EUROCLIMA

Science and Policy jointly fighting Climate Change

EUROCLIMA e-Newsletter

Climate Change in Latin America: Soils, Desertification and Drought

4 | 1 June 2012

Editorial

Sustainable Land Use

Drought could parch close to 70 percent of the planet's soil by 2025 unless countries implement policies to slow desertification, according to United Nations' estimates. Rather than a discouragement, this should be a call to governments, private sector, international donors and society in general, for coordinated action.

Climate change and the resulting land degradation reveal the need to intervene decisively through green economies and policies aimed at preserving the ecosystem and the quality of life of the population. This calls for different actions on natural resources, especially on sustainable soil management. It also demands more knowledge and sound financial management of the resources allocated to address this problem.

The studies referenced in this e-newsletter provide the rigor of scientific analysis to guide the establishment of public policies as a significant step in combating land degradation caused by climate change. Desertification and drought are not a matter only of loss of productive soils, but also of fighting poverty and ensuring food security for millions of people worldwide. This e-Newsletter of EUROCLIMA presents an introduction to this problem in Latin America as well as actions undertaken in the region that give some confidence in the face of the intimidating projections.

We are grateful to four researchers from the Joint Research Centre of the European Commission (JRC, Italy) for their articles on pages 1 to 7: Paulo Barbosa, Hugo Carrão, Michael Cherlet and Ciro Gardi. See the credits on page 10.

Editorial Committee:
Jan Karremans (Coordinator)
Luis Miguel Galindo (CEPAL)
César Carmona-Moreno (JRC)
Catherine Ghyoot (EuropeAid, G/2)
Boris Ramírez (Communication Exp)
Ibis Liulla (Adviser)

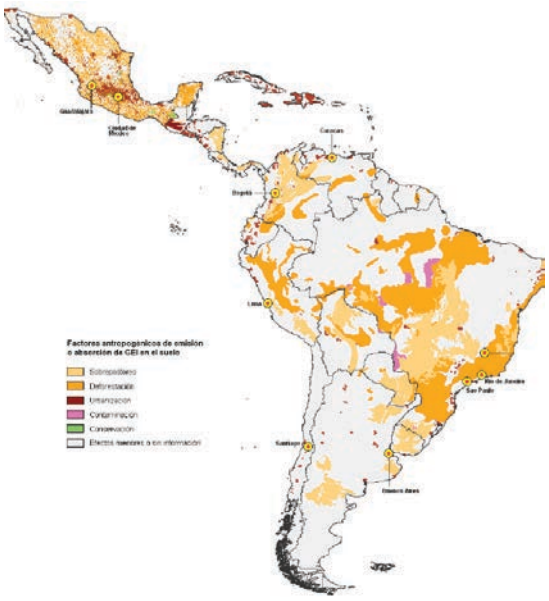
European Commission

Soils, desertification and drought in Latin America

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 foods, feeds, 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 (Nature, 2010). But several experts, such as the United Kingdom's Royal Society (Royal Society, 2009), has advised against substantially increasing the extent of cultivated land, arguing that this would damage ecosystems and biodiversity. One possible option to reach a win-win solution could be through a concept generally defined as "sustainable intensification", which has become the priority of many agricultural research agencies. For instance, the FAO (OECD-FAO, 2010) forecasts that Brazil's agricultural output will grow faster than that of any other country in the world in the coming decade (increasing by 40% by 2019). This increasing pressure on soil requires a precautionary approach to the management of this key resource in order to avoid, or at least to maintain within a sustainable threshold, the degradation processes.

Soil degradation is probably the best observable process of land degradation with a direct economic impact in agricultural areas. In Latin America, the Economic Commission for Latin America and the Caribbean (ECLAC) provided already several studies comparing agriculture productive output on comparable degraded and non-degraded lands and indicated that direct economic losses can easily



Most relevant soil degradation in Latin America and Caribbean (Source: Carlos Cruz Gaistardo). ***to see map in high definition:*** *http://www.euroclima.org/eNewsletter4/map1*

reach 10-15 percent. Further to soil deterioration, land degradation evokes many more processes, including biophysical, such as decline in natural productive capacity due to vegetation cover and type change and socio-economic aspects, such as market response, policy strategies and levels of education and poverty. Very complex feedback mechanisms are at play to characterize the current status and trend of the land that is the most important bio-productive system to sustain humanity. Land degradation causing a general loss of productive capacity of the land is already affecting some 300 million ha of land in Latin America (UNEP, 2007). Knowing where this happens and understanding the local individualities why it happens is crucial in outlining local and territorial land use and policy strategies. Promotion of sustainable land use programmes is best possible when there is proper knowledge on what the current or potential land problems are. EUROCLIMA is catalyzing this knowledge by inventorying the best available information with all partners and developing newly developed satellite based products. EUROCLIMA

also ensures links to global initiatives, such as the compilation of a new Global Atlas on Desertification coordinated by the JRC; this warrants that local processes and impacts can be assessed in a worldwide compatible way as to further link this knowledge appropriately into the assessments of global phenomena such as climate change and the modeling of its feedback effects. Climate change can influence drought occurrence and frequency, and hence heavily affecting land and soil degradation.

