



# GRID-Geneva Quarterly Bulletin No. 2 - 2001

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UNEP/Global Resource Information Database-Geneva

## UNEP Study Reveals Collapse of Mesopotamian Marshlands

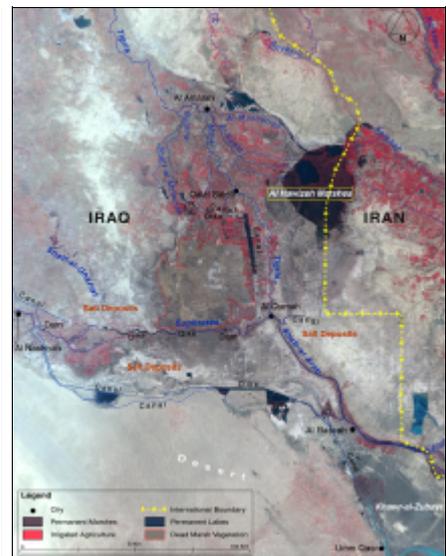
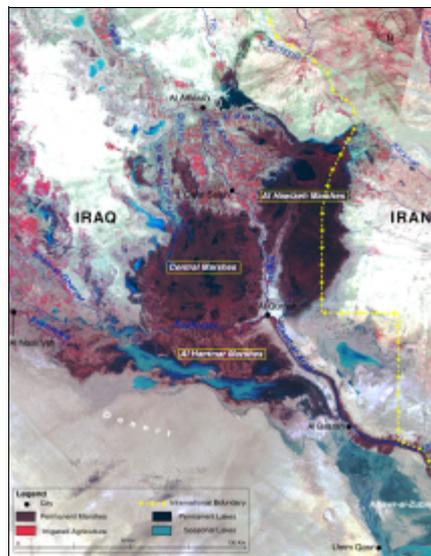
Drawing on historical and recent satellite imagery, a new UNEP study shows that the Mesopotamian marshlands of the Tigris-Euphrates delta - the largest wetland in the Middle East and one of the most outstanding freshwater ecosystems in the world - has nearly vanished. The results of the study were announced by UNEP Executive Director Klaus Töpfer at a press conference in Washington D.C. on 18 May 2001, on the occasion of a National Aeronautics and Space Administration (NASA) donation of a unique set of satellite imagery valued at US \$20 million to help UNEP assess global environmental change. "These findings on Mesopotamia have only been made possible by 'eyes-in-the-sky'", said Dr. Töpfer, describing the wetland loss as "a major ecological disaster, comparable to the drying of the Aral Sea and the deforestation of Amazonia".

The assessment study, which was carried out by GRID-Geneva, graphically documents with hard satellite evidence the stunning scale and speed at which the wetlands have disappeared. It concludes that about 90% of the

marshlands had dried up by May 2000, with devastating impacts on people, wildlife and fisheries. The full report of the study entitled "The Mesopotamian

Marshlands: Demise of an Ecosystem" will be released in mid-August 2001.

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Analysis of Landsat satellite imagery taken in 1973 (left) and 2000 (right) reveal that most of the Mesopotamian marshlands, the fabled Eden of the Fertile Crescent, to have been transformed into salt-encrusted desert.

## A New Website on Geneva's Environment is Launched

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The product of a joint project between UNEP/GRID-Geneva, the Canton and City of Geneva, this new website provides wide-ranging information about environmental conditions in the Geneva region. Developed within the framework of an international environmental reporting programme on the urban environment, Cities Environment Reports on the Internet (CEROI), the site is accessible at: <http://www.geneva-city.ch/ceroi/>

The CEROI-Geneva website was inaugurated at a press conference by Geneva's Mayor, Mr. Alain Vaissade, the Director of Geneva's Department of Interior, Agriculture, Environment and Energy (DIAEE) Mr. Robert Cramer, and DEWA/GRID-Geneva's Regional Coordinator for Europe Ron Witt at the International Environment House on 23 April 2001. In his keynote message, Mr. Vaissade underlined the role of the CEROI-Geneva site in furnishing civil society with information

about their immediate environment, as well as providing solutions to emerging problems.

