



DEWA/GRID-Geneva

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Emerging Issues and Keeping Track of Environmental Change on the road to Rio+20 UNEP/GRID-Geneva “Science Day”

International Environment House 2, Geneva, Tuesday 29 November 2011

By Géraldine Boezio and Ron Witt

UNEP/GRID-Geneva is one of UNEP's major centres for data and information management, with a unique, "value-adding" mandate in the handling of global and regional environmental data, which in turn support the environment assessment and early warning activities of UNEP and its partners. The centre is supported by a "Partnership Agreement" between UNEP, the Swiss Federal Office for the Environment (FOEN) and the University of Geneva (UniGe).

The Partnership has endured through many changes in each of the three institutions, and currently operates under the

fourth, four-year Partnership Agreement. This can be seen as a sign of confidence of all three Partners in the GRID-Geneva office, and the work being produced over more than twelve years of common effort.

The purpose of the “Science Day” was to demonstrate and discuss some of the most prominent activities/projects that have been collectively undertaken, which help to underpin the scientific base of UNEP's work and the programmes of the two other partners, to a broad audience.

The day was organised into six distinct sessions, starting with a Keynote on the “Impacts of Climate Change in Switzerland” followed by presentations on “The UNEP Foresight Process and Emerging Issues for Rio+20”, “Keeping Track of Environmental Change: from Rio to Rio+20”, “Status of the GEO-5 Reporting Process in Europe”, and “Swiss Environmental Indicators project: a national stock-taking”. The final session was dedicated to discuss and debate what are the emerging issues that decision-makers need to be aware of and take into account in discussions at the Rio+20 Confer-

ence on Sustainable Development. Lively discussions indeed took place during the Science Day, including an audience of some 50 persons. The three partners expressed their satisfaction with the content and organisation of the event, as well as the ongoing work of GRID-Geneva.

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Photo 1: Panel of experts at the Science Day.

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World Resources Forum Davos, 19-21 September 2011

By Jaap van Woerden and Géraldine Boezio

The World Resources Forum (WRF) is a science-based platform to exchange knowledge about the economic, political and environmental implications of global resource use. The WRF promotes innovation for resource productivity by building bridges between researchers and policy-makers, business, NGOs and the public.

The WRF transcends the current political focus on climate change and aims to bring the broader issues of global resource consumption and resource productivity onto the agenda. It aims to create a science-based, realistic vision of sustainable resource use, and is directed towards academics, politicians, research-oriented practitioners, sustainability officers, consultants and other professionals working in the areas of sustainable development, resource efficiency, eco-innovation and climate change.

Based on the outcomes of the Expert Committee meeting held in St. Gallen in June 2010, the second WRF 2011 focused on five clusters:

- **Security of Supply**

Peak minerals, scarcity of metals and minerals, environmental and social burden of resource extraction, resource extraction and socio-political conflicts, recycling of important ma-



Photo 2: Panel discussion at WRF.

terial flows, secondary resources.

- **Growth, Innovation, Decoupling, Efficiency and Sufficiency**

Supply chain management, regional and global material flows, efficiency of processes and manufacturing, dematerialization, low carbon society, green economy, circular economy, resources and greenhouse gas emissions, best practice examples and case studies.

- **Assessment Methods, Resource Use Indicators and Targets**

Life cycle analysis, ecological footprint, grey energy, carbon footprint, other greenhouse-gas-related indicators, water footprint, soil-related indicators, material flow indicators and (per-capita) targets, standards.

- **The Social Dimension of Resources**

Welfare of countries, new economic approaches beyond growth, values and life-

styles, consumer behavior, social Life Cycle Assessment (LCA), sustainability assessment, sustainable consumption, North/South context, industrializing countries.

- **Communication and Education**

Information systems, product information, youth involvement, awareness for resource limits and sustainable resource management, workplace training, outreach.

UNEP is one of the main partners of the WRF and participated in this second conference (2011) through keynote addresses and organizing various workshops and panel discussions, while trying to broaden the constituency and audience to include more policy-makers and experts from global and regional levels. GRID-Geneva assisted colleagues from the regional offices in Bangkok and Panama organizing a side event at the WRF for the launch of two new regional reports on resource use issues: Resource Efficiency: Economics and Outlook for the Asia-Pacific and the Latin American (REEO LAC) region. Simultaneous launch events were held in Mexico, Panama, Brazil and China, and a news item was released on the UNEP website. The side event in Davos also included a panel discussion with reknowned global and regional resource efficiency experts. The two reports were commended by regions and countries as being innovative contributions on the topic of resource use, providing systemic overviews of resource issues in these regions and raising awareness for resource issues among governments and other decision-makers. They underlined the need to not only foster resource efficiency in the regions and world-wide, but called for a more fundamental, systemic change in order to move to sustainable development pathways – in short, a 'green industrial revolution'.