The variability of precipitation is the main driver for drought and leads to a reduction on water supply and agricultural production, which in extreme situations and accompanied by particular socio-economic conditions can trigger famines. Recurrent drought periods, which can be partly related with the ENSO (El Nino Southern Oscilllation) phenomenon are a major problem and are threatening the livelihoods of people in Latin America. Thus, proper drought monitoring and assessment systems that use a number of meteorological, agricultural and hydrological drought indicators are required to mitigate or solve this problem at multiple spatial and temporal scales.

EUROCLIMA aims to improve the knowledge of stakeholders and the scientific community about the problems and consequences of Climate Change (CC) for Latin America and integrating these topics into sustainable development strategies. As the first step towards this objective, the Joint Research Centre (JRC), in close collaboration with partners from Latin America, is developing, the first Soil Atlas of Latin America and the Caribbean, and an information system to assess the problem of drought and land degradation in Latin America.

Paulo Barbosa, Hugo Carrão, Michael Cherlet, Ciro Gardi;
European Commission, Joint Research Centre, Institute for Environment and Sustainability
http://eusoils.jrc.ec.europa.eu/

For more information, see page 10

Interview with Prof. Antonio Rocha Magalhães

Chair of the Committee on Science and Technology (CST) United Nations Convention to Combat Desertification (UNCCD)

What is distinctive about the problem of Desertification, Land Degradation and Drought (DLDD) in Latin America region?
Desertification, land degradation and drought affect large areas of the Latin American Region. What is distinctive is the fact that these are mostly areas that face serious problems of poverty and lack of sustainable development. In general, these regions are vulnerable to any types of crises, in particular to droughts and to climate change.

Is there a synergy between the processes of Climate Change (CC) and DLDD in in Latin America and which are the most sensitive/vulnerable areas?
DLDD increases vulnerability to Climate Change. The more DLDD, the more the region increases its vulnerability, the higher are the impacts on the population, in particular on the poor rural farmers. The drylands, such as Northeast Brazil, are the most vulnerable areas.

Who is mostly affected by the problem of DLDD in Latin America?
Small farmers and the poor rural populations living in the rural areas of South, Central and North (Mexico) America are the most affected by the problem of DLDD. In the drylands of Latin America, the problem of DLDD is most serious, and desertification is already occurring in several areas. However, land degradation is also a problem everywhere, not only on the drylands.

How significant is the impact of DLDD on economic growth in Latin America?
DLDD leads to reduction in agricultural productivity and, in consequence, to increases in expenditures in fertilizers and other inputs. There is still a lack of data on costs of DLDD in Latin America, but we can say that such costs are significant. Small farmers in drylands areas, in particular, cannot afford such costs, given lack of resources and the high uncertainty in regard to climate variability and change.

Costs of action versus inaction: prevention or mitigation of DLDD?
It is accepted that the costs of action to prevent or mitigate DLDD in LA will lower than the costs of inaction. The problem, however, is that to act now it is necessary to have credible scientific information and financial resources, while the costs of inaction will be bared in the future, so it is perceived that a decision to act can be postponed.

Which are the major challenges for building a Regional Integrated Information System for Decision Support on DLDD in Latin America?
I think that, in the first place, there is a need for international and also national leadership in this regard. The formulation of a clear vision by credible international organizations and the negotiation with governments and major stakeholders in Latin America, such as Embrapa - the Brazilian Company for Agricultural Research, and the Ministries of Agriculture of leading countries, is a necessary condition. With international leadership, good scientific information and adequate resources, I think that within a few years such a System could be successfully established in Latin America.

Antonio Rocha Magalhães is a Brazilian citizen, PhD in Economics by the University of São Paulo. He was Vice-Minister of Planning of Brazil (1992-1993), Principal Country Officer of the World Bank in Brazil (1996-2006), Minister of Planning for the State of Ceara (1987-89) and Distinguished Visiting Professor of World Peace at Texas University at Austin (1995-96), in the USA. His experience in sustainable development includes the organization of the First and the Second International Conference for Sustainable Development of Drylands (ICID) as part of the preparation process for the Rio 92 World summit and the Rio + 20 Summit that will take place in 2012. ICID was instrumental in providing the scientific inputs that allowed the Rio 92 Summit to recommend a UN convention on Desertification. Mr. Magalhães is a member of the IPCC and former member of the UNEP Climate Programme and of the IRI – International Research Institute on Climate Prediction, based at the University of Columbia, NY, USA. Currently he is a member of the Centre for Management and Strategic Studies (CGEE) (www.cgee.org.br), in Brasilia, Brazil.
For more information:
http://gahlm.unccd.int/#Profmal

Soil Bureau Network

The Latin America and Caribbean Soil Bureau 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 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.

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).

Second Meeting of the Latin America and Caribbean Soil Bureau Network, Mar del Plata - Argentina, April 2012.

Soils Atlas of Latin America and Caribbean

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 to raise soil awareness of the public at large, stakeholders, policy makers, and other scientists to the importance of soil in Latin America, the Joint Research Centre of the European Commission is producing the first ever Soil Atlas of Latin America and Caribbean (LAC). The Atlas brings together existing information on different soil types as easily understandable maps (both at regional and continental scale) covering the continents.

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 1:5,000,000 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.

For more information, see page 10

European Commission

Impact of climate change on drought and land degradation

This section integrates the perspectives from two documents [i.e. Magrin et al. 2007 and IPCC 2012] published by the Intergovernmental Panel on Climate Change (IPCC) on the impacts of climate extremes on the problem of Desertification, Land Degradation and Drought (DLDD) in Latin America region and its adaptation and vulnerability to the underlying processes.

