key institutions and scientists
Activity 2.2 Meetings, training and local capacity building (methods and tools)	Number of regional meetings organized Number of LA Experts invited to the meetings Number of LA Experts attending the meetings Number of countries attending the meetings Number of countries and LA Experts inscribed in the Working groups of the AQUAKNOW platform Methodology agreed by the LA Institutions	List of invited institutions from LA to the meetings List of LA institutions attending the meetings Specification Documents already published or being published: Methodology, data and data processing chains. Working groups implemented in the AQUAKNOW platform Trainings developed in the frame of AQUAKNOW and organized during the conferences EUROCLIMA Training materials	Relevant endorsement by key institutions and scientists Appropriation by national decision makers and scientific community of project objectives

	Number of LA Institutions invited to the meetings Number of LA Institutions attending the meetings Number of trainings and seminars organized Number of participants attending the training courses and meetings	available on-line through the AQUAKNOW platform and/or other LA website. Tools developed	
Activity 2.3 Monitoring of ongoing process and report dissemination	Number of scientific publications in international journals Number of oral presentations in specialized congresses and workshops Number of reports produced along the EUROCLIMA project	Papers published in scientific journals Documents on-line in the AQUAKNOW and other LA platforms with free-access. Reports by national and international institutions	Relevant endorsement by key institutions and scientists

LOGICAL FRAMEWORK	Project name: **EUROCLIMA (Bioenergy COMPONENT)** Country: Latin American Countries + Cuba	Project duration: 3 years

Intervention logic	Objectively verifiable indicators	Sources of verification	Hypothesis
Overall objectives 3. Improve knowledge of EU-LA decision makers, as well as the scientific community on opportunities, possible problems and consequences related to climate change and bioenergy development 4. Improve the institutional capacity and knowledge transfer in the Latin America bioenergy sector (South-South and North-South). 5. Develop strong, international and multi-disciplinary scientific/technical network in the field of bioenergy (with active participation from LA and EU experts)	Number of countries involved in the Bioenergy project component (All 18 but at different degrees) Number of participants and institutions (About 100 participants from EU + LA, for the three Workshops, i.e. about 30 participants per workshop) First Workshop held in Buenos Aires, Argentina, end of March 2011, upon invitation only (In English) followed by Open Seminar (In English and Spanish). Strong link with EU Delegation in Buenos Aires, contacts and joint meeting before the Workshop. Second Workshop in Campinas (Brazil) in 2011 and third Workshop in Santiago (Chile) in 2013	Workshop web page http://iet.jrc.ec.europa.eu/remea/past-events%20	Appropriation by LA national decision makers and scientific community of project overall objectives: Correct and confirmed

Specific objectives 1. To develop a realistic and scientifically based assessment of: - Environmental assessment of biofuels production, - GHGs emissions from biofuels and bioenergy - Technology transfer and Technology cooperation in the field of bioenergy. 2. Share data, information and methodologies in the region for establishing regional coherent analysis that will be used by the decision makers in the bioenergy sector.	Number of LA Institutions contacted: about 20 per workshop Number of LA Institutions attending the meetings: about 15per workshop Number of LA Experts attending the meetings: About 20 per workshop Number of countries attending the meetings: 5 attending the first Workshop in Buenos Aires, then 5 & 7 Number of scientists attending the meetings: About 30 per workshop (30 LA + 10 EU)	Workshop web page http://iet.jrc.ec.europa.eu/remea/past-events%20 Articles at the editing stage are available, including contributions of Mexico, Costa Rica, Spain, Brazil and Argentina. Strong input from INTA Argentina, Ministry of Agriculture, Livestock & Fisheries of Argentina and other Argentina institutions (Universities, CARBIO, AAPRESID…) + Colombia, Nicaragua, Mexico, Costa Rica, FAO, Oeko Institute, Imperial College London, CIEMAT Spain, CER Chile, CTBE Brazil, Monterrey Technology and EC JRC (See list of participating institutions in the Report)	Appropriation by national decision makers and scientific community of project objectives: Correct and confirmed
RESULT 1 Workshop on GHG Emissions from biofuels and bioenergy	Workshop held in Buenos Aires, Argentina, 29-30 March 2011, followed by Open Seminar on the same subject and field trip to soya producing regions Exchange of information, and data, network development, identification of thematic fields of common interest for future cooperation, capacity building.	- Web page of the Workshop, including detailed presentation and summary conclusions http://re.jrc.ec.europa.eu/biof/html/ghg_argentina.htm - Paper Proceedings (with specific articles) in preparation, 3 workshops together Articles at the editing stage are available, with contributions of Mexico, Costa Rica, Spain, Argentina & Brazil.	EUROCLIMA partners sharing data on GHG emissions from bioenergy (Correct).
RESULT 2 Workshop on Agro-environmental assessment of biofuels and bioenergy	Held in Campinas, Brazil, end of November 2011, in cooperation with University of Campinas and CTBE (Brazilian Centre for Bioethanol)	- Web page of the Workshop, including detailed presentation and summary conclusions http://re.jrc.ec.europa.eu/biof/html/ghg_argentina.htm - Paper Proceedings (with specific articles) in preparation	EUROCLIMA partners sharing data on agro-environmental impact of bioenergy (Correct).
RESULT 3	Held in Santiago de Chile, March 2013,	- Web page of the Workshop, including detailed	EUROCLIMA partners sharing data

Workshop on Technology Transfer and Technology Cooperation	in cooperation with the Centre for Renewable Energy of the Ministry of Energy	presentation and summary conclusions http://re.jrc.ec.europa.eu/biof/html/ghg_argentina.htm - Paper Proceedings (with specific articles) in preparation	on Technology Transfer/Technology Cooperation in the field of bioenergy (Correct).

LOGICAL FRAMEWORK	Project name: **EUROCLIMA AGRI4CAST COMPONENT** Country: Latin American Countries + Cuba	Project duration: 3 years

Intervention logic	Objectively verifiable indicators	Sources of verification	Hypothesis
Overall objective: To help LA countries in anticipating potential climate change impacts on agriculture and to develop risk response strategies in the region	Number of accesses to the web pages/web services containing the model platform and data	Project activity reports	LA national decision makers and scientific community of project are interested in the acquisition of data and tools to analyse the potential impact of climate scenarios on agriculture
Specific objective: To provide a common modelling platform (BioMA) for sharing and further developing data and model tools that can be used by LA institutions as a basis to test, assess and develop science-based questions relevant to the above	The distribution of the modelling platform and associated datasets to LA stakeholders via Web services Number of accesses to the web pages/web services containing the model platform and data	Project activity reports Project web pages Project web services for data distribution	Interest by LA stakeholders in the acquisition of the modelling platform by LA stakeholders
RESULT 1 **Development of consistent agro-climatic database (weather, soils, crop and management);**			
Activity 1.1 Collection of regional datasets (climate, soil, crop calendars, field and crop management) and implementation within an agro-climatic database.	Data schemas included in the database The distribution of data to LA stakeholders via web services: number of accesses to the web pages containing the distributed data Production of crop simulation results in RESULT 2 which depend on the outcome of RESULT 1	Project activity reports Project web pages Project web services for data distribution	Interest by LA stakeholders in the acquisition of data layers

RESULT 2 **Implementation of crop models and agro-climatic indexes for short to medium-term climate change impact and response analysis**			
Activity 2.1 Calibration of crop models over LA	Simulation of crop yield results when simulating with baseline climate	Expert knowledge, appropriate external reports and scientific literature	Interest by LA stakeholders in the acquisition of parameters sets for crop development and growth simulation
Activity 2.2 Development and implementation of agro-climatic indices based on the collected climatic data for analysis of trends, thresholds, etc.	Generation of valid values for the indices when applied to baseline climate The distribution of the indices to LA stakeholders via Web services: number of accesses to the web pages containing the distributed data	Expert knowledge, appropriate external reports and scientific literature Project activity reports Project web pages	Interest by LA stakeholders in the acquisition of indicators for the scenarios analyzed.
Activity 2.3 Crop growth simulations under future climate scenarios for a series of crops (wheat, maize, soybean, rice)	Distribution of the results of the crop simulations to the LA stakeholders via web services: number of accesses to the web pages containing the distributed data	Expert knowledge, appropriate external reports and scientific literature Project activity reports Project web pages	Interest by LA stakeholders in the acquisition of preliminary simulation of impact assessment and adaptation strategies via crop models.

LOGICAL FRAMEWORK	Project name: **EUROCLIMA-DLDD COMPONENT** Country: Latin American Countries + Cuba	Project duration: 35 months

Intervention logic	Objectively verifiable indicators	Sources of verification	Hypothesis
Overall objectives 6. To allow for a coordinated collection, analysis, and distribution of relevant data for assessing and monitoring drought and desertification in Latin America, leading to a better harmonization of the information that exists at the national level. 7. To contribute to a global information system on drought and desertification in the longer run.	Number of data sets collected in the database Number of Latin American Institutions contacted Number of Latin American Institutions collaborating Number of Latin American experts attending the meetings Statistics on accesses to the Web map server	Project activity reports	Appropriation by LA national decision makers and scientific community of project overall objectives

Specific objectives 1. Provide access to regional wide fundamental bio-physical and socio-economic datasets including remote sensing based phenology metrics and derived higher level indices that are essential as baseline layers for addressing specific DLDD issues 2. Provide access to drought related indicators through the integration of existing information at national and regional level and the development of a continental drought mapping tool based on remote sensing and gridded meteorological data in the Latin America Region. 3. Development of a Desertification Land Degradation and Drought Map Server for Latin America through the integration of existing information at national and regional level and the development of relevant desertification land degradation and drought indicators at continental level	Fundamental datasets compilation covering Latin America and available in the Map Server. Compilation of layers of higher level indices as well as drought indicators available in the Map Server	Project activity reports	Appropriation by national decision makers and scientific community of project objectives
RESULT 1 Provide access to regional wide fundamental bio-physical and socio-economic datasets including remote sensing based phenology metrics and derived higher level indices that are essential as baseline layers for addressing specific DLDD issues			
Activity 1.1 Coordination of data collection and harmonization of existing datasets into standardized regional products.	Number of Latin American Institutions involved Number of datasets collected Initial coordination and networking meeting	Project activity reports Data included in the web map server	EUROCLIMA partners are willing to share datasets and products Relevant endorsement by key institutions and scientists

	Final meeting in order to disseminate results and provide capacity building regarding tools and methodologies used.		
Activity 1.2 Phenological metrics will be calculated based on satellite time series data	Number of Phenological metrics computed	Project activity reports Data included in the web map server	Appropriation by the EUROCLIMA partners
Activity 1.3 Special Issue on International Scientific/ Academic Journal on DLDD topic in LA: EUROCLIMA Programme.	Number of submitted papers.	Project activity reports Journal Special issue	EUROCLIMA partners are willing to contribute to special journal issue.
RESULT 2 Provide access to indicators through the integration of existing information at national and regional level and the development of a continental drought mapping tool in the Latin America Region			
Activity 2.1 Computation of the Standardized Precipitation Index (SPI) using monthly precipitation based on the Global Precipitation Climatology Centre (GPCC) dataset and/or alternatively on existing Continental datasets of precipitation for South America	SPI product computed for Latin America at Continental Level	Project activity reports Data included in the web map server	Appropriation by the EUROCLIMA partners
Activity 2.2 Computation of regional standardized vegetation indices anomalies to follow agricultural drought	Time-series of agricultural drought maps produced	Project activity reports Data included in the web map server	Appropriation by the EUROCLIMA partners