Photo 3: Presentation of REEO LAC report.

More information can be found at:

WRF:

<http://www.worldresourcesforum.org/>

REEO report Asia-Pacific:

<http://www.unep.org/ROAP>

REEO report Latin America:

<http://www.pnuma.org/reeo/>

UNEP press release:

<http://unep.org/NEWSCENTRE/Default.aspx?DocumentID=2653&ArticleID=8868>



World Resources Forum



Photo 4: Lake Sevan in Armenia, the largest lake in the Caucasus region (940 km²). © Nicolas Ray

Launch of the “Armenian distributed Processing Capacities for Environmental GEOspatial data (ARPEGEO)” project

Building capacities in the management, processing, and sharing of geospatial data in the environmental domain of Armenia

By Nicolas Ray and Géraldine Boezio

The ARPEGEO project is designed to establish a tripartite institutional partnership between GRID-Geneva/Institute for Environmental Sciences at the University of Geneva (ISE), the Center for Ecological-Noosphere Studies of the National Academy of Sciences of the Republic of Armenia (CENS), and the Institute for Informatics and Automation Problems of the National Academy of Sciences of the Republic of Armenia (IIAP).

Armenia is a small country located in the South Caucasus region. Its past and current industrial activities have led to various severe environmental problems, notably in regard to soil pollution and degradation. During the Soviet Era, Armenia had a long tradition of excellence in science and technology. However, the disintegration of the Soviet Union had many direct negative consequences: a plunge of research and education budgets, the exodus of scientific and technical talents, obsolescence of laboratory material, and little visibility and competitiveness to participate in pan-European and international scientific projects. The ARPEGEO project aims at building capacities in two leading Armenian Institutions in the management,

processing and sharing of geospatial data in the environmental domain. In order to achieve high-quality and cost-effective environmental assessment and research studies in Armenia, there is a strong need to deploy a standardized Spatial Data Infrastructure (SDI) dedicated to a wide array of environmental data. There is also a strong need to process computationally-demanding analyses in an efficient manner, notably through distributed computing such as Grid computing. ARPEGEO is a two-year project that runs from September 2011 to August 2013 and has received seed funding from the Swiss National Science Foundation under the SCOPES (Scientific Cooperation Projects with Eastern Europe) programme. ARPEGEO is built around five joint activities:

1. A SDI will be set up at CENS to establish centralized efficient data management. A common workshop will be organized to transfer the know-how and the best practices regarding international meta-data standards and to initiate participation in the Global Earth Observation System of Systems (GEOSS).
2. The Armenian Grid computing facility located at IIAP will be scaled up through an increase in storage capacity, and new innovative workflows for analyzing environmental data will be implemented.
3. A new Masters-level course on “Data management and analyses in environmental sciences” will be developed. Selected students will be able to do an internship at UniGe/UNEP offices in Geneva.
4. A new Masters programme in the domain of environmental geocomputation will be established in order to foster new multidisciplinary avenues for research.
5. National and international networking activities will be implemented, and an international event will be organized in the Armenian capital (Yerevan) focusing on data sharing and SDI. The event will target users, stakeholders and scientists in the region. Networking activities will be achieved thanks to the 30-partner consortium that GRID-Geneva/UniGe is coordinating around the Black Sea in the framework of the EU/FP7 project enviroGRIDS (<http://www.envirogrids.net>).

The kick-off meeting took place in Yerevan on 6-9 September 2011 where project leaders gathered to discuss the road map for the first year of the project. Key stakeholders were also present to participate to the discussions.