Weather and climate stresses increase drought impacts.

Natural ecosystems, agriculture, water resources and human health in Latin America have been impacted by unusual extreme weather events reported in the past years. For example, the tropical forests of Amazonia are increasingly susceptible to fire occurrences due to increased El Niño-related droughts. Droughts related to La Niña create severe restrictions for water supply and irrigation demands in central western Argentina and central Chile between 25°S and 40°S. Droughts related to El Niño impacts on the flows of the Colombia Andean region basins (particularly in the Cauca river basin), are causing a 30% reduction in the mean flow, with a maximum of 80% loss in some tributaries, whereas the Magdalena river basin also shows high vulnerability (55% losses in mean flow). Consequently, soil moisture and vegetation activity are strongly reduced/augmented by El Niño/La Niña in Colombia.

Hydropower is the main electrical energy source for most countries in Latin America, and is vulnerable to large-scale and persistent rainfall anomalies due to El Niño and La Niña. A combination of increased energy demand and drought caused a virtual breakdown in hydroelectricity generation in most of Brazil in 2001, which contributed to a gross domestic product (GDP) reduction of 1.5%.

Droughts favoured the development of epidemics in Colombia and Guyana, and outbreaks of hantavirus pulmonary syndrome have been reported for Argentina, Bolivia, Chile, Paraguay, Panama and Brazil after prolonged droughts, probably due to the intense rainfall and flooding following the droughts, which increases food availability for peri-domestic (living both indoors and outdoors) rodents. Prolonged droughts in semi-arid north-eastern Brazil have provoked rural-urban migration of subsistence farmers, and a re-emergence of visceral leishmaniasis . A significant increase in visceral leishmaniasis in Bahia State (Brazil) after the El Niño years of 1989 and 1995 has also been reported. Human migration resulting from drought, environmental degradation and economic reasons may spread disease in unexpected ways, and new breeding sites for vectors may arise due to increasing poverty in urban areas and due to deforestation and environmental degradation in rural areas.

There is medium confidence that droughts will intensify in the 21st century in some seasons and areas, due to reduced precipitation and/or increased evapotranspiration. This applies to regions including Mexico, Central America and northeast Brazil. Elsewhere there is overall low confidence because of inconsistent projections of drought changes (dependent both on model and dryness index). Definitional issues, lack of observational data, and the inability of models to include all the factors that influence droughts preclude stronger confidence than medium in drought projections.

Land-use changes have intensified the use of natural resources and exacerbated many of the processes of land degradation.

Almost three-quarters of the drylands are moderately or severely affected by degradation processes. The combined effects of human action and climate change have brought about a continuous decline in natural land cover at very high rates. In particular, rates of deforestation of tropical forests have increased since 2002 due to land-use change (deforestation, selective logging and forest fragmentation). There is evidence that biomass-burning aerosols may change regional temperature and precipitation in the southern part of Amazonia. Biomass burning also affects regional air quality, with implications for human health. Land-use and climate changes acting synergistically will increase vegetation fire risk substantially and hence a potential increase in land degradation.

Future sustainable development plans should include adaptation strategies to enhance the integration of climate change into development policies.

Some countries have made efforts to adapt, particularly through conservation of key ecosystems, early warning systems, risk management in agriculture, strategies for flood, drought and coastal management, and disease surveillance systems. However, the effectiveness of these efforts is outweighed by, among others: a lack of basic information, observation and monitoring systems; lack of capacity-building and appropriate political, institutional and technological frameworks; low income; and settlements in vulnerable areas. Without improvements in these areas, the sustainable development goals of Latin America countries will be seriously compromised, adversely affecting, among other things, their ability to reach the Millennium Development Goals (MDGs).

For more information, see page 10

Monitoring Drought in Latin America

The first challenge towards an effective drought monitoring system in Latin America is to build awareness of drought as a recurrent phenomenon. 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, as well as to formulate actions to mitigate their impacts on human activities. As a temporal and recurring phenomenon, a drought should always be defined as an abnormal water supply condition relative to some long-term-average state, e.g. current monthly precipitation, weekly balance between precipitation and evapotranspiration, etc. Because deficiency of rainfall is always the driver of a drought, practically all drought indices use precipitation either singly 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. Drought indices 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 indices provides a framework for evaluating the drought parameters of interest.

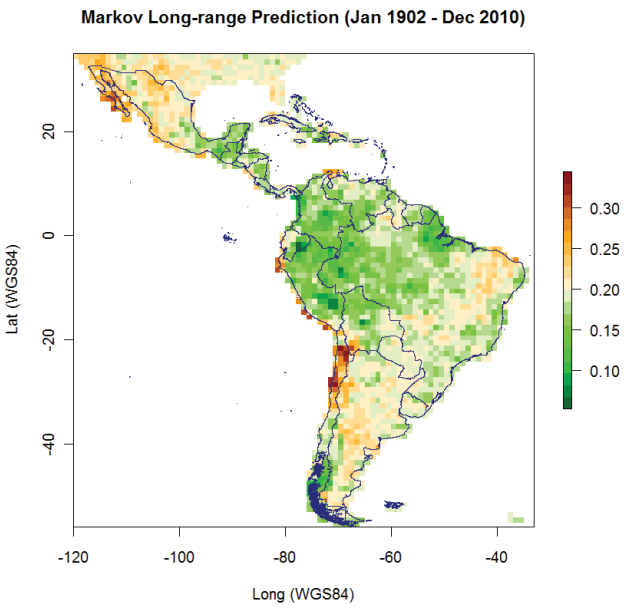
Within the context of the EUROCLIMA programme of the European Union and Latin America, the JRC DESERT Action is responsible for developing methodologies and tools for monitoring and assessing drought events in their distinct typologies and for mapping characteristic drought frequencies for the region. To undertake this task, the Standardized Precipitation Index (SPI), a Standardized Vegetation Index (SVI) and a Drought Frequency Index (DFI) will be computed at the continental level on monthly, ten-daily and yearly basis, respectively, and will be made available to the LA community using a web-map server, i.e. the EUROCLIMA DLDD Information System.