Activity 2.3 Drought frequency map	Drought frequency map computed for Latin America at Continental Level	Project activity reports Data included in the web map server	Appropriation by the EUROCLIMA partners
Activity 2.4 Research and development of innovative approaches to monitor different types of drought and their publication on Journals and Scientific Seminars/Workshops	Number of publications	Project activity reports Scientific publications	Relevant results are disseminated to key institutions and scientists
RESULT 3 Development of a Desertification Land Degradation and Drought Map Server for Latin America			
Activity 3.1 Web map server development for Latin America	Web Map Server developed Phenological metrics and drought products produced at the JRC as well as other data layers proposed by the Latin American institutions involved during the project.	Project activity reports Web map server online	Appropriation by the EUROCLIMA partners EUROCLIMA partners are willing to share datasets and products

6.2. Overview of Achieved Results versus Planned Results (IOVs)

	CODE	PLANNED ACTIVITIES	PLANNED RESULTS (IOVs)	ACHIEVED RESULTS	OBSERVATIONS
1: SOIL ACTION					
R.1.1		**Publication of Soil Atlas of LAC**			
Activity	1.1	Establishment LAC Atlas Editorial Board	Contribution and scientific support of the Editorial Board, in the preparation of the Atlas	The Editorial Board (EB) was established on July 2011 and actively contributed to the preparation of the LAC Soil Atlas. The EB meets 3 times as plenary, while two additional meetings were organized for a restricted group of experts, on specific issues.	There was very heterogeneous level of commitment within the member of the editorial board, causing some delay in the preparation of the Atlas
Activity	1.2	Collection and harmonization of soil maps received within a given deadline	Collect, integrate and harmonize the existing soil geographic information available in the LAC countries	Improvement in the thematic/geographical accuracy of soil data available for LAC. Soil Geographic Databases at national level, integrated in the existing version 2.0 of Soterlac have been provided by the following countries: Cuba, USA (Porto Rico), Mexico, Guatemala, Panama, Costa Rica, Colombia, Venezuela, Peru', Ecuador, Brazil, Uruguay, Argentina.	For several countries there were no available Soil Geographic Databases in digital format. For other countries, the data were existing, but we couldn't have access to them by the mean of the contact points we had.
Activity	1.3	Preparation and publication of the Atlas	Publication of the Soil Atlas, thanks to the integration of all the	Compilation and publication of	Despite the declaration of commitment, several authors were very late in providing the

	CODE	PLANNED ACTIVITIES	PLANNED RESULTS (IOVs)	ACHIEVED RESULTS	OBSERVATIONS
			contributions produced by the involved experts	the Atlas. The Atlas can be also downloaded as pdf file.	contributions, and some of them didn't provide any of the agreed contribution. On the other end some of the contributors of the Atlas showed a very enthusiastic participation to this activity.
R.1.2		**Establishment of Scientific Network of LAC Soil Scientists (Latin America Soil Bureau Network)**			
Activity	2.1	Establishment of the scientific network	Reinforcement of the connections within the LAC soil science community and establishment of relationships between LAC and EU soil science community	Up to now 71 soil experts from 19 LAC countries have been involved in the Networks	There was very heterogeneous level of commitment within the member of the Scientific Network
Activity	2.2	Management and activities of the network	Organization and coordination of the meetings of the LAC Soil Bureau Network. Management of the activities of the network, aimed to the preparation of the LAC Soil Atlas and to the production of other scientific outputs.	Two meetings of the LAC Soil Bureau Network were organized.	
Activity	2.3	Courses, seminars, trainings	Organization and coordination of courses, seminars, trainings.	As a joint activity of the EUROCLIMA programme and of the Latin America and Caribbean Soil Bureau Network, a workshop on digital soil mapping was organized during the Mar del Plata meeting. This workshop act as catalyst for the organization of other two workshops, on the same topic, organized by EMBRAPA and Ciat, with the financial support of FAO.	

	CODE	PLANNED ACTIVITIES	PLANNED RESULTS (IOVs)	ACHIEVED RESULTS	OBSERVATIONS
R.1.3		**Establishment of the Latin American Soil Portal**			
Activity	3.1	Collection and publication of data, information on the Latin American Soil Portal	Collection and publication of data, information on the Latin American Soil Portal	Establishment of the EUROCLIMA Soil Portal. The portal host all soil related data and information, produced within the EUROCLIMA project. The portal act also as "mirror" for the soil related activities, taking place in LAC.	
2: AGRI4CAST ACTION					
R.2.1		**Development of consistent agro-climatic database (weather, soils, crop and management)**			
Activity	1.1	Collection of regional datasets (climate, soil, crop calendars, field and crop management) and implementation within an agro-climatic database.	Data schemas included in the database The distribution of data to LA stakeholders via web services: number of accesses to the web pages containing the distributed data Production of crop simulation results in RESULT 2.2 which depend on the outcome of RESULT 2.1	Data layers produced as expected. They can be visualized on the web site and accessed via the BioMA platform that can be installed from the website. The crop simulation results that were produced using these data layers result in plausible results, thereby confirming the validity of the data. Number of visitors to the website from November 2012 to April 2013: 109	The number of accesses to the dedicated website as an objectively verifiable indicators is of limited value to measure the impact, because the webpage, being a final outcome of the project, was finalized and publicized only in the end of the project.
R.2.2		**Implementation of crop models and agro-climatic indexes for short to medium-term climate change impact and response analysis**			
Activity	2.1	Calibration of crop models over LA	Simulation of crop yield results when simulating with baseline climate	The crop simulation results that were produced using this calibration yields plausible results as determined by expert knowledge..	

	CODE	PLANNED ACTIVITIES	PLANNED RESULTS (IOVs)	ACHIEVED RESULTS	OBSERVATIONS
Activity	2.2	Development and implementation of agro-climatic indices based on the collected climatic data for analysis of trends, thresholds, etc	Generation of valid values for indices when applied to baseline climate The distribution of the indices to LA stakeholders via Web services: number of accesses to the web pages containing the distributed data	The results of the calculated indices yield plausible valid as determined by expert knowledge Number of visitors to the website from November 2012 to April 2013: 109	The number of accesses to the dedicated website as an objectively verifiable indicators is of limited value to measure the impact, because the webpage, being a final outcome of the project, was finalized and publicized only in the end of the project.
Activity	2.3	Crop growth simulations under future climate scenarios for a series of crops (wheat, maize, soybean, rice)	Distribution of the results of the crop simulations to the LA stakeholders via web services: number of accesses to the web pages containing the distributed data	The crop simulation results that were produced provide plausible results as determined by expert knowledge. Number of visitors to the website from November 2012 to April 2013: 109	The number of accesses to the dedicated website as an objectively verifiable indicators is of limited value to measure the impact, because the webpage, being a final outcome of the project, was finalized and publicized only in the end of the project.
3: WATER RESOURCES MANAGEMENT ACTION					
R.3.1		**Latin America & Caribbean (LAC) Water Resources Management Data Base**			
Activity	1.1	Development of geographical database of Water Resources	Spatial data uploaded in the AQUAKNOW platform with access to the LA Experts Geographical tools and spatial functionalities developed	> 80 datasets and water related indicators >7000 Meteorological stations from Latin America and Cuba were analyzed and published at the AquaKnow: http://www.aquaknow.net/en/platform-developer/node/12312 - Development of a GIS Map Viewer and a set of geographic tools for uploading your own data. http://www.aquaknow.net/en/data/gis - Tools for performing spatial operations such as: buffer,	In addition to this, the JRC in close collaboration with the Latin American partners involved in this action developed the software: Regional Frequency Analysis of Climate Variables (REFRAN-CV). This tool allows the generation of return periods maps of hydrological events using L-moments statistics. The software can be found at AquaKnow: http://goo.gl/NUYpv

	CODE	PLANNED ACTIVITIES	PLANNED RESULTS (IOVs)	ACHIEVED RESULTS	OBSERVATIONS
				intersect, within, etc. http://www.aquaknow.net/en/geo-dashboard	
Activity	1.2	Virtual support to the Network for inter-institutional scientific & technological dialogue on water resource management	Number of users registered in the "EUROCLIMA-Agua" working group (AquaKnow) Number of accesses to EUROCLIMA-Water pages Number of documents published by EUROCLIMA partners in the AquaKnow Platform.	Number of members: 105 Number of documents: 33 Statistics of EUROCLIMA-Water since the creation of the working group: Page Views 4.112, Average Time On Page 46 seconds.	
R.3.2		**Water Resources Management Monitoring System**			
Activity	1.1	Exchange of information and preparation and holding of Regional Seminar		Kick off Meeting Quito (Ecuador)- October 2010, 43 participants, 11 LAC countries 1st Regional Seminar Latin America centres of excellence RALCEA and EUROCLIMA Ispra (Italy) July 2011, 53 participants, 14 LAC countries	
Activity	1.2	Meetings, training and local capacity building (methods and tools)	Number of regional meetings organized Number of LA Experts invited to the meetings Number of LA Experts attending the meetings Number of countries attending the meetings Number of countries and LA Experts inscribed in the Working groups of the AQUAKNOW platform	-Training courses and meetings: Panama City (Panama) – May 2011, 25 participants, 12 LAC countries on AQUAKNOW and EC Water Project Toolkit. Ispra (Italia) – July 2011, 15 participants from 12 LAC countries -> Training of Trainers: L-Moments methodology for Computing the Variability of Climate Variables involved in the Water Balance	

	CODE	PLANNED ACTIVITIES	PLANNED RESULTS (IOVs)	ACHIEVED RESULTS	OBSERVATIONS
			Methodology agreed by the LA Institutions Number of LA Institutions invited to the meetings Number of LA Institutions attending the meetings Number of trainings and seminars organized Number of participants attending the training courses and meetings	Guayaquil (Ecuador) October 2011, 30 participants from 12 LAC countries -> Training LA Institutions on the production of National Products of Regional Frequency Analysis of Climate Variables (Precipitation) Santiago (Chile) March 2013, 10 participants, 7 LAC countries -> REFRAN-CV training -On-line training course on AquaKnow: A complete set of videos explaining how to calculate L-moments using R software: http://www.aquaknow.net/en/balance-hidrologico-regional/news/tutoriales-sobre-el-analisis-regional-de-frecuencias-basado-en-l-momentos	
Activity	1.3	Monitoring of ongoing process and report dissemination	Number of scientific publications in international journals Number of oral presentations in specialized congresses and workshops Number of reports produced along the EUROCLIMA project	Two scientific papers were published in peer reviewed journals, one abstract was presented at a Scientific International Conference and another paper is currently under preparation.	