Providing a comprehensive account of the major environmental issues facing Geneva, the CEROI-Geneva site also assesses how human activity is impacting on the local environment and offers ways to protect and enhance its quality. Mr. Cramer noted that as a member of the CEROI network of cities, the portal would also provide an opportunity to compare Geneva's environment and share lessons with other urban centers around the world. A special welcome has been extended to CEROI-Geneva as the first francophone site, which is also available in English and is equipped with unique features including a glossary and thematic bibliography.

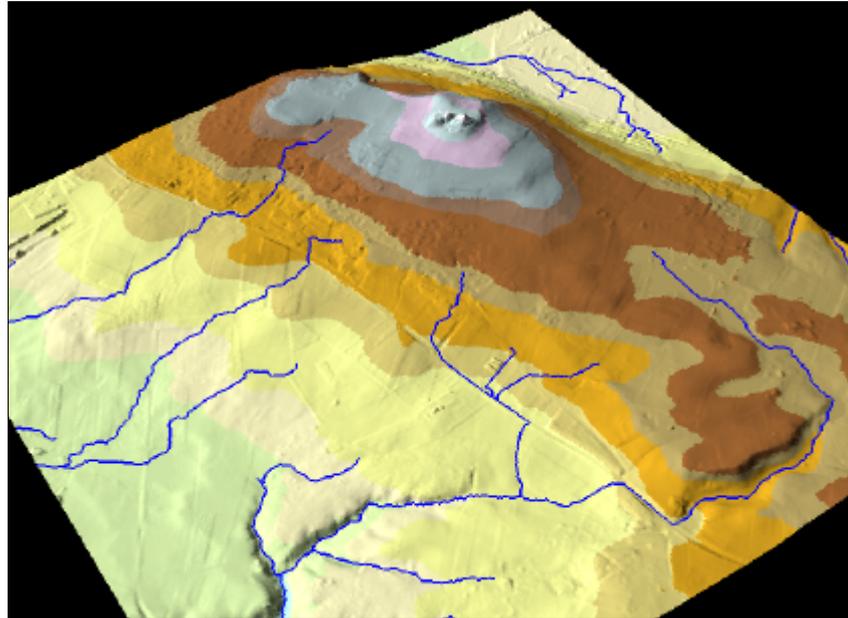
The CEROI programme (<http://www.ceroi>).

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## Testing of a "state-of-the-art" High-Resolution Elevation Model

Digital terrain or elevation models (DEM) are traditionally used in environmental applications such as watershed delineation or landslide hazard mapping. Most of these early DEM's were derived by interpolating between map contour lines, producing relatively coarse and not very accurate maps.

Recent technological advances in remote sensing have completely changed this state of affairs. Similar to the more familiar radar, the LIDAR (Light Detection and Ranging) can be thought of as a laser radar. Flown aboard an aircraft or helicopter, LIDAR sends short pulses of laser light. When an earth feature (trees, houses or ground surface) intercepts the laser pulse, it is reflected back to the aircraft. The time interval between the laser pulse leaving the aircraft and the return of the reflected pulse back to the sensor is measured precisely. In post-flight data processing, the time lapse for the return LIDAR signal is converted to distance measurement by referencing it



Virtual hydrographic network around Bernex (near Geneva, Switzerland), computed by, and overlaid on a 3-D rendering of the one-metre Digital Terrain Model.

to the aircraft's location using a Global Positioning Systems. From the precisely known altitude of the aircraft, it is then possible to determine the altitude of topographic features.

Geneva's "Service de

Géomatique" commissioned a campaign of LIDAR data recording by helicopter in Spring 2000 and two topographic models were computed by the contractor: a digital surface model (DSM, with vegetation and buildings) and a digital terrain model

(DTM, representing the topographic surface). Several elevation points were collected per square meter, yielding models with a resolution of one meter after interpolation.