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. 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.

SVI is designed to show the effects of drought on vegetation greenness over short-time periods, 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 for each short-time period. Low SVI values indicate poor vegetation condition that could be the result of climate conditions; high SVI values might reflect ideal climate growing conditions so that vegetation greenness is higher than encountered in other years. At the continental level, the SVI is computed from 10-daily NDWI and NDVI, both computed from the SPOT-VEGETATION satellite data, and from the fAPAR, derived from MERIS satellite data at 1km spatial resolution.

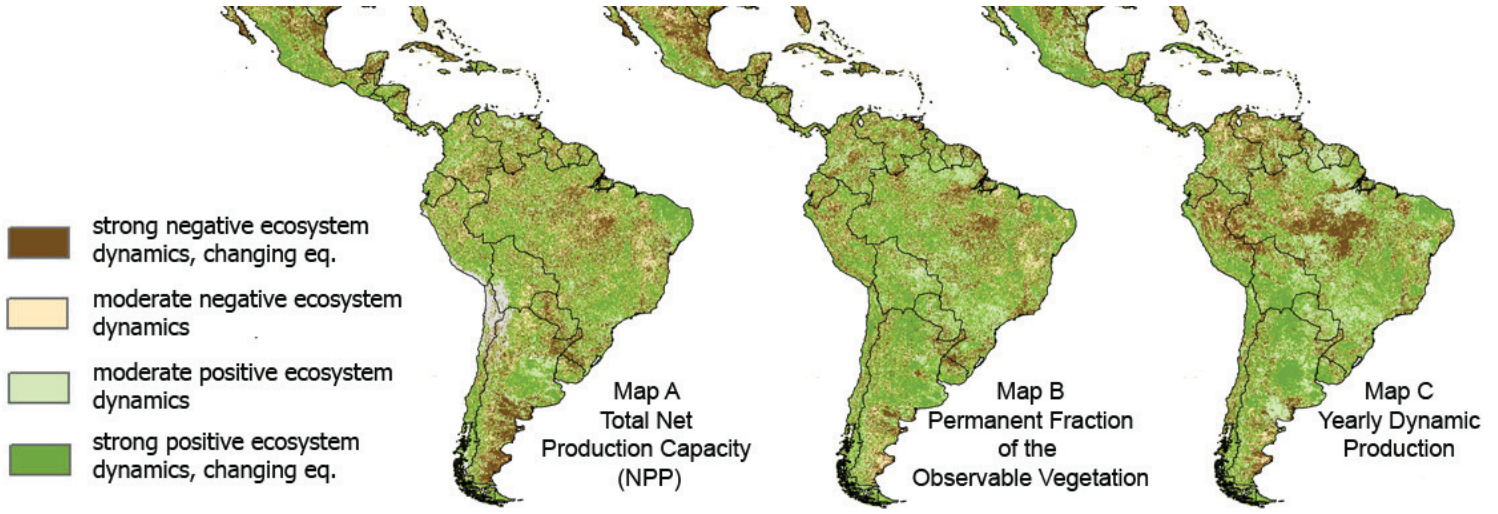
The DFI (see map) is a new index, still in development, proposed by the JRC DESERT Action to estimate the long-range likelihood trend of drought occurrences and their spatial and temporal persistency. The DFI should give important structural information on drought that can be used as a basis for regional long-term risk assessment and prediction. In short, historical low rainfall regimes are computed for each location based on the empirical cumulative distribution of 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. At the continental level, the DFI is computed with the GPCC (Global Precipitation Climatology Centre) monthly gridded precipitation from the DWD (Deutscher Wetterdienst) at 1° spatial resolution.



Drought Frequency Index (DFI) computed for 12-months rainfall accumulation in Latin America.
to see map in high definition: http://www.euroclima.org/eNewsletter4/map2

Assessing Trends in Land Degradation in Latin America



Latin America is mostly associated with tropical and sub-tropical climates but about a quarter of its surface actually belongs to the drylands, 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. During the last decennia, the Latin American drylands of which an estimated 28% is already degraded have seen a paramount increase of agricultural activities in response to commercial demands. Intensification of agricultural production poses considerable pressures on the land resource and invokes competition for its use. The IPCC reports that the soybean cropping boom provoked critical Land use changes that will enhance aridity as well as land degradation in already water stressed regions in e.g. Argentina, Bolivia, Brazil and Paraguay. Land degradation results from such complex interactions of geo-physical, socio-economic and political aspects leading to trade-offs in which all too often environmental sustainability gets little consideration. Recent studies estimate at around 7 percent the loss in economic productivity of the land due to degradation in agricultural areas. Extreme events, such as severe droughts, worsen this situation. Not 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. Land degradation is possible aggravating poverty in vulnerable areas. Hence, adapted land management is essential in combating those adverse conditions. To identify priorities and to monitor the consequences of actions, further knowledge on the trend of degradation processes and their spatial inventory can certainly contribute to this process.