	CODE	PLANNED ACTIVITIES	PLANNED RESULTS (IOVs)	ACHIEVED RESULTS	OBSERVATIONS
4: BIO-S ACTION					
R.4.1					
		Organisation of 3 Bioenergy Workshops (see below 1, 2 & 3) in Latin America with Joint participation from LA and EU experts	3 EUROCLIMA Bioenergy Workshops	Bioenergy Workshops held as planned in Buenos Aires,& Campinas, 2011 and Santiago de Chile, 2013	Costa Rica & Colombia initially planned as location of the third Workshop
	1	Workshop on GHG Emissions from biofuels and bioenergy		Workshop held in Buenos Aires, Argentina, 29-30 March 2011, followed by Open Seminar on the same subject and field trip to soya producing regions Exchange of information, and data, network development, identification of thematic fields of common interest for future cooperation, capacity building.	
	2	Workshop on Agro-environmental assessment of biofuels and bioenergy		Held in Campinas, Brazil, end of November 2011, in cooperation with University of Campinas and CTBE (Brazilian Centre for Bioethanol)	
	3	Workshop on Technology Transfer and Technology Cooperation		Held in Santiago de Chile, March 2013, in cooperation with the Centre for Renewable Energy of the Ministry of Energy	

	CODE	PLANNED ACTIVITIES	PLANNED RESULTS (IOVs)	ACHIEVED RESULTS	OBSERVATIONS
5: DESERTIFICATION, LAND DEGRADATION AND DROUGHT (DLDD) ACTION					
R.5.1		**Provide access to regional wide fundamental bio-physical and socio-economic datasets including remote sensing based phenology metrics and derived higher level indices that are essential as baseline layers for addressing specific DLDD issues**			
Activity	1.1	Coordination of data collection and harmonization of existing datasets into standardized regional products.	Number of Latin American Institutions involved Number of local/national datasets in the map server Initial coordination and networking meeting Final meeting in order to disseminate results Provide capacity building regarding tools and methodologies used.	> 30 institutions > 30 datasets Kick-off Meeting in Santiago de Chile (Apr. 2011) Final Meeting in Natal (Oct. 2012) 2 capacity building workshops	
Activity	1.2	Computation of regional phenological metrics based on satellite time series data for Latin America	Number of phenological metrics computed	6 regional metrics included in the map server	
Activity	1.3	Special Issue on International Scientific/ Academic Journal on DLDD topic in LA: EUROCLIMA Programme	Number of submitted papers	> 20 scientific papers were submitted by Latin American institutions collaborating with EUROCLIMA DLDD component	Activity developed after the extension of the initial Administrative Arrangement.
R.5.2		**Provide access to indicators through the integration of existing information at national and regional level and the development of a continental drought mapping tool in the Latin America Region**			
Activity	2.1	Computation of regional Standardized Precipitation Index (SPI) maps for Latin America	Automatic SPI processing chain completed and successfully updating regional indicators each month	Regional SPI maps included in the map server and updated automatically for each month since Jan. 1950	

	CODE	PLANNED ACTIVITIES	PLANNED RESULTS (IOVs)	ACHIEVED RESULTS	OBSERVATIONS
Activity	2.2	Computation of regional standardized vegetation indices anomalies to follow agricultural drought	Time-series of agricultural drought maps produced	Time-series of vegetation anomalies computed and available in the map server	Activity developed after the extension of the initial Administrative Arrangement.
Activity	2.3	Computation of regional drought frequency and duration maps for Latin America	Regional drought frequency and duration maps produced	Regional drought frequency and duration maps computed and available in the map server	
Activity	2.4	Research and development of innovative approaches to monitor different types of drought and their publication on Journals and Scientific Seminars/Workshops	Number of publications	1 published, 1 submitted, 2 in final preparation	Activity developed after the extension of the initial Administrative Arrangement.
R.5.3		**Development of a Desertification Land Degradation and Drought Map Server for Latin America**			
Activity	3.1	Development of a web map server for Latin America	Web Map Server on-line Number of phenological metrics and drought products produced at the JRC as well as other data layers proposed by the Latin American institutions involved during the project.	Web map server online. Around 50 Desertification, Land Degradation and Drought products online and published through map server	

6.3. Listing of stakeholders linked to the Project

EUROCLIMA-JRC Component SOIL

Contact Person	Institution	Country
Marcos Angelini	Instituto Nacional de Tecnología Agropecuaria	Argentina
Julio Alegre	Universidad Nacional Agraria La Molina	Perú
Alfredo Altamirano	Ministerio de Ganadería Agricultura y Pesca	Uruguay
Álvaro Califra	Facultad de Agronomía. UDELAR	Uruguay
Gloria Arevalo	Universidad Agrícola Panamericana de Zamorano	Honduras
Jesús Argumedo	Instituto Nacional de Estadística y Geografía	México
Durán Artigas	Facultad de Agronomía. UDELAR	Uruguay
Sara Barcelo	Joint Research Center	Italia
Francisco Bautista	Universidad Nacional Autónoma de México	México
Laura Reyes	Sociedad Latino Americana de la Ciencia del Suelo	México
Jose Bojórquez	Universidad Autónoma de Nayarit	México
Dalmacio Bosch	Instituto de Suelos	Cuba
Javier Burgos	Universidad Mayor de San Simon - CISTEL	Bolivia
Libardo Burgos	Instituto Geográfico Agustín Codazzi	Colombia
Priscila Carrasco	Centro de Información de Recursos Naturales	Chile
Aracely Castro	Centro Internacional de Agricultura Tropical	Colombia
José Colocho	Asociacion Salvadoreña de la Ciencia del Suelo	El Salvador
Juan Comerma	Sociedad Venezolana de Ciencias del Suelo	Venezuela
Francisco de la Trinidad	Instituto Nacional de Estadística y Geografía	México
Ricardo de Oliveira	EMBRAPA Solos	Brasil

Hector F. Del Valle		Argentina
Martin Dell'Acqua	Ministerio de Ganadería Agricultura y Pesca	Uruguay
Mário Diamante	EMBRAPA Solos	Brasil
Vicente Díaz	Secretaría del Medio Ambiente del Estado de Aguascalientes	México
Emma Fuentes	Instituto de Suelos	Cuba
Gonzalo Gajardo	Centro de Infromacion de Recursos Naturales	Chile
Jorge Etchevers	Colegio de Postgraduados. SAGARPA.	México
Carlos Cruz	Colegio de Postgraduatdos	México
Sady García	Universidad Nacional Agraria La Molina	Perú
Ciro Gardi	Joint Research Center	Italia
Humberto Gonçalves	EMBRAPA Solos	Brasil
Augusto González	Centro de Levantamientos Integrados de Recursos Naturales Por Sensores Remotos CLIRSEN	Ecuador
Juan Guerrero	Universidad Nacional Agraria La Molina	Perú
Renato Haro	Centro de Levantamientos Integrados de Recursos Naturales Por Sensores Remotos CLIRSEN	Ecuador
Alberto Hernández	Instituto Nacional de Ciencias Agrícolas	Cuba
Luis Hernani	EMBRAPA Solos	Brasil
Mariana Hill	Ministerio de Ganadería	Uruguay
Juan Jimenez	Pyrenean Institute of Ecology	España
Arwyn Jones	Joint Research Center	Italia
Pavel Krasilnikov	Eurasian Center for Food Security (Rusia)	Rusia
Braulio La Torre	Universidad Nacional Agraria La Molina	Perú
Ana Larrosa	Ministerio de Ganadería Agricultura y Pesca	Uruguay
Raúl Marsán	Instituto de Suelos	Cuba
Rafael Mata	Universidad de Costa Rica	Costa Rica
Maria Mendonça	EMBRAPA Solos	Brasil
Reynaldo Mendoza	Universidad Nacional Agraria	Nicaragua
José Merlo	Centro de Levantamientos Integrados de Recursos Naturales Por Sensores Remotos CLIRSEN	Ecuador

Luca Montanarella	Joint Research Center	Italia
Olegario Muñiz		Cuba
Julio Nazario	Universidad Nacional Agraria La Molina	Perú
Marco Nocita	Joint Research Center	Italia
Pedro Núñez	Instituto Dominicano de Investigaciones Agropecuarias y Forestales	Republica Dominicana
Federico Olmedo	Instituto Nacional de Tecnología Agropecuaria	Argentina
Ronald Ontiveros	Universidad Autónoma Chapingo	Mexico
Lily Paniagua		Costa Rica
Patrocinio Alonso	Sociedad Paraguaya de Ciencias del Suelo	Paraguay
Juan Pérez	Instituto de Suelos	Cuba
Cecilia Petraglia	Ministerio de Ganadería Agricultura y Pesca	Uruguay
Lúcia Queiroz	EMBRAPA Solos	Brasil
Carlos Quesada	Amazon Forest Inventory Network	Brazil
Thomas Reinsch	Unite States Department of Agriculture	USA
Gerardo Reyes	Centro de Información de Recursos Naturales	Chile
Riekhnath Sanchit	National Planning Office	Surinam
Luis Rivero	Instituto de Suelos	Cuba
Mauricio Rizzato	EMBRAPA Solos	Brasil
Andrés Rodríguez	Instituto Geográfico Agustín Codazzi	Colombia
Arnulfo Encina	Sociedad Paraguaya de Ciencias del Suelo	Paraguay
Víctor Romero	Instituto Nacional de Estadística y Geografía	México
Lucas Ruiz	Glaciología y Ciencias Ambientales.Consejo Nacional de Investigaciones Científicas y Técnicas	Argentina
Darwin Sanchez	Centro de Levantamientos Integrados de Recursos Naturales Por Sensores Remotos CLIRSEN	Ecuador
Peter Schad		Alemania
Gustavo Sevillano	Centro de Levantamientos Integrados de Recursos Naturales Por Sensores Remotos CLIRSEN	Ecuador
Ricardo Siachoque	Instituto Geográfico Agustín Codazzi	Colombia

José de Souza	EMBRAPA Solos	Brasil
Constantino Soto	Universidad Mayor de San Simon	Bolivia
Wenceslau Geraldes	EMBRAPA Solos	Brasil
Hugo Tobías	Universidad de San Carlos de Guatemala	Guatemala
María Vara	Joint Research Center	
Ronald Vargas	Food and Agliculture Organizatin	
José Villarreal	Instituto de Investigación Agropecuaria de Panamá	Panamá
Gilberto Xix	INEGI	México
Darwin Yánez	Centro de Levantamientos Integrados de Recursos Naturales Por Sensores Remotos CLIRSEN	Ecuador
Yusuf Ygini	Joint Research Center	Italia

EUROCLIMA-JRC Component WATER

Table Water1 – *Names of the Latin American contact persons, and main Institutions, contributing to the implementation of the EUROCLIMA-Water.*

Contact Person	Institution	Country	e-mail
Roberto Eduardo Zanvettor	Universidad Nacional Cordoba (CREAN)	Argentina	rzanvetor@gmail.com
Arthur Lucas Bernardo	Laboratorio de Análisis y Procesamiento de Imágenes de Satélite LAPIS	Brasil	Arthur.lucas.melo@gmail.com
Jorge Nuñez Cobo	Centro del Agua para Zonas Áridas y Semiáridas de América Latina y El Caribe (CAZALAC)	Chile	jnunez@cazalac.org
Claudia Yaneth Contreras Trujilo	IDEAM	Colombia	ccontreras@ideam.gov.co
Claudia Patricia Romero Hernández	Universidad Nacional de Colombia	Colombia	rhclaudiapatri@hotmail.com
José Joaquín Chacon	Dirección del agua, MINAET	Costa Rica	jchacon@da.go.cr
Dr. Roberto Aroche	CITMA	Cuba	Roberto.aroche@insmet.cu
Pilar Ycaza	Centro Internacional para la Investigación del Fenómeno de El Niño (CIIFEN)	Ecuador	p.ycaza@ciifen.org
Abdel Borbor	Instituto Nacional de Meteorología e Hidrología (INAMHI)	Ecuador	aborbor@inamhi.gob.ec
Dr. Luis Brito Castillo	Centro de Investigaciones Biológicas del Noroeste SC	Mexico	Lbrito04@cibnor.mx
Gladys Haydee	Autoridad Nacional del Ambiente	Panama	Gladys.villareal@anam.gob.pa
Julia Acuña Azata	SENAMHI	Perú	jacuna@senamhi.gob.pe
Franklin Javier Paredes Trejo	Centro de Investigaciones Hidrologicas y Ambientales (CIHAM-UC)-Facultad de Ingeniería Universidad Carabobo Unellez	Venezuela	Franklinparedes75@gmail.com

