The United Nations Environment Programme 2011–2013 strategy focuses on six thematic priorities – climate change; resource efficiency; disasters and conflicts; environmental governance; harmful substances and hazardous waste; and ecosystem management. As part of its effort to come to terms with these priorities, UNEP engaged Zoï Environment Network to create thematic maps for use as objective tools for priority setting in the European region.

This assignment – as simple as it may look – confronted Zoï with many challenges in terms of both content and cartographic display.

- Finding contents: The careful selection of contents and the building of appropriate map legends for each priority area was an essential part of the map-making. Some UNEP priority areas are more straightforward and comprehensible to the outside world (climate change; disasters and conflicts; environmental governance) compared to other highly complex or ambiguous ones (resource efficiency; harmful substances and hazardous waste; ecosystem management).

- Reduction: With the goal of having one map on one page for each priority area, we had to discard information that did not fit, or risk overloading the map and making it unreadable. Some of this discarded information included highly interesting indicators.

- Consistency: One of our guiding principles was that each map should have consistent data for the entire region that it covered. This narrowed our options considerably, and we had to exclude some interesting data that exist for only one country or subregion – pollution hot spots in Russia, for example.

- Mixing apples and oranges: In an ideal conceptual world, environment assessments follow the DPSIR (Driver, Pressure, State, Impact, Response) model. Our maps sometimes display drivers, pressures, state and impact in a mixed manner. The next round of priority setting will deal with the responses by the countries and the international community.

- No consultations: To make the maps as objective as possible we had no consultations with UNEP and its responsible officers. We used this approach to avoid a bias towards the current project portfolio. The mapping exercise at the UNEP Regional Office for Europe staff retreat in June was informal, and the exercise outputs did not flow into the maps, but such a consultative exercise would be an excellent method to derive priorities based on the current maps.

- Geographic coverage beyond borders: While the main focus is on the UNEP European region, we have nevertheless mapped indicators – where available – in Northern Africa, the Middle East and some Asian countries. We believe this approach communicates a broader picture and will help UNEP plan beyond – at times artificial – regional borders.

- Graphical supplements: Where we have reached the cartographic limits of one-page maps, we have used bar charts and other graphical means to display relevant supplementary information.

- Present (as opposed to past or future): We have used as up-to-date information as possible to display the current status. There are – except for climate change – no scenarios or predictions for future trends, nor have we used historical data or time series.

Despite these challenges we have succeeded in producing the six thematic maps, which in our opinion can be very useful for UNEP priority setting. As a next step, we suggest mapping the various actors and activities as a way of providing a base for assessing UNEP niches.
Rhine delta
Alps
Mediterranean basin
Arctic
London
Amsterdam and Rotterdam
Hamburg
Venice
Istanbul
Alexandria

Map produced by ZOÏ Environment Network, August 2011

¹ CO2 emissions of Belgium and Luxembourg
Source: Intergovernmental Panel on Climate Change, IPCC Fourth Assessment Report: Climate Change 2007 (www.ipcc.ch); National Snow and Ice Data Center (http://nsidc.org)
Gagnon-Lebrun and Abrawala, 2008 (www.???.xxx)

UNEP thematic priorities - 1. Climate change

More precipitation
Sea-level rise concerns and affected major cities
Impact on mountain regions
Negative agricultural changes
Melting of glaciers
Present permafrost
Permafrost in 2050
Changes in ecosystems
Forest fires
Median September pack ice edge 1979-2000

CO2 emissions 2009

Progress in impact assessment, adaptation options and policy response
Moving towards implementing adaptation
Advanced impact assessment, but slow development of policy responses
Early in advanced stages of impact assessment

Greenhouse gas emissions and Kyoto targets 2008
On target
Not on target
This map is a straightforward illustration based on the IPCC Fourth Assessment Report, showing potential impacts in the greater European region – areas with changing precipitation, ice, snow and permafrost; changes in ecosystems; negative impacts on agriculture; forest fires; and the “hot spots” in the Arctic, the Mediterranean and the mountain regions where drastic impacts are to be expected and are already visible.