Within Latin America substantial progress has been reached on the definition and implementation of land degradation indicators, building on the early work of IADIZA/CONICET on integrated assessment in Argentina dating back to 1989. Data and information is casually available for quite some indicators, hence the desertification related activities under the EUROCLIMA programme aim at inventorying these data sets and compiling adapted products to be freely accessible through a dedicated web site. Furthermore, the project develops and produces relevant and spatial continuous baseline information layers for addressing land degradation issues based on innovative satellite remote sensing approaches. Using satellite based time-series imagery, vegetation phenology and productivity metrics for the whole continent are compiled. 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. 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 have been 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. Map "A" 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. Map "B" 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 map "C" 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 EUROCLIMA programme is now in the phase of improving the calculation of these variables and developing more understanding in their combined meaning. Other ancillary data layers as compiled and collected by the EUROCLIMA partners are needed to accomplish the complex endeavour of understanding land degradation trends in the region required to outline adapted strategies.

For more information, see page 10

to see map in high definition: http://www.euroclima.org/eNewsletter4/map3

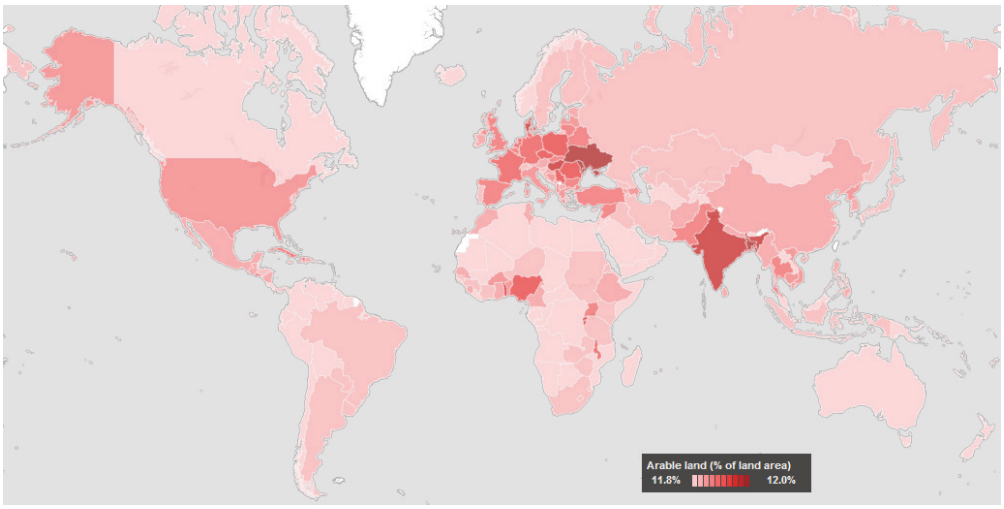
European Commission

Looking ahead to RIO+20

The Executive Secretary of the UNCCD, MR. Luc Gnacadja, calls on world leaders to promote effective land use methods to mitigate drought and combat land degradation. Land is generating life-supplying biological productivity and its really productive area is a very limited part of it. At present it is estimated that some 30 percent of the globe's land surface is somehow suitable for agriculture; however, around 70 percent of this area would suffer one or more soil and terrain constraints, leaving only 12-14 percent of real arable land. The important notion to derive from this however is that the productive surface of the globe represents a finite area and resource which indeed needs to be used with extreme caution in order to keep its productive potential. Feeding the expected 9 billion people by 2050 will need this resource in its best possible state. Aware of this need, and ahead of the RIO+20, the UNCCD aims at setting sustainable development goals on land use by launching the challenging target of achieving zero net land degradation until 2030, and drought policies being implemented by 2020 Soils are the most significant non-renewable resource within the bio-productive land system for ensuring water, energy and food security for present and future generations. Adapted landuse can build resilience to climatic shocks and changing occurrence of extreme events, such as drought. Hence land and soil protection and drought monitoring and forecasting need to be built into policy strategies to be able to reach these targets.

The recognition of the needs to protect soils and the raised awareness on its importance is confirmed by several international initiatives launched in the last years, such as the Global Soil Partnership, the Global Soil Forum, and the Global Soil Map. This revitalized interest can be deduced also from the more and more frequent appearance of soil related issues in the media. The example of the growing interest on "land take" and "soil sealing", within the civil society and among the citizens, is a clear demonstration of a change in the perception of the value of land and soil: from private goods to global resource.

It is now necessary that this increased awareness on soil is reflected by an increased priority of soil protection within the policy agenda, at international, national and local scale. In this process it will be necessary to consider the new and emerging threats on soil and on land, such as the problems deriving from biofuel crops to the decline in soil biodiversity. Strengthening the knowledge on soil, as stated in the second pillar of the Global Soil Partnership, is also a necessary step for the achievement of an effective soil protection.