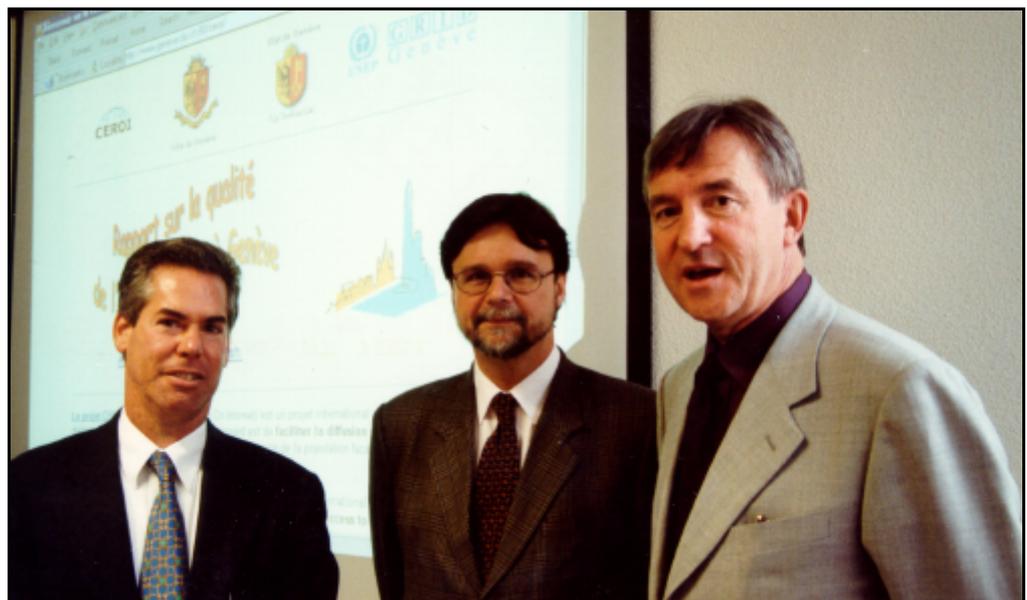
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## CEROI-Geneva Website Launched

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net) was set up by UNEP/Habitat in collaboration with the International Council for Environmental and Local Initiatives (ICELI) as a practical means to implement Agenda 21 at the local level and to act on its recommendations and that of the Aarhus Convention on improving access to environmental information for sound decision-making and general awareness-raising for the public. It provides city authorities with an efficient framework to report on their environment on the Internet, based on a standard set of indicators.

GRID-Geneva introduced the CEROI concept to Geneva authorities in early 1999, and was responsible for collecting the relevant information from local government agencies and preparing its publication on the Internet. Updating of website



Officiating the launching of the CEROI-Geneva website at the International Environment House (IEH) from left to right: Ron Witt, Regional Coordinator of UNEP's DEWA/GRID-Geneva; Robert Cramer, State Councillor for Geneva's Department of the Interior, Agriculture, Environment and Energy (DIAEE), and Alain Vaissade, Mayor of the City of Geneva.

contents will now be done by a recently appointed Agenda 21 delegate, while maintenance of the site has been entrusted to GRID-Geneva.?

## GEO-3 European Regional Consultation Meeting

The European Regional Consultation for the Global Environment Outlook (GEO-3) reporting process took place at the Palais des Nations in Geneva on 6-7 June. The Consultation, which involved some 50 participants, received substantive inputs and feedback from European governments spanning the pan-European area, as well as civil society and the NGO community, EU institutions, GEO Collaborating Centres from Europe, private sector and youth representatives.

The Regional Consultation was co-chaired by Mr. Frits Schlingemann, the Director of UNEP's Regional Office for Europe (UNEP/ROE), his

Deputy Ms. Françoise Belmont and the DEWA Regional Coordinator, Ron Witt, with substantive discussions focussed on reviewing draft chapters of GEO-3. The first chapter that was taken up is entitled "Integrating environment and development: 1972-2002". The meeting spent the bulk of the time reviewing Chapter Two on integrating state-of-environment reporting and policy-making, in a discussion that was led by Ms. Mary McKinley of the Regional Environment Centre (REC). This was followed by lively discussions on Chapter 3 addressing "future outlooks" for Europe in another discussion led by RIVM, and

Chapter 4 on human vulnerability and security which was presented by Ms. Anna Stabrawa of the UNEP/GEO Core Team from UNEP Headquarters in Nairobi. Additional presentations were also made on UN-ECE/UNEP preparations for the World Summit on Sustainable Development (Rio+10) by ROE, and preparation of the report for the Kiev European Ministerial meeting scheduled to take place in 2002, by the EEA.