The other side of the equation – drivers and responses – are illustrated in the graphic underneath the map: countries ranked by their total CO\textsubscript{2} emissions and “smiley faces” for two indicators – “reaching the Kyoto target” and “Progress in impact assessment, adaptation options and policy response”. The latter is a composite indicator using the national communications to UNFCCC as the main source.

The map and the graphic clearly show where action is needed: first of all where climate change impacts are most severe, mainly at the extremes of Europe – the Arctic North, the Mediterranean South and the high altitudes. Other entry points are indicated where the faces are not smiling about the Kyoto protocol targets or about general progress regarding assessments and policy implementation.

Discarded: climate neutral countries; the highly interesting index of vulnerability to climate change (World Bank 2009), available only for the East.
Number of enterprises (companies) with certified environmental management systems (ISO 14001*)

*ISO 14001 provides the requirements for an environmental management system

Total resource extraction* in 2007 (in kilotonnes)

* Extraction of biomass, fossil fuels and minerals

Map produced by ZOÏ Environment Network, October 2011

Source: World Energy Council (www.worldenergy.org/publications/energy_efficiency_policies_around_the_world_review_and_evaluation/1230.asp); www.materialflows.net; Das Umweltbundesamt (UBA) (www.umweltbundesamt.de)
2. RESOURCE EFFICIENCY

This map was probably the most difficult one to grasp and took several iterations to produce. In the published version we put emphasis on the spatial pattern of resource use and efficiency in wider Europe: a simple indicator of resource extraction is overlaid by energy efficiency.

A real innovation is the graphical display of the ISO140001 indicator, simply showing the number of enterprises with an environmental management certificate as an indication of the private sector commitment to environmental issues, a first step in the direction of a green economy.

This map shows a clear East-West divide, with the former Soviet Union still highly visible – abundant natural resources historically available to be wasted, while in the market economies in the West, resources were something to be handled with care.

Discarded: ecologic footprint as a measure of human demand on the Earth’s ecosystems (seems to be too much linked with simple economic indicators, although there are exceptions).
3. DISASTERS & CONFLICTS

This map is somewhat retro, showing where conflicts and natural and industrial disasters have occurred in the last 20 years, but also showing the location of nuclear power plants. The conflicts, however, may be pointing towards the future as well: in areas with “frozen” conflict, such as the Southern Caucasus, the probability of future conflicts is much higher than elsewhere. The disasters are more complex in that they may strike everywhere. This possibility suggests that it may be interesting to have an indicator of “preparedness”, but we found no adequate proxy to be mapped.

The diagram gives a more sober – and grim – picture of the number of people affected by disasters.

Responses will be needed in the fragile areas, the whole EECCA region and in particular in the South. The Arab spring is happening in Europe’s neighbourhood and will also need responses from Europe even if strictly speaking – in terms of UNEP administration – the Arab world does not belong to the European region.

Discarded: the ENVSEC map published earlier in the year (already part of the response).
UNEP thematic priorities - 4. Environmental governance

GNI per capita, PPP (current international $)

- $50,000
- $25,000
- $10,000
- $1,000

Number of ratified international environmental conventions and protocols**

▲ Five or more ratifications between 2007 and 2011
▲ Ten or more ratifications between 2007 and 2011

( ) Including the following environmental conventions and protocols:

(**) Including the following environmental conventions and protocols:


Map produced by ZOÏ Environment Network, August 2011.
* The Former Yugoslav Republic of Macedonia

Belarus
Finland
Sweden
Norway
Iceland
Svalbard (Norway)
Greenland (Denmark)
Estonia
Ukraine
Latvia
Lithuania
Poland
Czech Republic
Austria
Switzerland
Hungary
Italy
Serbia
Slovenia
Croatia
Bosnia and Herzegovina
Montenegro
Albania F.Y.R.O.M.*
Slovakia
Germany
France
Spain
Portugal
United Kingdom
Ireland
Morocco
Algeria
Libya
Tunisia
Egypt
Cyprus
Israel
Lebanon
Syria
Jordan Iraq
Map produced by ZOÏ Environment Network, August 2011

