UNEP STRATEGIC PRIORITIES IN EUROPE

MAPS & GRAPHICS
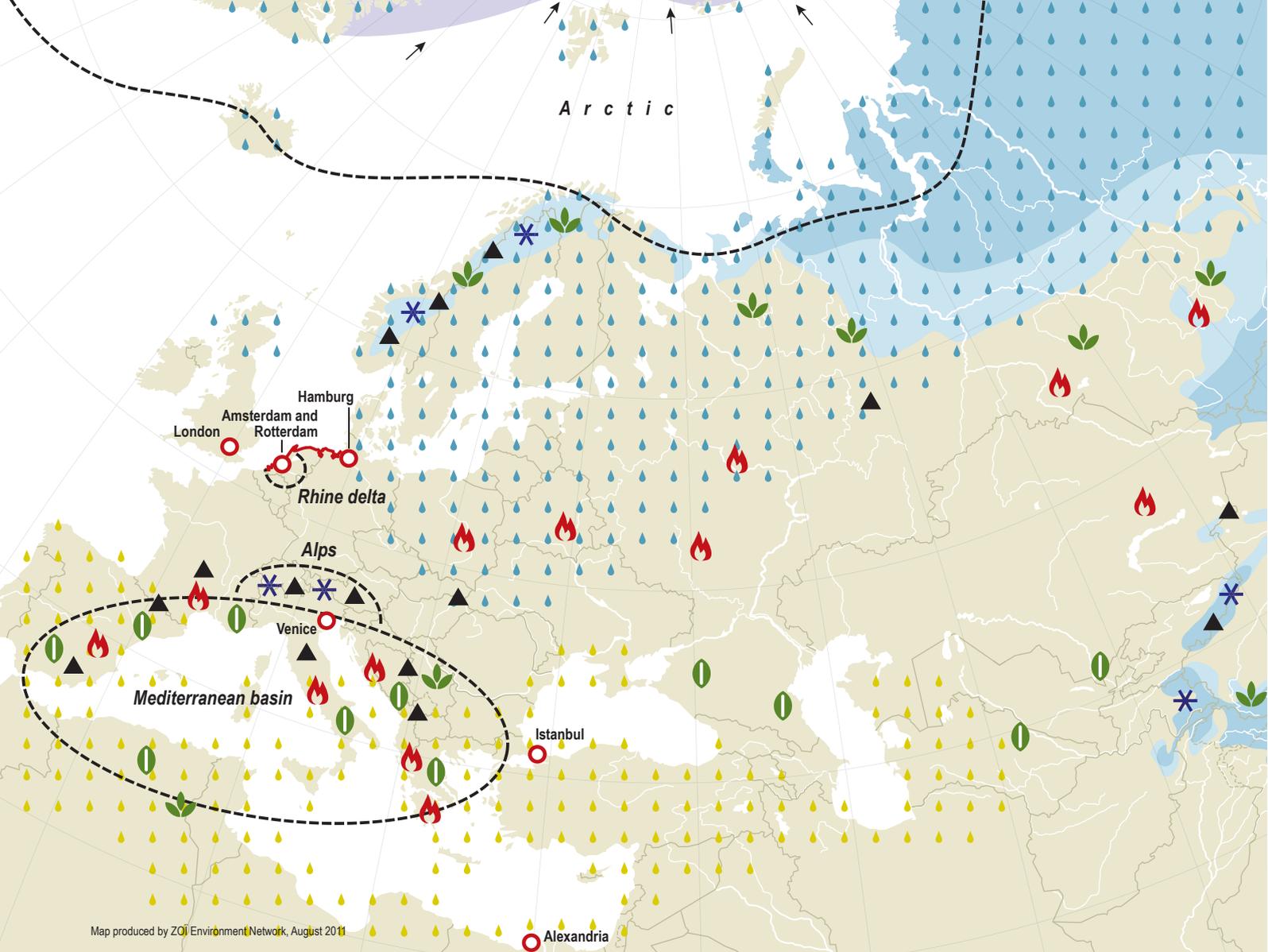
The United Nations Environment Programme 2011–2013 strategy focuses on six thematic priorities – climate change; resource efficiency; disasters and conflicts; environmental governance; harmful substances and hazardous waste; and ecosystem management. As part of its effort to come to terms with these priorities, UNEP engaged Zoï Environment Network to create thematic maps for use as objective tools for priority setting in the European region.
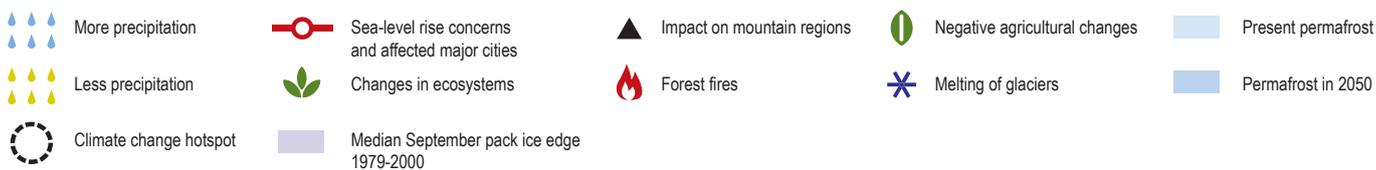
This assignment – as simple as it may look – confronted Zoï with many challenges in terms of both content and cartographic display.