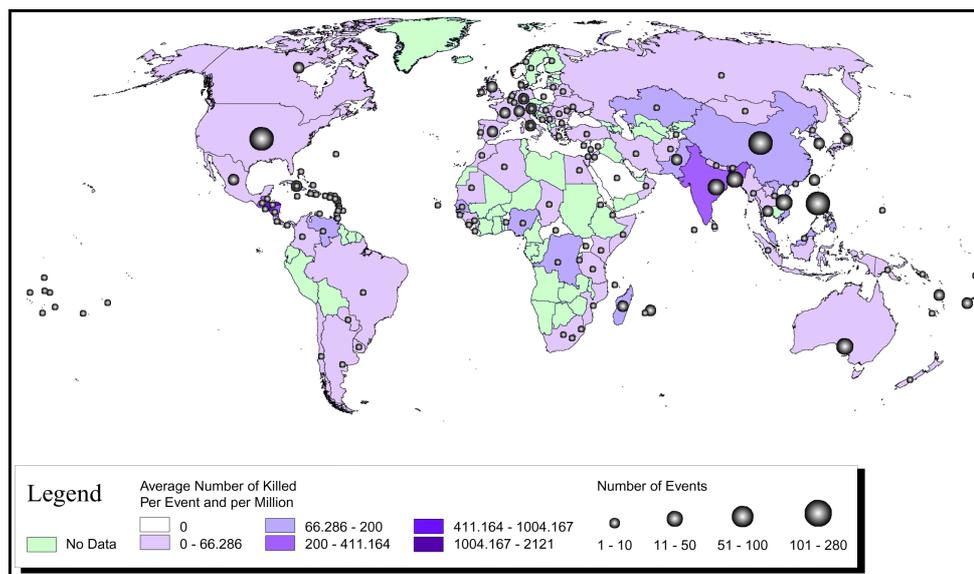
The overall conclusions of the Regional Consultation will be used to better structure the current draft versions of Chapters 2 and 3 in particular, and also to increase the policy-

relevance of some sections of the document. The participants expressed their satisfaction that the existing content of the GEO-3 report is "on target" and praised UNEP for its efforts to date in its development, as well as for so closely involving their governments and various other sectors in the review. ?

## Development of a Preliminary Global Risk and Vulnerability Index

Since January 2001, GRID-Geneva has been commissioned by UNDP's Emergency Response Division (ERD) to prepare an index ranking the world's countries in terms of their risk and vulnerability to natural disasters. In carrying out the analysis, GRID-Geneva merged statistical socio-economic data with spatial data sets on several natural disasters (volcanoes, earthquakes, cyclones and floods). Correlations were found between the number of victims from natural disasters, as derived from the Centre for Research on the Epidemiology of Disasters (CRED) database and socio-economical factors. A Geographic Information System (GIS) approach was employed to extract and analyse spatial information, whereas statistical analysis was employed to attempt a first model of "Global Risk and Vulnerability Index Trends by Year" (GRAVITY).

The findings reveal the potential of merging geophysical and socio-economic data in developing the concept of human vulnerability. Nevertheless, there are several limitations to the methods employed, which are fully explained in the



### Wind storm events as recorded by CRED (1980 – 2000).

(Data sources: EM-DAT: The OFDA/CRED International Disaster Database, Université Catholique de Louvain - Brussels - Belgium.)

report. It appears that trends exist, but caution is urged due to the generalised nature of the original data. The GRID-Geneva team also explored patterns, tendencies and possibilities for data extrapolation and margins of error.

The outputs achieved so far include a ready-to-use database and spatial information layers, as well as the identification of the most

relevant factors for assessing risk and vulnerability. A versatile method to model an index is proposed that should be adapted to respond to UNDP's strategies and goals. Multi-criteria analysis may also be performed which could be extended to assess drought and other types of disasters if appropriate data are made available. Follow-up work includes developing methods for validation and for interlinking affected

populations and victims in a more precise manner. ?