Number of ratified international environmental conventions and protocols**

▲ Five or more ratifications between 2007 and 2011
▲ Ten or more ratifications between 2007 and 2011

( ) Including the following environmental conventions and protocols:

4. ENVIRONMENTAL GOVERNANCE

Environmental governance is highly correlated with existing regimes or blocs: the European Union (plus the Western non-member countries and countries in varying stages of accession); the Commonwealth of Independent States; and then the countries “in between”, such as Turkey. The Arab league countries are also shown on the map. Another key factor influencing environmental governance is simply wealth, which we display with a straightforward GNI per capita indicator.

In the bar chart we introduce a rating according to the ratification of and adherence to environmental conventions and protocols using data from the convention secretariats.

The EU members and proxies can be regarded as the most progressive with regard to environmental governance. Here the main role of the United Nations could be propagating and mainstreaming good policies and practices worldwide. The poor countries outside the EU should in our opinion be the main target of UNEP activities in Europe. Special attention needs to be given to the immediate neighbours on the south where – with the Arab spring – new opportunities will be emerging.

UNEP thematic priorities - 5. Harmful substances and hazardous waste

Estimated cumulative global usage of PCB's with 1° x 1° longitude and latitude resolution (tonnes)

Hazardous waste* generation 2008

* Hazardous waste is waste that owing to its toxic, infectious, radioactive or flammable properties poses an actual or potential hazard to the health of humans, other living organisms, or the environment. Hazardous waste here refers to categories of waste to be controlled according to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (Article 1 and Annex I). If data are not available according to the Basel Convention, amounts can be given according to national definitions.

Obsolete pesticides 2008 (tonnes)

5. HARMFUL SUBSTANCES AND HAZARDOUS WASTE

The background map shows a combination of global usage of PCBs (model calculation) and the areas of major deposition of lead, cadmium and mercury to highlight the geographical areas with potentially the highest contamination. We have also added the few places in the region that are featured on the “World’s most polluted” list from the Blacksmith Institute – Chernobyl, Sumgayit, Dzerzhinsk, Magnitogorsk, Norilsk, Bratsk, Ust-Kamenogorsk and Mailuu Suu. The hazardous waste generation per country is shown with a barrel symbol.

The graphic underneath the map shows a ranking of the countries with regard to their stocks of obsolete pesticides.

Discarded: nuclear waste and decommissioning since these may fall outside the mandate of UNEP and because of consistency concerns regarding the data.
6. ECOSYSTEM MANAGEMENT

With its myriad connections to land, biodiversity, rivers, oceans and other physical characteristics, ecosystem management may be the most complex of all the priority areas to map. We have generalized as much as possible, but still have a quite loaded map showing forest, protected areas, sea- and river-related transboundary arrangements or conventions, mountain areas and arid lands – most prone to desertification – as a background.

The graphic underneath the map shows a ranking of “water stress”, one of the most relevant indicators related to ecosystem management.

Discarded: symbols for the location of the UNESCO and Ramsar sites; indicators developed under the Biodiversity Indicators Partnership, and the Ecosystem Services Indicators, both of which would be highly relevant for this priority area, but at this stage exist only as descriptive catalogues that still need to be populated with data.
→ http://www.bipindicators.net/
→ http://www.bipindicators.net/LinkClick.aspx?fileticket=QxjDuq2Qk%3D&tabid=155
The United Nations Environment Programme (UNEP) 2011–2013 strategy focuses on six thematic priorities – climate change; resource efficiency; disasters and conflicts; environmental governance; harmful substances and hazardous waste; and ecosystem management. As part of its effort to come to terms with these priorities, UNEP engaged Zoï Environment Network to create thematic maps for use as objective tools for priority setting in the European region. Despite many challenges in terms of both content and cartographic display, Zoï has succeeded in producing the six thematic maps, which are presented here.