EUROCLIMA-JRC Component BIOENERGY

Institution	Country
LAC Countries	
Ministry of Agriculture of Argentina, INTA	Argentina
RECOPE	Costa Rica
Ministry of Environment	Mexico
Technology Monterrey	Mexico
Ministry of Environment	Colombia
Corn Chain Chamber	Argentina
No Till Farming Association	Argentina
University of Campinas	Argentina
EMBRAPA	Brazil
University of Sao Paulo	Brazil
University of La Pampa	Argentina
University of Mendoza	Argentina
Ecology University of Buenos Aires	Argentina
INAI Foundation	Argentina
UNICA	Brazil
CITNIA	Cuba
Delta CO_2	Brazil
Ministry of Mines & Energy	Colombia
Ministry of Environment	Nicaragua
INPE	Brazil
Centre for Renewable Energy	Chile
Ministry of Energy	Chile
Unit of Technological Development of Concepcion	Chile

Foundation for Agriculture Innovation	Chile
Desert Biofuels Consortium	
AlgaeFuels Consortium	
Bioenercel Consortium	
Interdisciplinary Center of Energy Planning	
University of Bucaramanga	Colombia
Europe and International	
CIEMAT	Spain
National Renewable Energy Centre (CENER)	Spain
IFEU	Germany
Oeko Institute	Germany
Utrecht University	Netherlands
Pennsylvania University	USA
Delft University	Netherlands
Wageningen University	Netherlands
Swedish University of Agricultural Sciences	Sweden
Centre for Renewable Energy & Renewables	France
Imperial College London	
United Nations Food & Agriculture Organisation (FAO)	
Comisión Económica para América Latina (CEPAL)	
International Energy Agency (IEA)	
Inter-American Institute for Cooperation on Agriculture IICA	
Intenational Institute for Sustainability Analysis & Strategy (INAAS)	

EUROCLIMA-JRC Component AGRI4CAST

Table AGRI4CAST1 – *Names of the Latin American contact persons, and respective institutions, participating in the development of the Agri4cast component of EUROCLIMA (including with their contribution to the workshops)*

Contact Person	Institution	Country	e-mail
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Aryeverton Fortes de OLIVEIRA	EMBRAPA	Brazil	ary.fortes@embrapa.br
RUDORFF, Bernardo	Instituto Nacional de Pesquisas Espaciais (INPE), Brazil	Brazil	bernardo@dsr.inpe.br
Hilton PINTO	University of Campinas	Brazil	hilton@cpa.unicamp.br
Camilo BARRIOS PEREZ	International Center for Tropical Agriculture (CIAT)	Colombia	c.barrios@cgiar.org
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EUROCLIMA-JRC Component DLDD

In Table DLDD3 we present the name of the Latin American stakeholders that were actively participating in the workshops, capacity building training sessions and on the implementation of the EUROCLIMA DLDD Observatory for Latin America.

Table DLDD3 **–** *List of stakeholders linked to the DLDD component of EUROCLIMA.*

Contact Person	Institution	Country	e-mail
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Vanesa Pántano	Laboratorio de Extremos Climáticos en Sudamérica - Departamento de Ciencias de la Atmósfera y los Océanos - Facultad de Ciencias Exactas y Naturales - Universidad de Buenos Aires	Argentina	vanesapantano@yahoo.com.ar
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Contact Person	Institution	Country	e-mail
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Mariano Espinoza	Sistema Nacional de las Áreas de Conservación (SINAC) del Ministerio de Ambiente, Energía y Telecomunicaciones (MINAET)	Costa Rica	mariano.espinoza@sinac.go.cr
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Ricardo Zimmermann	Centro de Información Climatológica y Agrometeorológica, Servicio Nacional de Estudios Territoriales (SNET), Ministerio de Medio Ambiente y Recursos Naturales (MARN)	El Salvador	rzimmermann@marn.gob.sv
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Contact Person	Institution	Country	e-mail
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Carlos Cruz Gaistardo	Coordinación General de Ganadería de la Secretaria de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación	México	carloscruzg@yahoo.com.mx
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Gerardo González Sandoval	Director de Gestión Integrada de Cuencas Hidrográficas, Autoridad Nacional del Ambiente (ANAM)	Panamá	ggonzalez@anam.gob.pa
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Dra. Sonia Gonzalez	Ministerio de Ambiente	Peru	pcolibris@yahoo.com
Agustín Giménez	GRupo Agroclima y Sistemas de información (GRAS), Instituto Nacional de Investigación Agropecuaria (INIA)	Uruguay	agimenez@inia.org.uy
Franklin Paredes	Universidad Nacional Experimental de los Llanos Occidentales "Ezequiel Zamora" (UNELLEZ), Grupo para Investigaciones sobre Cuencas Hidrográficas y Recursos Hidráulicos del Programa Ingeniería (GICHRI)	Venezuela	franklinparedes75@gmail.com
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Carlos Horacio	División de Suelos y Aguas de la Dirección	Programa	cclerici@mgap.gub.uy

Contact Person	Institution	Country	e-mail
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Koen Verbist	Oficina Regional de Educación de la UNESCO para América Latina y el Caribe (OREALC/UNESCO Santiago)	Naciones Unidas (UN)	k.verbist@unesco.org
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6.4. Listing of all materials, publications, studies and other products of the Project

EUROCLIMA-JRC Component SOIL

- **Calendar**

  The calendar was a mean to highlights the diversity and richness of soil in South America and the Caribbean and should help the reader to better understand the characteristics and potential of various soil types in this part of the world. It has been published in three languages (Spanish, Portuguese and English), and distribute in more than 1000 copies in Latin America and Caribbean, Europe and in several international conferences worldwide.

- **Soils Atlas**

  The Soil Atlas of LAC illustrates the Diversity of soils from the humid tropics to the arid deserts through a series of maps supported by explanatory texts, high quality photographs and descriptive graphics. The Atlas has been published in 3000 copies in Spanish, Portuguese and English.
  Details on the Soil Atlas of Latin America, as well as on the meeting are available at
  http://eusoils.jrc.ec.europa.eu/library/Maps/LatinAmerica_Atlas/Index.html
  https://ec.europa.eu/jrc/sites/default/files/jrc_newsrelease_20140214_soil_atlas_en.pdf

- **Soil maps and associated datasets and Latin American Soil Portal**
  Useful for making broad distinction among soil types and provide general trends at the global and regional scales
  http://eusoils.jrc.ec.europa.eu/

Scientific papers

At the moment we published one scientific paper, on Current Opinions in Environmental Sustainability, but further scientific output are already planned. The paper, "Soil information in support of policy making and awareness raising" (Bouma et al., 2012) presented an overview on the example of innovative ways to present soils and raise soil awareness, and among them the Soil Atlas of LAC.

http://www.sciencedirect.com/science/article/pii/S1877343512000887

- **Capacity building**

  The establishment of the Latin America and Caribbean Soil Bureau Network, already presented in the point 3.1, should be considered a capacity building activity.

  Other initiative in this context, were the trainings on digital soil mapping and harmonization of soil data, the first of them was entirely organized with the support of EUROCLIMA project, and the following two, funded by FAO.

During the project lifetime two scientific papers were published in peer reviewed journals, one abstract was presented at a Scientific International Conference and another paper is currently under preparation:

- Maeda, E.E., Arévalo, J., Carmona-Moreno, C., "Effects of time-series length and gauge network density on rainfall climatology estimates in Latin America". In: European Geosciences Union General Assembly 22-27 April, 2012, Vienna. JRC 68521. http://adsabs.harvard.edu/abs/2012EGUGA..14.4010M
- Maeda, E.E., Arévalo, J., Carmona-Moreno, C. (2012) "Characterization of global precipitation frequency through the L-moments approach". Area-Royal GeographicalSociety. doi: 10.1111/j.1475-4762.2012.01127.x JRC66941 http://onlinelibrary.wiley.com/doi/10.1111/j.1475-4762.2012.01127.x/abstract
- Maeda, E.E., Arévalo, J. (2012) "Open environmental data in developing countries: who benefits?" AMBIO, 41 (4) 410-412, doi: 10.1007/s13280-012-0283-4. JRC 69596. http://link.springer.com/article/10.1007%2Fs13280-012-0283-4
- Maeda, E.E., Arévalo, J., Carmona-Moreno, C., Nuñez, J., Romero, C., Ycaza, P., Aroche, R., Brito., L. (2013) "Improving climate knowledge in Latin America through international cooperation." *Paper under preparation*.
- Arévalo, J., Carmona-Moreno, C., Nuñez, J., Romero, C., Ycaza, P., Aroche, R., Brito., L. (2013) "Regional Frequency Analysis for Climate Variables (REFRAN-CV). A Software for the analysis of Climate Variability". *Paper under preparation*.

● Publication of the REFRAN-CV software (Open-source and free downloadable software):
http://www.aquaknow.net/en/euroclima-agua/links/regional-frequency-analysis-climate-variables-refran-cv-software-alpha-version

● EUROCLIMA-WATER website on Aquaknow
http://www.aquaknow.net/en/euroclima-agua

EUROCLIMA-JRC Component BIOENERGY

- Practical indicators on extensive agriculture production

F.Frank, ffrank@anguil.inta.gov.ar
INTA EEA "Ing. Agr. Guillermo Covas" Anguil (LP)
Facultad de Ciencias Exactas y Naturales – UNLPam
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- Sustainability Certification of Argentine Soybean Based Biodiesel

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- Field measurements of agricultural emissions

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- Argentine Soybean oil biodiesel: GHG calculation for different agrotechnologies and productive areas of Argentina

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- Quantification of GHG emissions derived from biofuels and bioenergy, Upgrading the state of the art on N_2O emissions from agricultural soils

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- Biofuels in Mexico: challenges for sustainable production and use

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INE - Instituto Nacional de Ecología, Periférico Sur 5000, Col. Insurgentes Cuicuilco, 04530 México D.F., México

- *Costa Rican experience in the field of biofuels for transport and bioenergy for heat or electricity,*

P. Orozco paola.orozco@recope.go.cr
Refinadora Costarricense de Petróleo S.A., Energy and Research Unit,
Postal Code Nº4351-1000, San José, Costa Rica.

- *GHG Savings from biofuel production and use in Spain. The effect of regional raw material cultivation peculiarities.*

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Agroenergy Group. GA-ETSIA Madrid, Spain.

- *Agrofuels and water in Argentina*

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Centro de Investigación de recursos Naturales
Las Cabañas y Los Reseros s/n
1712 Castelar, Buenos Aires, Argentina

- *Bioenergy and water: Brazilian sugarcane ethanol*

F.Vale Scarpare
Brazilian Bioethanol Science and Technology Laboratory (CTBE/CNPEM)
Caixa Postal 6170,8 13083-970 Campinas, São Paulo, Brazil.