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<http://www.grid.unep.ch/>

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## Mesopotamian Marshlands

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The desiccation of the marshlands, which originally covered between 15,000 to 20,000 square kilometres, is attributable to two main causes: upstream dams and drainage schemes. With more than 30 large dams, the Tigris and Euphrates are amongst the most intensively dammed rivers in the world. By turning off the tap, dams have substantially reduced the water available for downstream ecosystems and eliminated the floodwaters that nourished the marshlands. The immediate cause of marshland drying, however, has been the massive drainage works implemented in southern Iraq in the early 1990s. A small northern fringe of the wetland system straddling the Iran-Iraq

border is all that remains of the marshlands. Yet even this last vestige is rapidly dwindling as its water supply is impounded by new dams and diverted for irrigation purposes.

UNEP is urging Iraq and Iran as well as other riparian countries to agree to a recovery plan for the marshlands. For this purpose, UNEP plans to carry out a comprehensive scientific assessment of the Tigris-Euphrates river basin in collaboration with regional organisations to help demonstrate how improvements can be made. ?

For more information please visit the following website:

<http://www.grid.unep.ch/activities/sustainable/tigris/marshlands/>

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## GRID-Geneva Calendar of Events

(July - September 2001)

### 3 - 6 July

UNEP/DEWA IEA/GEO Process Workshop, Arendal, Norway.

### 9 - 11 July

Global Observation of Forest Cover (GOFC)-Fire Workshop on Satellite Product Validation, Lisbon, Portugal.

### 16 - 19 July

GRID-Geneva's Workshop on Data and Information Management for the Caspian Environment Programme (CEP) and member countries, Baku, Azerbaijan.

### 23-24 July

UNEP/DEWA GEO Data and Human Vulnerability Index Meeting, Geneva, Switzerland

### 13-15 August

IATFNOAA, Workshop on Vulnerability Assessment Techniques VAT II, Charleston, South Carolina, U.S.A.

### 24-25 September

RIO+10 European Regional Preparatory Meeting, Geneva, Switzerland.

## High Resolution DEM

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UNEP/GRID-Geneva examined the LIDAR model (several gigabytes) and performed a series of quality controls. Among these, we tested for various artifacts and suggested methods to attenuate residual "noise". The models were also resampled to five and ten metre resolution.

Several applications for the LIDAR-derived models are in the pipeline including:

- ◆ Accurate ortho-rectification of high-resolution colour aerial photographs.
- ◆ 3-D model of buildings, to be used for traffic noise

exposure modelling and cellular phone network planning.

- ◆ Tree height and volume estimation.
- ◆ Flood zone mapping in very flat areas.
- ◆ Provision of additional criteria to multispectral classification of satellite imagery, enabling a discrimination of land cover classes based on vegetation height. ?

For additional information please consult the following website:  
<http://www.sitg.ch/>

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## GRID-Geneva Advisory Board Meeting

The University of Geneva hosted the first 2001 bi-annual meeting of the "GRID-Geneva Partnership Advisory Board" on 9 May 2001. In attendance were representatives from the University, the Swiss Federal Agency for Environment, Forests and Landscape (SAEFL) and UNEP's Division of Early Warning and Assessment (DEWA) and the Regional Office for Europe (ROE). GRID-Geneva projects carried out and outputs realised in the past six months were presented and discussed at the meeting, as well as the Workplan for 2001. An overview of the staffing and budget situation was also provided, with Advisory Board (AB) members expressing their overall satisfaction with the sound and steady growth attained.

agreement for signature by SAEFL, UNEP and the University later in 2001. It was also noted that other organisations had expressed interest in joining the Partnership and it was agreed that this needed to be carefully assessed, based on specific criteria and their potential substantive contribution.

Mr. Dan van Claassen, DEWA Deputy Director, thanked University of Geneva AB member Prof. András November, who will be retiring later this year, for his cooperation and support to the Partnership during the pilot phase period. The AB also welcomed a new member, Dr. Frank Perez, Head of SAEFL's Global Affairs Section who replaced Ms. Monika Linn Locher earlier this year. ?

Given that the current phase of the Partnership Agreement will lapse by the end of this year, one of the major issues on the agenda was its renewal for the next four years. As all partners have expressed their ready willingness to continue the Partnership, a committee was set up to prepare a revised version of the