For more info, please go to: <http://www.unige.ch/envirospace/Projects/ARPEGEO.html>

Follow-up training on the RiVAMP Methodology 5-9 December 2011, Kingston (Jamaica)

By Géraldine Boezio and Pascal Peduzzi

A UNEP pilot study tested a risk and vulnerability assessment methodology in Jamaica that integrates the role of ecosystems and climate change in risk and vulnerability analysis. Known as RiVAMP, the project published a report entitled "Linking Ecosystems to Risk and Vulnerability Reduction: the Case of Jamaica", which was launched in March 2010 in Kingston and Negril (pilot study area). This project was jointly implemented by the Division of Early Warning and Assessment (DEWA)/GRID Geneva and the Division of Environmental Policy Implementation (DEPI)/Post-Conflict and Disaster Management Branch (PCDMB), in consultation with the Caribbean Environment Programme (CEP) based in Kingston and the Regional Office for Latin America and the Caribbean (ROLAC).

The Government of Jamaica has requested GRID-Geneva to conduct a training on the RiVAMP methodology as an immediate follow-up to the pilot. Representatives from various government technical agencies, including the Planning Institute of Jamaica (PIOJ), the National Environment and Planning Authority (NEPA) and the National Spatial Data Management Division expressed strong interest in developing national capacities to apply the methodology in other parts of Jamaica. Moreover, the University of the West Indies (UWI) through the Institute of Sustainable Development (ISD) also views the training as an important opportunity to further develop regional capacity in undertaking ecosystems-based assessments.

Given that RiVAMP seeks to enhance coastal protection through improved ecosystems management, it supports priorities of UNEP's Ecosystems-based Adaptation (EbA) programme as well as other ongoing programmes related to the Regional Seas and the Small Island Development States (SIDS). The RiVAMP training in Jamaica helped build national and regional capacities for applying ecosystems-based disaster risk reduction and climate change adaptation strategies. Moreover, this follow-up initiative in Jamaica strengthened the newly-established partnership between UNEP and UWI on mainstreaming environmental education in the Caribbean region (Main-

streaming Environment and Sustainability into Caribbean Universities - MESCA).

Objectives of the training

The overall objective of this training was to promote greater understanding of the role of ecosystems for disaster risk reduction, including climate change-related risks, through integrated assessments that can support policy and land-use planning decisions.

The training sought to enhance national and regional capacity in applying scientific approaches and community-based consultations in a complementary way, to demonstrate how coastal ecosystems in particular (e.g. coral reefs, sea grasses, mangroves) can mitigate coastal hazard impacts and reduce local vulnerability. The training further aimed to facilitate intra-governmental collaboration by bringing together various sectors (environment, land-use planning and disaster management) and to support increased cooperation between government and academia in promoting an ecosystems-based approach to coastal zone management and hazard mitigation.

By providing a hands-on learning experience, the training allowed participants to collectively apply the methodology as well as train others in undertaking the process.

Specifically, the training enabled participants to:

- Map population distribution for computation of exposure.

- Explain the method for extracting ecosystems and other contextual features.
- Carry out statistical analysis, for identification of ecosystems role in mitigating beach erosion.
- Compute scenarios on beach erosion (design of simple tool with inputs on slope, sea level rise and environmental features).
- Run scenarios on different densities of coral and sea grass and their influences on wave energy and beach erosion.

Scope

This training was a GRID-Geneva-led exercise but was developed and executed in close consultation with existing partners, namely the PIOJ and UWI, to ensure that it met local needs and priorities. A course overview was provided to create a common baseline of understanding amongst participants with respect to environment, disaster and climate change linkages and the role of ecosystems management for disaster risk reduction and climate change adaptation. An overview of the RiVAMP methodology was also presented.

Targeted participants

The training targeted representatives from both national and local government technical agencies working in the environment (or natural resource management), land-use planning and zoning, disaster risk management and/or climate change adaptation. Counterparts from the University of the West Indies also attended.



Photo 5: Berm scarp along Long Bay beach. The constrained length of scarps can indicate beach replenishment © UNEP, October 2009

The ClimBirdproject: how will the distribution of Swiss breeding birds change in the future according to the forecast changes in climate and human activities?

By G eraldine Boezio and Anthony Lehmann

Many bird species are sensitive to weather conditions, and they are already responding to current rates of climate change. Phenological changes have been observed in the dates of migration and nesting. Moreover, the distribution of some temperate species has already started to move northward, and range shifts upwards in the mountains have already been identified for a few tropical species.