Arable land as percent of land area
World Bank: http://data.worldbank.org/indicator/AG.LND.ARBL.ZS/countries?display=map

The complex interactions of bio-physical and socio-economic processes that lead to land degradation, as well as the options for mitigation, are more and more understood and scientific knowledge increased rapidly during the last 15 years. Land degradation has very local characteristics but now we know that these are thematically very similar over the globe and repeatable global assessment methods are being devised. Efforts made by all partners in EUROCLIMA are helping to build these methods. To capture this progress and address the increased interest and awareness for land degradation both at scientific and decision making levels, the JRC is coordinating, in collaboration with many partners globally, including EUROCLIMA, the compilation of a new World Atlas of Desertification. This atlas, including a web based information system, builds on new concepts to tackle the challenges of scale and aims at illustrating the status of integrated assessment. The EUROCLIMA programme contributes to the monitoring and assessment of the status and trends of land and soil degradation in Latin America by inventorying useful existing data layers and by developing satellite based products to assess the long term evolution of the ecosystem dynamics and the possible impact of crucial land use transitions. This information will be made available as Soil Atlas for Latin America and as interactive web based server for data layers and integrated products' on land degradation and drought.

Looking farther ahead, Rio + 20 can set and implement the definitions of concrete and reachable targets on land and soil protection and drought policies. The land, soil and drought activities within EUROCLIMA definitely are geared to contribute to make this happen so our next generations will appreciate and benefit from our efforts in the fight to preserve the planet.

For more information: see page 10

European Commission

Latin America Strengthens Cooperation and Capabilities to Combat Climate Change

Opening of the EUROCLIMA and RALCEA meetings

With the commitment to strengthen regional ties and capabilities of their countries to tackle climate change, in particular on financial resources available for adaptation and mitigation, political leaders and experts on climate change in Latin America and the Caribbean concluded successfully on 04 May two regional events promoted by the EUROCLIMA programme and two Secretariats of the Government of Honduras: the Secretariat of Planning and External Cooperation (SEPLAN) and the Secretariat of Natural Resources and Environment (SERNA).

On May 2-4, some 60 representatives from Latin America and the Caribbean participated in the *2nd Regional Coordination Workshop of EUROCLIMA and the First Regional Dialogue in Latin America and the Caribbean on Climate Change Finance and Development Effectiveness*. These meetings served to highlight the importance of the exchange of information and experiences on adaptation and mitigation, as well as on the implementation of policies on climate change.

Focal Points at the EUROCLIMA Session

During the May 2 Coordination Workshop of the EUROCLIMA national focal points, links between climate change offices in the region were strengthened, there was an interchange of experiences on climate change initiatives in the countries, in particular concerning progress of research by JRC and ECLAC as part of EUROCLIMA, and future actions were coordinated. To achieve synergies between EU-LA programmes, the event was held together with the Annual RALCEA Seminar, an EU funded Latin American Network of Knowledge Centres in the Water Sector whose main objective is to promote public policies based on scientific and technical knowledge by encouraging the development of skills in the water sector.

"These regional meetings promoted by EUROCLIMA are vital to facilitate access to information the countries need to design and implement public policies in order to address the urgent challenges of climate change", stated Catherine Ghyoot of the European Commission´s Directorate General for Development and Cooperation, EuropeAid.

Mr. Peter Versteeg, Charge d'Affaires, European Union Delegation in Honduras, speaking at the opening of the Regional Dialogue on Climate Change Finance

Moreover, discussions during the *Dialogue on Climate Change Finance* evidenced the existence of a gap between a significant amount of funding available for climate change initiatives and the actual implementation, apparently in part because of unfamiliarity with access mechanisms.

The minister of the Secretariat of Natural Resources and Environment (SERNA) in Honduras, Rigoberto Cuéllar, noted that the effectiveness of management and channeling of resources depends largely on the ability for organization and planning in each country: "These structural elements provide the confidence that aid agencies need concerning the adequate and transparent use of those resources".

For his part, Stefan Agne, of the Directorate General for Climate Action from the European Commission, emphasized the importance of using efficiently the different types of existing funds and to ensure that infrastructural investments imply low emissions and more resilience to climate change. Furthermore, work needs to be done on identifying new sources of funding, for example through the introduction of a price for carbon emissions.

It is worth noting that this First Dialogue received support from the European Union, through the EUROCLIMA Program, the Development Bank of Latin America (CAF), the German Federal Ministry for Economic Cooperation and Development (BMZ), the World Bank, the United Nations Development Programme (UNDP), the Inter-American Development Bank (IDB), the Pan American Health Organization (PAHO) and the Australian Cooperation (AusAID).

Focal Points of EUROCLIMA participating in the Regional Dialogue on Climate Change Finance

For more information:
http://www.euroclima.org/events/taller-de-coordinacion-regional-de-euroclima_en

http://www.euroclima.org/events/dialogo-latinoamericano-y-del-caribe-sobre-financiamiento-al-cambio-climatico-y-efectividad-del-desarrollo_en

DOCUMENT

Proposal for the Design of a Regional Integrated Financing Strategy: Provisions and actions to increase the flow of financial resources earmarked for UNCCD implementation in Latin America and the Caribbean.

Propuesta
Hacia el Diseño de una Estrategia Financiera Integrada Regional: Modalidades y Acciones para incrementar el flujo de Recursos Financieros Destinados a la Implementación de la CNULD en América Latina y El Caribe

http://bit.ly/LRUJ2L

The United Nations Convention to Combat Desertification presented this proposal at the XVII Forum of Environment Ministers of LAC, April 2010. It stresses financing issues, links with climate change, and calls for inter-institutional synergy and coordination of regional, subregional (Mesoamerica, Caribbean, Andean and Southern) and national initiatives.