- *Renewable energy progress in Mexico: a review*

Gibrán S. Alemán-Nava[a], Diana Linda Cardenas-Chavez[a], María Cuaresma[b], Maria Barbosa[c], Rouke Bosma[d], Rene H. Wijffels[d], Roberto Parra[a]*, JF Dallemand[e]
[a] Centro del Agua para América Latina y el Caribe, Instituto Tecnológico y de Estudios Superiores de Monterrey, Monterrey, México
[b] Departamento de Química y Ciencia de los Materiales, Universidad de Huelva, Huelva, España
[c] Food and Biobased Research, Wageningen University, Wageningen, The Netherlands
[d] Bioprocess Engineering, Wageningen University, Wageningen, The Netherlands
[e] European Commission Joint Research Centre

EUROCLIMA-JRC Component AGRI4CAST

- M. Donatelli, G. Duveiller, S. Niemeyer (2011). The EUROCLIMA Agriculture component. Poster presented at the COP2011 in Durban.
- R. Confalonieri, M. Donatelli, S. Bregaglio, F.N. Tubiello, E. Fernandes (2012). Agroecological Zones Simulator (AZS): A component based, open-access, transparent platform for climate change – Crop productivity impact assessment in Latin America. In: R. Seppelt, A.A. Voinov, S. Lange, D. Bankamp (Eds.) International Environmental Modelling and Software Society (iEMSs) 2012 International Congress on Environmental Modelling and Software. Managing Resources of a Limited Planet, Sixth Biennial Meeting, Leipzig, Germany. 8 pp. [available at http://www.iemss.org/sites/iemss2012//proceedings/C3_0915_Confalonieri_et_al.pdf]
- E. Fernandes, A. Soliman, R. Confalonieri, M. Donatelli, F. Tubiello. (2013) Climate Change and Agriculture in Latin America, 2020-2050: Projected Impacts and Response to Adaptation Strategies. Directions in Development. World Bank Report. Published July 1, 2013 by World Bank. ISBN: 978-0-8213-9653-7; SKU: 19653. 88 pp. [available at http://hdl.handle.net/10986/12582]

● AGRI4CAST Dedicated website the reader can find much information regarding the BioMA platform, the consolidated input datasets and the crop model runs.
http://agri4cast.jrc.ec.europa.eu/euroclima/

● More information of the general BioMA packages and ongoing developments, help guides and downloads is available from the general BioMA website
http://bioma.jrc.ec.europa.eu/

Note: For all, dissemination was done by either the web or via the conference at which they were presented. No hard copies were produced or disseminated by AGRI4CAST.

EUROCLIMA-JRC Component DLDD

Several scientific papers, technical reports and newsletters describing the advances, contributions and results of EUROCLIMA DLDD for the Latin America community were already published or are to be published, namely:

- Horion S., Hugo Carrão, A. Singleton, P. Barbosa and J. Vogt (2012). JRC experience on the development of Drought Information Systems. Europe, Africa and Latin America. EUR – Scientific and Technical Research Reports, Publications Office of the European Union, Luxembourg (Luxembourg): JRC68769. Available on-line at: http://publications.jrc.ec.europa.eu/repository/bitstream/111111111/23582/1/lbna25235enn.pdf
- EUROCLIMA e-Newsletter # 4 (2012). Climate Change in Latin America: Soils, Desertification and Drought, 10pp (http://edo.jrc.ec.europa.eu/scado/php/index.php?id=3006).
- Hugo Carrão, G. Sepulcre, S. Horion and Paulo Barbosa (2013). A multitemporal and non-parametric approach for assessing the impacts of drought on vegetation greenness: A case study for Latin America. *EARSeL eProceedings*, 12(1): 8-24. Available on-line at: http://www.eproceedings.org/static/vol12_1/12_1_carrao1.html.
- Hugo Carrão, A. Singleton, G. Naumann, P. Barbosa and J. Vogt (2013). An Optimized System for the Classification of Meteorological Drought Intensity with Applications in Frequency Analysis. *Journal of Applied Meteorology and Climatology*, peer-reviewed journal paper to be submitted.
- Michael Cherlet, E. Ivits, H. Carrão, E. Abraham, G. Dascal and S. Sommer (2013). Assessing Land Degradation in Latin America Using Satellite Derived Phenology and Productive variables. *Land Degradation and Development*, peer-reviewed journal paper to be submitted.

A special issue on Land Degradation and Desertification is being prepared in the framework of the EUROCLIMA DLDD component and to be published on the Journal of Land Degradation & Development with several contributions from Latin American partners. At the present moment, more than 20 papers were submitted and are under review by the Journal.

● EUROCLIMA map-based Web viewer http://edo.jrc.ec.europa.eu/scado The map-based Web viewer is based on similar work currently being developed by the JRC for the European Drought Observatory http://edo.jrc.ec.europa.eu and for the New World Atlas of Desertification http://wad.jrc.ec.europa.eu

6.5. Listing of all events (seminars, workshops, coordination meetings) and web links to the material produced.

EUROCLIMA-JRC Component SOIL

A number of meetings were organized:

- **Rio de Janeiro** 06 - 10 de Septiembre de 2010, Embrapa Solos, RIO, Rua Jardim Botânico, 1024 , Brazil
  The first activity of the thematic component soils was the kick-off meeting of the Soil Atlas of Latin America and the Caribbean
  Held together with the First Regional Workshop of the Latin American node of the project GlobalSoilMap.net

- **Ispra,** 4-7 July 2011**,** held in conjunction with the meeting of focal points of EUROCLIMA project. The editorial board of the Atlas attended a full day of the meeting
- **Mar de Plata,** 16-20 April 2012
  - In the occasion of the XIX Congress of Soil Science Societies of Latin America, we have organized the following activities and events:
  - Editorial Board meeting for the Soil Atlas of LAC
  - Symposium "Atlas de Suelos de Latinoamérica" 17th April 2012;
  - Symposium "Sistema de Información de Suelos de Latinoamérica" 18th April 2012; this symposium was an important Milestone for the establishment of LAC Soil Bureau Network.
- **Berlin ,** 18-22 November 2012. meeting with the editorial board of the Soil Atlas of Latin America and Caribbean region (LAC). The participants of the meeting were: Ricardo F. Siachoque Bernal (IGAC, Colombia), Miguel Taboada and Carla Pascale (Soil Institute, Argentina), Olegario Muñiz (Soil Institute, Cuba), Arnulfo Encina Rojas (Soil Department, Universidad Nacional de Asunción, Paraguay), Julio Alegre (Universidad Nacional Agraria, Perú), Ronald Vargas (FAO), Pedro A. Núñez Ramos (IDIAF, República Dominicana), Pavel Krasilnikov (Russia), Augusto González (Instituto Espacial Ecuatoriano, Ecuador), Marco Nocita, Ciro Gardi and María Isabel Vara Rodríguez (JRC).

Organized trainings:

- **Mar de Plata** April 212, Attended by more than 40 people actively involved in soil science, was also the occasion for the participants to present case studies and examples of excellence and good practices in the domain of digital soil mapping.
- **Cali,** 9-13 July 2012, 35 specialists in soil classification and mapping from 19 Latin American countries were in CIAT.

- **Rio de Janeiro,** 24 to 28 September 2012. Funded by FAO, 17 countries from Latin America and Caribbean partizipated in the event (Brazil, Argentina, Bolivia, Chile, Colombia, Costa Rica, Cuba, Ecuador, El Salvador, Guatemala, Honduras, Nicaragua, Panama, Paraguay, Peru, Dominican Republic, Uruguay and Venezuela)

EUROCLIMA-JRC Component WATER

A number of training seminars on the use of the Regional Frequency Analysis methodology for computing L-moments were organized:

- Panama City (Panama) – May 2011, 25 participants, 12 LAC countries.
- Ispra (Italia) – July 2011, 15 participants from 12 LAC countries -> Training of Trainers.
- Guayaquil (Ecuador) October 2011, 30 participants from 12 LAC countries -> Training LA Institutions.
- Satiago de Chile (Chile), March 2013, 10 Participants, 7 LAC countries -> Training on REFRAN-CV software (1st version)
- On-line training courses on AquaKnow: A complete set of videos explaining how to calculate L-moments using R software: http://www.aquaknow.net/en/balance-hidrologico-regional/news/tutoriales-sobre-el-analisis-regional-de-frecuencias-basado-en-l-momentos
- On-line REFRAN-CV software: http://www.aquaknow.net/en/euroclima-agua/links/regional-frequency-analysis-climate-variables-refran-cv-software-alpha-version

Training Seminars on Virtual Water Networking tool (AQUAKNOW):

- Quito (Ecuador) October 2010, 35 participants, 12 LAC countries
- Panama City (Panama) – May 2011, 25 participants, 12 LAC countries.
- Ispra (Italia) – July 2011, 57 participants, 14 LAC countries.
- Guayaquil (Ecuador) October 2011, 30 participants from 12 LAC countries
- On-line Virtual Networking Tool: http://www.aquaknow.net/es

Training Seminars on the Water Project Toolkit:

- Quito (Ecuador) October 2010, 35 participants, 12 LAC countries
- Panama City (Panama) – May 2011, 25 participants, 12 LAC countries.
- Ispra (Italia) – July 2011, 57 participants, 14 LAC countries.
- Guayaquil (Ecuador) October 2011, 30 participants from 12 LAC countries
- On-line training course on AquaKnow: http://www.aquaknow.net/en/water-project-toolkit

- ***EUROCLIMA-JRC Component BIOENERGY***

- Green House Gases emissions from biofuels and Bioenergy
  http://iet.jrc.ec.europa.eu/remea/events/green-house-gases-emissions-biofuels-and-bioenergy

  This Expert Consultation was organised by the Joint Research Centre (JRC) of the European Commission (www.jrc.cec.eu.int) and the National Institute of Agriculture Technology (INTA), of the Ministry of Agriculture, Livestock and Fisheries of Argentina (www.inta.gov.ar/index.asp). This Meeting was an EUROCLIMA activity within the EUROCLIMA Bioenergy Module which includes the organisation in Latin America of 3 Expert Consultations on the following topics: GHG emissions from bioenergy, agroenvironmental assessment of biofuels/bioenergy and technology transfer in the field of bioenergy.

- Agro-Environmental impact of biofuels and bioenergy
  http://iet.jrc.ec.europa.eu/remea/node/11

  The objective of this Expert Consultation is to exchange expertise, collect/analyse/discuss data and information on the agro-environmental impact of biofuels and bioenergy. This meeting will focus on the impact of biofuels and bioenergy production in Latin America and Europe but considerations about other regions of the world are also relevant.

- Workshop on International Cooperation in the field of Bioenergy and Technology
  http://iet.jrc.ec.europa.eu/remea/node/215

  This meeting was organised by the Joint Research Centre in cooperation with the Centre for Renewable Energy (CER) of Chile (Ministry of Energy), and with the support of the Food and Agriculture Organisation Regional Office. This workshop was hosted by the Latin American Faculty of Social Sciences (FLACSO) and took place in Santiago de Chile. The meeting was organised further to the first EUROCLIMA Bioenergy Workshop of Buenos Aires (Argentina, March 2011, cooperation with INTA) which focused on GHG emissions from biofuels and bioenergy (see Proceedings on http://re.jrc.ec.europa.eu/biof/html/ghg_argentina.htm) and to the second EUROCLIMA Bioenergy Workshop (Campinas, Brazil, cooperation with the Brazilian Centre of Bioethanol & Technology, CTBE, see Proceedings on http://re.jrc.ec.europa.eu/biof/html/euroclima_brazil.htm.