The fourth report of the Intergovernmental Panel on Climate Change (IPCC) predicts that 20-30% of species (flora and fauna confounded) are likely to be at increased risk of extinction if the global average warming exceeds 1.5-2.5 C compared to 1980-1999. Some scenarios forecast increases possibly exceeding 3.5 C, which would cause a major loss of species (40%-70%) globally. Recent studies predict an average increase of 4 C (compared to 1960-1990) for Switzerland by the end of the 21st century. Hence, it is very important to assess the current situation and to be able to forecast future changes in order to suggest effective adaptation measures for bird conservation. The ClimBird project made an assessment of the past changes and made predictions about the situation in

Switzerland for the end of the 21st century. ClimBird project aims were to:

- highlight past changes in the altitudinal distribution for common breeding birds in Switzerland;
- model the present distribution of bird species across Switzerland using different techniques and to predict their future distribution according to combined scenarios of climate warming and land use change;
- develop a vulnerability index for each species.

GRID-Geneva/UniGe actively participated in the ClimBird project and in the symposium "Climate change and birds" that took place on 9th September 2011 at the Swiss Ornithological Institute of Sempach. During the symposium, the effects of climate change and land use on the distribution of breeding birds in Switzerland were presented. Issues related to the impacts of global change on species as well as protection and conservation measures were also discussed.

In this three-year research project, the Ornithological Institute discovered that birds, in particular alpine birds, will be significantly impacted by climate change in the future. Predictions are particularly bad for the Rock Ptarmigan. According to this research, the worst case scenario is that this species could lose almost all its suitable habitat in Switzerland by the end of this century. The predicted effects are already visible today. The Swiss Ornithological Institute observes that the number of Rock Ptarmigan has already decreased by a third over the past twenty

years. Furthermore, an assessment over 95 common breeding birds has shown that at least one third of the species have modified their altitudinal distribution toward higher altitudes since the end of the last century. It is crucial that the Swiss Confederation and the Cantons take into account these results to create protection zones. In alpine areas of high-altitude, it is crucial to create zones of retreat safe from human disturbance if we want to preserve alpine birds on the long-term.

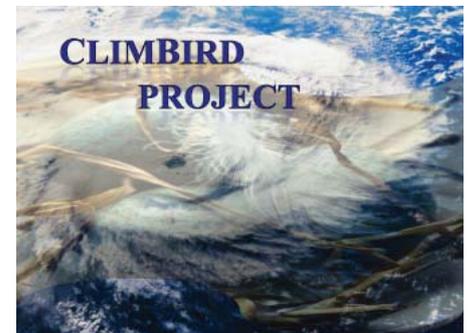


Photo 6: Rock Ptarmigan   Eduard Germann

Does permafrost hold the key to our planet's future?

By Ron Witt

Out of the world's entire population, only a small percentage knows what permafrost is; fewer among those persons have ever seen - leave alone set foot on - actual permafrost. Yet permafrost soil exists in 24% of exposed land in the Northern Hemisphere, including in some Alpine regions. Permafrost may hold the key to the planet's future, in the sense that it contains huge stores of carbon and methane that, if released into the atmosphere via thawing processes, could reinforce current global warming and even propel a warmer world beyond a threshold of no return.

UNEP/GRID-Geneva is leading a process to develop a new report "Policy Implications of Thawing Permafrost" to inform a broad audience about permafrost, and communicate to decision-makers and the general public the impacts and implications of thawing permafrost in a warming climate. It will summarize the best scientific information available from published literature as of mid-2011, emphasizing the Northern Hemisphere including Alpine regions. The report will include the impacts of changing climate on ecosystems and human infrastructure in the Arctic, as well as the impacts of thawing permafrost on global climate. It will have a wide range of graphics, illustrations and photos to

make the concepts and ideas easily understood by a non-scientific audience, also allowing the basic processes at work in permafrost thawing, and the impacts of the same, to be visualized by the reader.

An informal meeting of the expert lead authors took place in Geneva on 26 September, where a plan for completing the report by December 2011 was developed, with the intention of launching the final document in April 2012.

Calendar of events

EuroGEOSS – Advancing the vision of GEOSS Conference, 25-27 January 2012, Madrid (Spain)

Intergovernmental Meeting on the GEO-5 Summary for Policy Makers, 30 January - 1 February 2012, Metropolitan City of Gwangju (Republic of Korea)

27th UNEP Governing Council/Global Ministerial Environment Forum (GC/GMEF), 20th – 22nd February 2012 Nairobi (Kenya)

GIS for the UN, Environmental Systems Research Institute (ESRI), 6-7 March 2012, WMO, Geneva (Switzerland)



Photo 7: When permafrost thaws, the ice melts, flows away, and the soil collapses to form a thermokarst.