European Commission

Additional Documents

GEO 5. Global Environment Outlook Summary For Policy Makers

http://www.unep.org/geo/pdfs/GEO5_SPM_English.pdf
Presented as an important input for Rio+20 it provides an analysis of the situation, trends and prospects of the global environment, including Latin America. Underlines the importance of soil resources and their sustainable management to prevent land degradation, including erosion. The link leads to the "Summary for Policy Makers".

Desertification in Peru. Fourth National Communication to the Convention to Combat Desertification and Drought

http://cdam.minam.gob.pe/novedades/desertificacionperu.pdf
The characteristics of desertification in Peru, with a historical perspective, political responsibilities and intervention strategies. 46 programmes related to the 10-year strategic plan 2008-2018 of the UNCCD were reviewed for this report.

Desertification and civil society

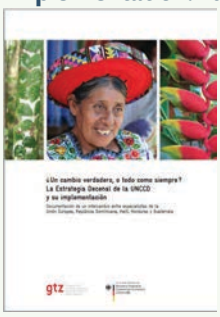
http://www.aspan.org.br/riodbrasil/pt/documentos/Desert_y_Soc_Civil.pdf
Articles by representatives of different NGOs in LAC, all members of the International NGO Network on Desertification (RIOD). Although dating from 2003, it still presents meaningful analytical insights from the perspective of civil society on the actions of governments and on society's responsibility to change patterns of land use and soil conservation.

European Commission

Indicators of Desertification for South America. 2006.

http://www.cricyt.edu.ar/ladyot/publicaciones/libro_bid/libro_bid.pdf
Six LA countries (Argentina, Bolivia, Brazil, Chile, Ecuador and Peru) established and adopted a set of indicators as well as its validation and incorporation into an Integrated System for the Assessment and Monitoring of Desertification. The need for indicators is related to the fight against poverty and meeting the Millennium Development Goals.

Real Change or business as usual? The Ten-Year Strategy for UNCCD and its implementation. 2009



http://www.desertifikation.de/uploads/media/La_estrategia_decenal_de_la_UNCCD_2009.pdf
Experts and policy makers from Central America, the Caribbean and Europe developed a series of dialogues about the implementation of the Ten-Year Strategy of the UNCCD. The document highlights the various responsibilities of the countries, national priorities and the need to further strengthen international collaboration in the face of climate change.

Further links

More links on, http://www.euroclima.org/web-links/soils

United Nations Convention to Combat Desertification

http://www.unccd.int/en/regional-access/LAC/Pages/lac.aspx
UNCCD site: Information on relevant actions of the LAC countries as well as reports and regional and country profiles related to the fight against desertification.

United Nations Environment Programme. Regional Office for LAC

http://www.pnuma.org/perfil_ing/esferas9.php
UNEP site on desertification and degradation in LAC: brief information on the situation of the countries of the region and key indicators and actions implemented by UNEP at the regional level to act against desertification and land degradation.

Interinstitutional Technical Group on Desertification of Dominican Republic

http://www.ambiente.gob.do/gti/index.php/sobre-gti-rd-3
An example of coordination and collaboration between the Dominican Republic's government, civil society organizations and international donors in the Interinstitutional Technical Group on Desertification.

Agricultura, desarrollo rural, tierra, sequía y desertificación: resultados, tendencias y desafíos para el desarrollo sostenible de América Latina y el Caribe. 2008

http://www.eclac.cl/publicaciones/xml/1/32921/LCW192.pdf
Publication on the state of the environment and natural resources in Latin America and the Caribbean shows the impact of deforestation, biodiversity loss and the processes of land degradation and desertification. ECLAC reviews impacts of land degradation on productive systems, poverty and rural development in the countries of the region.

CONTACTS

European Commission

Directorate-General for Development and Cooperation, EuropeAid
Regional Programmes Unit Latin America and the Caribbean (G/2)
www.ec.europa.eu/europeaid
EuropeAid-EUROCLIMA@ec.europa.eu

EUROCLIMA Technical Assistance
www.euroclima.org
info@euroclima.org

European Commission

European Commission
Joint Research Centre
www.ec.europa.eu/dgs/jrc

Naciones Unidas
CEPAL

United Nations Economic Commission for Latin America and the Caribbean
www.cepal.org

CREDITS

The following climate change experts have contributed articles on Soils and Climate Change:

Paulo Barbosa (JRC)
- paulo.barbosa@jrc.ec.europa.eu,

Hugo Carrão (JRC)
- hugo.carrao@jrc.ec.europa.eu,

Michael Cherlet (JRC)
- michael.cherlet@jrc.ec.europa.eu,

Ciro Gardi (JRC)
- ciro.gardi@jrc.ec.europa.eu,

Photographs:

Ronald Vargas (Picture Front Page),
Marta Fuchs (Picture pag 3),
Roosevelt Garcia (Picture pag 4),

Other contributions:

Members of the Editorial Committee.

European Commission

To subscribe to the EUROCLIMA e-Newsletter

www.euroclima.org

Visitors to the EUROCLIMA portal can sign up to receive this regular e-mail newsletter.

The portal also contains information about the programme and its components, the national Focal Points and the agencies responsible for the theme of climate change in each country, along with the Programme workshops, courses and seminars.