EUROCLIMA-JRC Component AGRI4CAST

- Workshop 1. Buenos Aires, Argentina, 25-26 October 2010. [no existing weblink to material]
- Workshop 2. Campinas, Brazil, on 1-5 August, 2011. [no existing weblink to material]
- Workshop 3. Buenos Aires, Argentina, on 5-6 March 2013. [presentations of AGRI4CAST available in http://agri4cast.jrc.ec.europa.eu/euroclima under "downloads"]

EUROCLIMA-JRC Component DLDD

The EUROCLIMA DLDD Component promoted a Kick-off and a Final meeting in Latin America, as well as two Capacity Building Training workshops to Latin America scientific community on data analysis and operational systems for monitoring and alert of environmental risks. The web links to the material of the events is listed below:

- *Capacity Building Training on "Regional Analysis of Precipitation Frequencies based on L-Moments", 4 – 5 April 2011, Santiago de Chile, Chile*
  - Number of participants: 28
  - Number of countries: 17 Latin American + United States of America
  - Number of hours:16h

- *1st Regional EUROCLIMA Workshop on DLDD, 6 – 7 April 2011, Santiago de Chile, Chile*
  - Number of participants: >30
  - Number of countries: 17 Latin American + United States of America
  - Number of presentations: 25

- *Capacity Building Training on "TerraMA2 for monitoring and alert of environmental risks", 22 – 23 October 2012, Natal, Brazil*
  - Number of participants: 24
  - Number of countries: 15 Latin American
  - Number of hours: 16h

- *2nd Regional EUROCLIMA Workshop on DLDD, 24 – 25 October 2012, Natal, Brazil*
  - Number of participants: > 30 in the room + > 600 on-line through webinar
  - Number of countries: 15 Latin American + United States of America
  - Number of presentations: 27

6.6. Listing and documents of all presentations in international events during the Project

EUROCLIMA-JRC Component SOIL

Rio de Janeiro (kick-off meeting) 06 - 10 de Septiembre de 2010, Embrapa Solos, RIO, Rua Jardim Botânico, 1024 , Brazil

The first activity of the thematic component soils was the kick-off meeting of the Soil Atlas of Latin America and the Caribbean (Rio de Janeiro, Brazil, 8-9 September 2010) held together with the First Regional Workshop of the Latin American node of the project GlobalSoilMap.net

Final Programme Link: http://eusoils.jrc.ec.europa.eu/library/maps/LatinAmerica_Atlas/Meeting2010/ProgramaFinal.pdf

Final Minutes of the meeting: http://eusoils.jrc.ec.europa.eu/library/maps/LatinAmerica_Atlas/Meeting2010/Minutes_AtlasSuelosALC_2010.pdf

Presentations available at http://eusoils.jrc.ec.europa.eu/library/maps/LatinAmerica_Atlas/Meeting2010.html

DAY 1:

Presentacion (ES)	Presentation Title (EN)	Speaker
Antecedentes, vista general, expectativas y especificaciones del Proyecto GlobalSoilMap.net por el líder del Nodo para Latinoamérica y Caribe	Antecedents, general view, expectations and specifications of the GlobalSoilMap.net Project by the leader of the Node Latin America and the Caribbean	Dr. Maria de Lourdes Mendonça Santos
La Cartografía Digital de Suelos (Digital Soil Mapping -DSM) – Usos y aplicaciones de los mapas.	The Digital Ground Cartography (Digital Soil Mapping - DSM) - Uses and applications of the maps.	Dr. Bob Macmillan (Coordinador Científico del Consorcio, ISRIC, Holanda)
Teoría de los métodos de predicción para la cartografía digital de suelos: puntos, mapas existentes (polígonos) y mixtos.	Theory of the methods of prediction for the digital ground cartography: existing points, maps (polygons) and compounds.	Dr. Bob Macmillan
Preparación de datos: configuración y limpieza de datos, generación de variables medioambientales (co-variables) para la predicción de clases y propiedades de suelos.	Preparation of data: configuration and cleaning of data, generation of environmental variables (Co-variables) for the prediction of classes and ground properties.	Dra. Elisabeth Bui (Investigadora de CSIRO, Australia)
Vis-NIR análisis para aumentar la base de datos	Vis-NIR analysis to implement the data base	Raphael Viscarra Rossel, CSIRO Land and

		Water
Logística y preparación para la cartografía digital de suelos: Recolección, sistematización y armonización de datos. Ajuste de curvas (splines) a datos de perfiles de suelos para generar funciones de profundidad	Logistic and preparation for the digital soil cartography: Harvesting, systematization and harmonization of data. Adjustment of curves (splines) to data of soil profiles to generate depth functions	Dr. Bob Macmillan

DAY 2:

Presentacion (ES)	Presentation Title (EN)	Speaker
Caso de estudio sobre predicción de propiedades de suelos a través de puntos.	Case studies on prediction of soil properties through points	Dra. Elisabeth Bui
Caso de estudio sobre cartografía digital de suelos y evaluación de la aptitud para la producción de caña de azúcar en San Buenaventura, Bolivia.	Case study on digital soil mapping and evaluation of the aptitude for the sugar cane production in San Buenaventura, Bolivia	MSc. Ronald Vargas (CISTEL-Universidad Mayor de San Simón)
Caso de estudio sobre predicción de propiedades de suelos – Un ejemplo Argentino	Case study on prediction of soil properties - an Argentine example	MSc. Marcos Angelini (INTA-Argentina)
Caso de estudio sobre carbono en los suelos en el Estado de Rio de Janeiro, Brazil	Case study on soil organic carbon in the State of Rio de Janeiro, Brazil	Dra. Maria de Lourdes Mendonça Santos
Caso de estudio sobre cartografía digital de suelos en Chile	Case study on digital soil mapping in Chile	Dr. Rodrigo Ortega Blu (Universidad Federico Santa Maria, Chile)
Técnicas de disgregación espacial y uso de las informaciones para el mapeo digital de suelos	Methods of Disaggregation	Dr. Bob Macmillan
Predicción de propiedades de suelos a través de mapas discretos	Prediction of soil properties through discreet maps	Dra. Elisabeth Bui
Navigate the DVD " Latin America & Caribbean Islands " (1074 Maps)	Navigate the DVD " Latin America & Caribbean Islands " (1074 Maps)	JRC

DAY 3: **Presentation Country(EN)**	**Speaker**
Ecuador	Dr Augusto Gonzalez
Ecuador (C)	Dr Augusto Gonzalez
Ecuador (D)	Dr Augusto Gonzalez
Peru	Dr Julio Alegre Orehuela
Uruguay	Dra Mariana Hill
Honduras	Dr Carlos Antonio Gauggel
Costa Rica	Dr Rafael Mata
Venezuela	Dr Francisco Ovalles
Bolivia	Dr Ronald Vargas
Chile	Dr Rodrigo Ortega Blu
Mexico	Dr Gilberto Xix Ake
Brasil	Humberto Gonçalves
Nicaragua	Dr Jorge Luis Martinez Rayo
Colombia	Dr Carlos Castilla
El Salvador	Dr Jose Luis Colocho
Guatemala	Dr Hugo Antonio Tobias
Paraguay	Dr Arnulfo Encina Rojas
Panama	Dr Jose Ezequiel Villareal
Argentina	Dr Marcos Argelini
Argentina (B)	Ramon Sobral

Cuba	Dr Olegario Muniz
Republica Dominicana	Dr Pedro Antonio Nunez

Presentacion (ES)	Presentation Title (EN)	Speaker
Esfuerzos de Recaudación de fondos y posibilidades de financiamiento	Possibilities of financing	MBA. Johanna Martinez
Proyecto RAINFOR, presentación y sinergías con nuestro proyecto.	Project RAINFOR, presentation and synergies	Dr. Oliver Phillips , Dr. Carlos A. Quesada
Apoyo de la Comisión Europea: Como encaja el proyecto en el marco de políticas de sostenibilidad y de medio ambiente	Support of the European Commission	Dr. Luca Montanarella

DAY 4:

Presentacion (ES)	Presentation Title (EN)	Speaker
Introducción al Atlas de Suelos de Latinoamérica. Propósito y objetivo del Atlas. Beneficios futuros del atlas para los países y la región.	Introduction to the Soil Atlas of Latin America. Objectives of the Atlas. Future benefits of the atlas for the countries and the region.	Dr. Luca Montanarella
Atlas de Suelos: Tour a iniciativas en otros continentes y Contenido esperado para el Atlas de América Latina (Parte I)	Soil Atlas : Tour to initiatives in other continents and expected contents for the Atlas of Latin America (Part I)	Dr. Peter Schad (Universidad Tecnológica de Munich)
Atlas de Suelos: Tour a iniciativas en otros continentes y Contenido esperado para el Atlas de América Latina (Parte II)	Soil Atlas : Tour to initiatives in other continents and expected contents for the Atlas of Latin America (Part II)	Dr. Peter Schad (Universidad Tecnológica de Munich)
Atlas de Suelos: Tour a iniciativas en otros continentes y Contenido esperado para el Atlas de América Latina (Parte III)	Soil Atlas : Tour to initiatives in other continents and expected contents for the Atlas of Latin America (Part III)	Dr. Peter Schad (Universidad Tecnológica de

		Munich)

DAY 5:

Presentacion (ES)	Presentation Title (EN)	Speaker
Resumen del estado de la información de suelos a nivel regional. Diseño del Atlas (Tabla de contenidos, organización, etc)	Summary of the state of the information of soils at regional level. Design of the Atlas (Table of contents, organization, etc)	Dr. Pavel Krasilnikov (Karelian Research Centre, RAS, Petrozavodsk, Russia)
Sinergias entre el Atlas de Suelos de Latinoamérica y el Nodo Latinoamericano del GlobalSoilMap.net (ej. recopilación de datos históricos de suelos).	Synergies between the Soil Atlas of Latin America and the Latin American Node of GlobalSoilMap.net (ex. historical soil data)	Ronald Vargas y Lou Mendonça

Mar del Plata

Soil Atlas of Latin America, due for final publication in 2013. Details on the side event are available at http://www.cnps.embrapa.br/noticias/banco_noticias/20120619.html.

EUROCLIMA-JRC Component WATER

- "EUROCLIMA – Water Component". Dr. César CARMONA-MORENO. COP 17- Climate Change Conference. Durban, South Africa, December 2011
- "EUROCLIMA – Scientific Component". Dr. César CARMONA-MORENO, Dr. Andrea LEONE, Mr. Juan AREVALO. World Water Week Stockholm August 2011, 2012, 2013.
- "EUROCLIMA – Scientific Component". Dr. César CARMONA-MORENO, Dr. Andrea LEONE, Mr. Juan AREVALO. World Water Forum Marseille, March 2012.
- "EUROCLIMA – Water Component". Mrs. Catherine GHYOOT on Dr. César CARMONA's behalf. COP 18 - Climate Change Conference. Doha, Qatar, December 2012.
- "EUROCLIMA – Scientific Component". Dr. César CARMONA-MORENO, Green Week May, Brussels, Belgium May 2012.
- "EUROCLIMA – Scientific Component". Dr. César CARMONA-MORENO, 1st International EUROCLIMA Seminar, Varese, Italy July 2011
- "EUROCLIMA – Scientific Component". Dr. César CARMONA-MORENO, 2nd International EUROCLIMA Seminar, Tela, Honduras, May 2012
- "EUROCLIMA – Scientific Component". Dr. César CARMONA-MORENO, Coordination meeting with UNESCO-PHI and IAI. Montevideo, Uruguay March 2013.
- "EUROCLIMA – Scientific Component". Dr. César CARMONA-MORENO, EUROCLIMA-Water Final Meeting, Bogota, Colombia March 2013

EUROCLIMA-JRC Component BioEnergy

- Green House Gases emissions from biofuels and Bioenergy

  http://iet.jrc.ec.europa.eu/remea/events/green-house-gases-emissions-biofuels-and-bioenergy

  Session 1: Production of feedstocks for biofuels

  Soybean in the production systems of Argentina (A. Bianchinni, AAPRESID)

  The impact of biofuels production in Argentina. National Bioenergy Programme (J. Hilbert, INTA)

  EC JRC activities in the field of biofuels (L. Marelli, European Commission, Joint Research Centre)

  Global activities towards sustainable bioenergy (U. Fritsche, Oeko Institute)

  Practical indicators on extensive agriculture production (F. Frank, INTA / University of La Pampa)

  Session 2: GreenHouse Gases (GHG) emissions from biofuels GHG emissions from biofuels and bioenergy (J. Hilbert, INTA)

  GHG emissions from biofuels. The Spanish perspective (Y. Lechon Perez, CIEMAT)

  Life Cycle Assessment and sustainability calculations for biofuels supply chains (M. Black, Imperial College London)

  GHG emissions from biofuels in the EU Renewable Energy Directive (R. Edwards, European Commission, Joint Research Centre)

  Session 3: Issues related to the quantification of GHG Emissions from biofuels and bioenergy

  Quantification of N2O emissions from biofuel feedstock cultivation (R. Koeble, European Commission, Joint Research Centre)

  Update information on N2O emissions from agricultural soils (M. Taboada, INTA IPCC)

  Field measurements of agricultural emissions (G. Posse, INTA)

  Land use monitoring of biofuels development (S. Carballo, INTA)

  GHG emissions from bioenergy: a longer term view (U. Fritsche, Oeko Institute)

  Session 4: Biofuels/bioenergy certification initiatives and GHG emissions

  GBEP's work in the areas of GHG Life Cycle Analysis and sustainability indicators for bioenergy (J. Reeves, FAO)

  CSCS CARBIO certification scheme (F. Pochat, CARBIO)

  The ISCC certification scheme (L. Munoz, Atlas Consulting)

  UK Renewable Transport Fuel Obligation and GreenHouse Gas emissions (M. Black, Imperial College London)

Rural Land Use Planning Project (RULUPP) (D. Somma, INTA)

Influence of international and national requirements in global trade (G. Idigoras, Consultant, Min. of Agri. of Argentina)

- Agro-Environmental impact of biofuels and bioenergy
  http://iet.jrc.ec.europa.eu/remea/node/11

  JRC activities in the field of bioenergy (F. Monforti, Joint Research Centre, European Commission)

  IPCC 2011 Bioenergy Report (F. vd Hilst, Utrecht University)

  Advanced land-use modelling and spatially explicit impact analysis of bioenergy systems (F. vd Hilst, Utrecht University)

  The Brazilian sugarcane sector experience: promoting sustainability with adequate tools (L. F. do Amaral, UNICA)

  Life Cycle Analysis (LCA) of biofuels from jatropha, palm and soy (N. Rettenmaier, IFEU Heidelberg)

  CENER experience in biofuels & bioenergy (D. Sanchez, CENER)

  Environmental implications associated with sweet sorghum production and use for biofuels (N. Rettenmaier, IFEU Heidelberg)

  Sustainability of energy crops in Spain: the preliminary results of the "On Cultivos" National Project (J. Carrasco, CIEMAT)

  IEA Bioenergy Task on Trade (A. Walter, UNICAMP)

  By-product use of soybean for sustainable biodiesel production in Argentina (J. A. Hilbert, INTA)

  Biomass & biodiesel produced on a novel agricultural process as potential alternative to ensure a sustainable future (P. Parra)

  Biomass as a renewable source for the rural world in Cuba (J. A. Sotolongo Perez)

  CTBE's Research program on sustainability: an overview (A. Walter, UNICAMP and CTBE)

  GHG emissions and soil carbon dynamics in sugarcane production in Brazil (C. E. Cerri, Delta CO2)

  Use of modelling and GIS in the sustainability assessment of sugarcane production (M. Galdos, CTBE)

  Remote sensing for sustainable sugarcane production (B. Rudorff, INPE)

  GHG balance of ethanol production in Brazil (J. Seabra, UNICAMP and CTBE)

  Assessment of working conditions in sugarcane production (V. Glass, Reporter)

  Assessment of socio-economic impacts due to sugarcane ethanol production in Brazil: the strategy of…(M. Cunha, CTBE)

  Strategies to improve water use efficiency and sustainability of sugarcane production systems...(V. Bof Bufon, EMBRAPA Cerrados)

- Workshop on International Cooperation in the field of Bioenergy and Technology
  http://iet.jrc.ec.europa.eu/remea/node/215

  Status and perspectives of bioenergy in Chile, CER - Viviana Avalos (Ministry of Energy, Chile)
  European Commission JRC activities in the field of Renewable Energy Mapping & Monitoring, N.Scarlat (EC JRC)
  International Energy Agency (IEA) Biofuels & Bioenergy Technology Roadmaps J.Spitzer (IEA Bioenergy)
  FAO activities in Latin America in the field of use of biomass for energy, J.Carvalho, F.Duhart (FAO)
  Climate Change, Agriculture and poverty, J.E.Alatorre, (Climate Change Unit, CEPAL, Santiago de Chile)
  Role of bioenergy in forestry and agriculture development F.Bas, Ministry of Agriculture of Chile
  UDT (Technological Development Unit) activities in bioenergy Cristina Segura (Head of the Bioenergy Unit, UDT)
  GIS tools to assess biomass sustainable resources availability, J.Carrasco (CIEMAT, Madrid)
  Bioenergy & Innovation Policies / Development in the field of aviation fuels, O.Vega Charpentier (IICA, San José, Costa Rica)
  Biorefineries: Pilot experience in Chile Andrea Irarrazaval (Clean Energy Technology)
  CTBE experience in the field of bioethanol sustainability & perspectives of technological development in Brazil, M. Cunha (CTBE)
  Experience of Mexico in the field of bioenergy & perspectives in the field of bioenergy tech., R.Parra (ITM)
  Experience of Argentina in the field of bioenergy & perspectives in the field of bioenergy technology, J.Hilbert (INTA)
  Life Cycle Analysis, GHG calculation and water related issues for advanced biofuels or new pathways, H. Fehrenbach (IFEU)
  CENER activities in the field of biomass & bioenergy technology, D.Sanchez (CENER)
  Chilean Biorenewable roadmap Sebastian Flores Head of the project
  Agricultural frontier, adaptation to Climate Change and development of energy crops in Chile, M.Paneque, University of Chile
  The Joint Programme on Bioenergy of the European Energy Research Alliance J.Carrasco (CIEMAT, Madrid)
  Bioenergy & Technology from a sustainable perspective: experience from Germany & global context, L.Iriarte (INAAS)
  Biocomsa Consortium: biofuel from lignocellulose biomass, Alvaro Urzua
  CEA activities in the field of bioenergy - C.Dupont (CEA France)

EUROCLIMA-JRC Component AGRI4CAST

- 1st International EUROCLIMA Seminar, 4 – 7 July 2011, Varese, Italy;
    - Oral presentation entitled "The EUROCLIMA Agri4cast component: Progresses and current status of activities and results", by Gregory Duveiller.
    - Oral presentation entitled "Priorities and future activities of the EUROCLIMA AGRI4CAST component", by Gregory Duveiller.
- COP 17 – Climate Change Conference, 6 December 2011, Durban, South Africa;
    - Poster entitled "EUROCLIMA – Agriculture component", presented by Paulo Barbosa on behalf of AGRI4CAST.
    - Contribution to the common JRC EUROCLIMA presentation, presented by Paulo Barbosa

EUROCLIMA-JRC Component DLDD

The main outcomes of the EUROCLIMA DLDD component were presented in several international events, for broad and different audiences, namely:

- 1st International EUROCLIMA Seminar, 4 – 7 July 2011, Varese, Italy;
  - Oral presentation entitled "The EUROCLIMA DLDD component: Progresses and current status of activities and results", by Hugo Carrão.
  - Oral presentation entitled "Priorities and future activities of the EUROCLIMA DLDD component", by Paulo Barbosa.
- 3rd Training Meeting of the South American Group of EUMETCast Operators, 30 August – 2 September 2011, Maceió- AL, Brazil;
  - Oral presentation entitled "The EUROCLIMA DLDD component and the possible integration with EUMETCast regional activities", by Humberto Barbosa.
- COP 17 – Climate Change Conference, 6 December 2011, Durban, South Africa;
  - Poster entitled "EUROCLIMA – Desertification, Land Degradation and Drought", by Paulo Barbosa.
- Workshop on "Temporal Analysis of Satellite Images" of the 32nd EARSeL (European Association of Remote Sensing Laboratories) Symposium, 23 – 25 May 2012, Mykonos, Greece;
  - Oral presentation entitled "A multitemporal and non-parametric approach for assessing the impacts of drought on vegetation greenness: A case study for Latin America", by Hugo Carrão.
- Joint ICTP-KFAS Workshop on the Cooperative Experience for Integrating Land and Water Resources Management in Latin America, 13 - 17 August 2012 in Fortaleza, Brazil.
  - Oral presentation entitled "The EUROCLIMA DLDD Observatory for Latin America", by Paulo Barbosa.
- Conference ''Understanding Risk Brasil", 12-14 November 2012, in Belo Horizonte (Brasil), organized by the World Bank and the Ministry for integration of Brasil.
  - Paulo Barbosa participated in a plenary Session and in a Technical Session on Drought including a presentation of the EUROCLIMA DLDD project.