¡Let us know your comments!
info@euroclima.org

For more information

Page 1: Soils, desertification and drought in Latin America

- Millennium Ecosystems Assessment, 2005. Ecosystems and Human Well-being: A Framework for Assessment. Island, Washington D.C.
- Nature, 2010. Food: The growing problem. Nature, 466:546-547
- OECD-FAO, 2009. OECD-FAO Agricultural outlook 2009-2018. Retrieved from http://www.agri-outlook.org/dataoecd/2/31/43040036.pdf on November 15, 2011
- OECD-FAO, 2010. OECD-FAO Agricultural outlook 2010-2019. Retrieved from http://www.agri-outlook.org/dataoecd/13/13/45438527.pdf on November 15, 2011
- Royal Society, 2009. Reaping the Benefits: Science and the Sustainable Intensification of Global Agriculture. The Royal Society, London, UK
- UNEP, 2007. Global Environmental Outlook GEO4 - Environment for Development. United Nations Environment Programme, Nairobi, 540 pp
- UNEP, 2009. Global Environmental Outlook GEO LAC3 - Latin America and the Caribbean. United Nations Environment Programme, Panama, 380 pp

Page 3: Soils Atlas

- Palm, C.A., Smukler, S.M., Sullivan, C.C., P.K., M., Nyadzi, G.I.,Walsh, M.G., 2010. Identifying potential synergies and trade-offs for meeting food security and climate change objectives in sub-Saharan Africa. Proceedings of the National Academy of Sciences of the United States of America, 107, 19661-19666
- Sachs, J., Remans, R., Smukler, S., Winowiecki, L., Andelman, S.J., Cassman, K.G., Castle, D., Defries, R., Denning, G., Fanzo, J., Jackson, L.E., Leemans, R., Lehmann, J., Milder, J.C., Naeem, S., Nziguheba, G., Palm, C.A., Pingali, P.L., Reganold, J.P., Richter, D.D., Scherr, S.J., Sircely, J., Sullivan, C., Tomich, T.P.,Sanchez, P.A., 2010. Monitoring the world's agriculture. Nature, 466, 558-560
- Sanchez, P.A., Ahamed, S., Carré, F., Hartemink, A.E., Hempel, J., Huising, J., Lagacherie, P., McBratney, A.B., McKenzie, N.J., De Lourdes Mendonça-Santos, M., Minasny, B., Montanarella, L., Okoth, P., Palm, C.A., Sachs, J.D., Shepherd, K.D., Vågen, T.-G., Vanlauwe, B., Walsh, M.G., Winowiecki, L.A.,Zhang, G.-L., 2009. Digital soil map of the world. Science, 325, 680-681
- UNEP, 2007. Global Environmental Outlook GEO4 - Environment for Development. United Nations Environment Programme, Nairobi, 540 pp

Page 4: Impact of climate change on drought and land degradation

- Magrin, G., C. Gay García, D. Cruz Choque, J.C. Giménez, A.R. Moreno, G.J. Nagy, C. Nobre and A. Villamizar, 2007: Latin America. Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, Eds., Cambridge University Press, Cambridge, UK, 581-615. Available for download at: http://www.ipcc.ch/pdf/assessment-report/ar4/wg2/ar4-wg2-chapter13.pdf
- IPCC, 2012: Summary for Policymakers. In: Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation [Field, C.B., V. Barros, T.F. Stocker, D. Qin, D.J. Dokken, K.L. Ebi, M.D. Mastrandrea, K.J. Mach, G.-K. Plattner, S.K. Allen, M. Tignor, and P.M. Midgley (eds.)]. A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, UK, and New York, NY, USA, pp. 1-19. Available for download at: http://ipcc-wg2.gov/SREX/images/uploads/SREX-SPMbrocure_FINAL.pdf

Page 6: Assessing Trends in Land Degradation in Latin America

- Application of Indicator Systems for Monitoring and Assessment of Desertification from National to Global Scales, 2011, S.Sommer et al., Land Degrad. Develop. Volume 22, Issue No.2, pp184-197.
- Fact Sheet Desertification Latin-America and Caribbean (www.giz.de/desertification)
- Abraham, Elena M. y Gertjan B. Beekman. Indicadores de la Desertificación para América del Sur, 2006, , Mendoza, Argentina, ISBN: 978-987-23430-0-2
- Magrin, G., C. Gay García, D. Cruz Choque, J.C. Giménez, A.R. Moreno, G.J. Nagy, C. Nobre and A. Villamizar, 2007: Latin America. Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, M.L. Parry, O.F. Canziani, J.P. alutikof, P.J. van der Linden and C.E. Hanson, Eds., Cambridge University Press, Cambridge, UK, 581-615.
- Simplifying The Complexity In The Non Linear Evolution Of Ecosystem Phenology, 2012, Ivits et al., Ecological Indicators - in press

Page 7: Looking ahead to RIO+20

- UNCCD, Towards a land Degradation Neutral World, Submission of the UNCCD Secretariat to the RIO+20 Conference, 2012 (http://www.unccd.int/Lists/SiteDocumentLibrary/Publications/Rio%206%20pages%20english.pdf)
- World agriculture: towards 2015/2030 AN FAO PERSPECTIVE, Edited by Jelle Bruinsma, FAO - Earthscan, 2003, ISBN 92 5 104835 5

EUROCLIMA