6.7. Overall Action Plan and Overall indicative time-lines

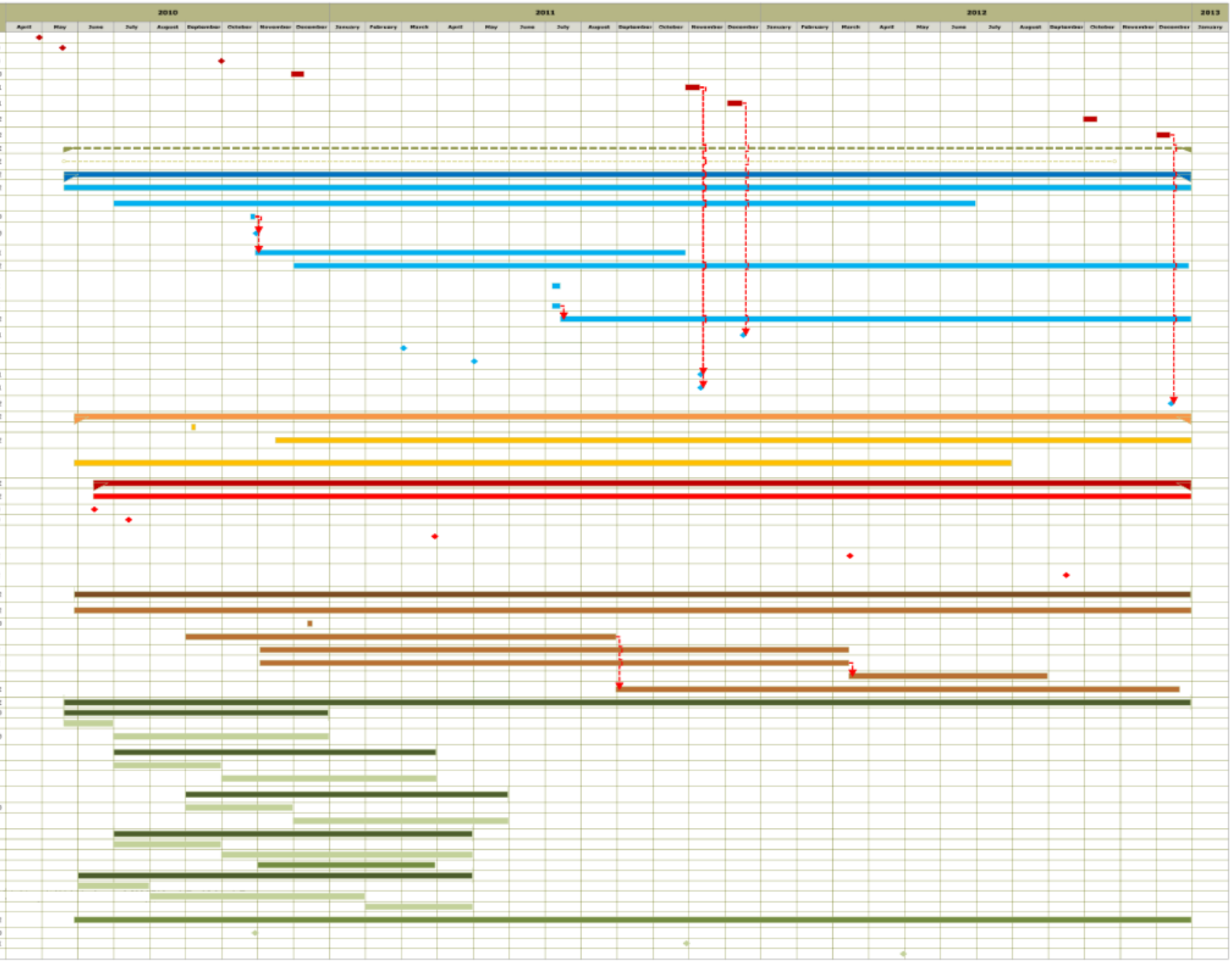
Proposed results and activities/Time line	N (months 1 to 12)				N+1(months 13 to 24)				N+2 (25 to 30)	
SOILS										
1.1 Data collection, meetings, editing and final printing for the Compilation of the "Soil Atlas of Latin America"			X	X	X	X	X	X	X	X
1.2 Meetings, training and local capacity building (methods and tools) for the Support to the Establishment of the Latin American Soil Bureau Network	X	X			X				X	
AGRI4CAST										
2.1 Collection and implementation of agro-climate database	X	X	X		X	X				
2.2 Calibration of Models	X				X					
2.3. Climate Change case studies	X				X				X	
WATER RESOURCES MANAGEMENT										
3.1 Creation of the Latin America Water Resources Management database	X	X	X	X	X	X	X	X	X	X
3.2 Virtual support to the Network for inter-institutional scientific & technological dialogue on water resource management		X	X	X	X	X	X	X	X	X
3.3. Exchange of information and preparation of Regional Seminar		X	X	X	X	X	X			
3.4. Meetings, training and local capacity building (methods and tools)					X	X	X	X		X
3.5. Monitoring of ongoing process and report dissemination							X	X	X	X
SUSTAINABILITY OF BIOENERGY										
4.1 Activity: Experts consultation on agro-environment impact			X							
4.2 Activity: Experts consultation on greenhouse gas emissions						X				
4.3 Activity: Experts consultation on technology transfer in bio fuels/bio energy										X
4.4 Activity: Technical support given by the staff of the JRC	X	X	X	X	X	X	X	X	X	X

DESERTIFICATION, LAND DEGRADATION and DROUGHT (DLDD)										
5.1 Coordination of data collection and harmonization of existing datasets	X	X	X	X						
5.2 Phenological metrics			X	X	X	X	X	X		
5.3 Computation of the Standardized Precipitation Index			X	X	X	X	X	X		
5.4 Drought frequency map									X	X
5.5 Web map server development for Latin America						X	X	X	X	X

Main activities and landmarks	Y-1				Y-2				Y-3			
Project mobilisation *(contractual and coordination arrangements)*												
VI EU-LAC Summit *(Spain, spring 2010)*												
Regional meetings *(data gathering / validation / processing)*												
UNFCCC COP-16 *(expected at the end of 2010)*												
Data processing *(theoretical models, IT and printing dissemination)*												
Capacity building *(Institutional and human resources)*												
Mid term evaluation												
I Regional seminar												
End of project evaluation												
II Regional seminar												
Audit mission												

EUrocLIMA - Scientific Component

Number	Task	Start	End
1	EUROCLIMA Kick-off Meeting	28/4/2010	29/4/2010
2	VI EU-LAC Summit (Madrid)	18/5/2010	19/5/2010
3	EUROCLIMA 1 Coordination Meeting (Indicative)	30/9/2010	1/10/2010
4	UNFCCC COP-16	29/11/2010	10/12/2010
5	EUROCLIMA Mid-term Evaluation (Indicative)	29/10/2011	10/11/2011
6	EUROCLIMA I Regional Seminar (Indicative)	3/12/2011	16/12/2011
7	EUROCLIMA Final Project Evaluation (Indicative)	30/9/2012	12/10/2012
8	EUROCLIMA II Regional Seminar (Indicative)	1/12/2012	13/12/2012
9	EUROCLIMA - JRC Coordination Task	28/5/2010	31/12/2012
9.1	EUROCLIMA - JRC Coordination Meetings (Every Three Months)	28/5/2010	27/10/2012
9.2	WATER RESOURCES MANAGEMENT	28/5/2010	31/12/2012
9.2.1	LA Water Institutions Collaboration development	28/5/2010	31/12/2012
9.2.2	Web-based LA Water DB Design, Development & Active Maintenance	1/7/2010	30/6/2012
9.2.3	LA Water I Meeting	26/10/2010	30/10/2010
9.2.4	LA Water DB Design + Virtual Network Strategy Proposals Presentation	30/10/2010	30/10/2010
9.2.5	LA Water Virtual Network Development & Active Maintenance	30/10/2010	29/10/2011
9.2.6	LA Water Data collection activity	1/12/2010	29/12/2012
9.2.7	EU-Africa-Asia-LA Workshop on Water Resources Management (Indicative) : South2South Collaboration	7/7/2011	14/7/2011
9.2.8	LA Water II Meeting	7/7/2011	14/7/2011
9.2.9	LA Water Data and Report Publication and Dissemination	14/7/2011	31/12/2012
9.2.10	LA Water Resources Management Ongoing Processes Presentation	16/12/2011	17/12/2011
9.2.11	LA Water DB First Version	2/3/2011	3/3/2011
9.2.12	LA Water Virtual Network First Version	1/5/2011	1/5/2011
9.2.13	LA Water DB Final Version	10/11/2011	10/11/2011
9.2.14	LA Water Virtual Network Final Version	10/11/2011	10/11/2011
9.2.15	LA Water Resources Management Results Presentation	13/12/2012	13/12/2012
9.3	LA SOIL	28/5/2010	31/12/2012
9.3.1	LA SOIL KO meeting	6/9/2010	9/9/2010
9.3.2	Data collection, editing and final printing "Soil Atlas of LA"	16/11/2010	31/12/2012
9.3.3	Meetings, training and local capacity building for support to the Establishment of the Latin American Soil Bureau Network	28/5/2010	31/7/2012
9.4	SUSTAINABILITY OF BIOENERGY	14/6/2010	31/12/2012
9.4.1	Technical support given by JRC staff	14/6/2010	31/12/2012
9.4.2	BIO-S KO Meeting	14/6/2010	15/6/2010
9.4.3	Meeting with INTA (Brussels)	12/7/2010	14/7/2010
9.4.4	Experts consultation on GHG emissions from biofuels and bioenergy	29/3/2011	30/3/2011
9.4.5	Experts consultation on agro-environment impact	15/3/2012	16/3/2012
9.4.6	Experts consultation on technology transfer in biofuels/bioenergy	15/9/2012	16/9/2012
9.5	Desertification, Land Degradation and Droughts	28/5/2010	31/12/2012
9.5.1	DLDD Institutions collaboration Development	28/5/2010	31/12/2012
9.5.2	Meeting with LA Partners	13/12/2010	17/12/2010
9.5.3	Data collection and harmonization	1/9/2010	31/8/2011
9.5.4	Phenological metrics	3/11/2010	15/3/2012
9.5.5	Standardized Precipitation Index (SPI)	3/11/2010	15/3/2012
9.5.6	Drought Frequency Map	15/3/2012	31/8/2012
9.5.7	Web map server development for Latin America	21/8/2011	21/12/2012
9.6	AGRI4CAST	28/5/2010	31/12/2012
9.6.1	ECMWF weather database	28/5/2010	31/12/2010
9.6.1.1	Importing data	28/5/2010	30/6/2010
9.6.1.2	Generation with WG and derived variables	1/7/2010	31/12/2010
9.6.2	Hadley3 climate scenario data base	1/7/2010	31/3/2011
9.6.2.1	Importing data	1/7/2010	30/9/2010
9.6.2.2	Generation with WG and derived variables	1/10/2010	31/3/2011
9.6.3	ECHAM-5 Climate scenario data base	1/9/2010	31/5/2011
9.6.3.1	Importing data and model	1/9/2010	30/11/2010
9.6.3.2	Generation with WG and derived variables	1/12/2010	31/5/2011
9.6.4	Web viewer	1/7/2010	30/4/2011
9.6.4.1	Web design	1/7/2010	30/9/2010
9.6.4.2	Web implementation	1/10/2010	30/4/2011
9.6.5	Soil DB	1/11/2010	30/3/2011
9.6.6	BioMA-EUrocLIMA	1/6/2010	30/4/2011
9.6.6.1	Design	1/6/2010	31/7/2010
9.6.6.2	Implementation	1/8/2010	31/1/2011
9.6.6.3	Customization	1/2/2011	30/4/2011
9.6.7	Calibration Models and Climate Change studies	28/5/2010	31/12/2012
9.6.8	KO Meeting	29/10/2010	30/10/2010
9.6.9	Intermediary Meeting	29/10/2011	30/10/2011
9.6.10	Final Meeting	29/4/2012	30/4/2012



European Commission
Joint Research Centre – Institute for Environment and Sustainability

Title: EUROCLIMA – Scientific Component Final Report

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Abstract

The EU-Latin American and Caribbean Summit held in Lima, Peru, in 16th May 2008, had sustainable development (climate change, environment and energy) as one of the two main themes. In the framework of the on-going efforts to foster bi-regional environmental cooperation with a special focus on climate change, the Lima Summit Declaration announced the launching of a joint EU-LA Environmental programme to the benefit of Latin American countries called "EUROCLIMA", with the main objectives of knowledge sharing, fostering structured and regular dialogue at all levels and ensuring synergies and coordination of current and future actions.

The objective of EUROCLIMA project is improving knowledge of Latin American decision-makers and the scientific community on issues and consequences of climate change, particularly in view of integrating these topics into sustainable development strategies.

As the 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 standards, methods and tools, and sharing and transferring its know-how to the Member States and international community.

Key policy areas include: environment and climate change; energy and transport; agriculture and food security; health and consumer protection; information society and digital agenda; safety and security including nuclear; all supported through a cross-cutting and multi-disciplinary approach.