- 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.
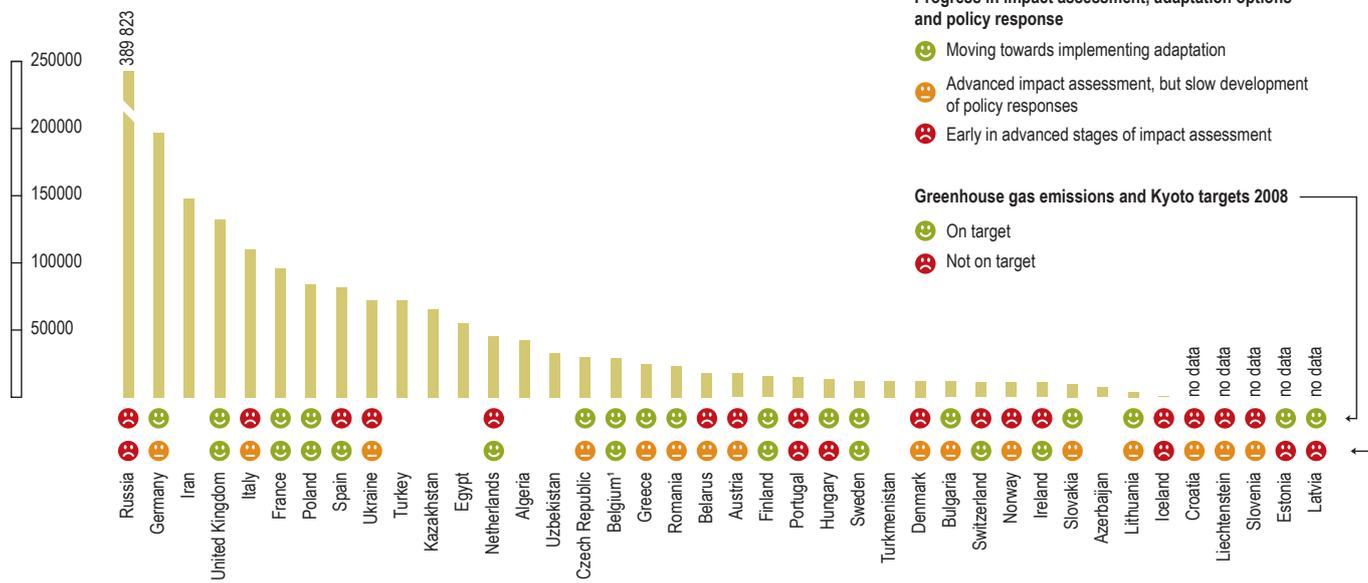
Despite these challenges we have succeeded in producing the six thematic maps, which in our opinion can be very useful for UNEP priority setting. As a next step, we suggest mapping the various actors and activities as a way of providing a base for assessing UNEP niches.

Arctic

Hamburg
Amsterdam and Rotterdam
London
Rhine delta
Alps
Venice
Mediterranean basin
Istanbul
Alexandria

Map produced by ZOÏ Environment Network, August 2011

UNEP thematic priorities - 1. Climate change

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

CO$_2$ emissions 2009

389 823

250000
200000
150000
100000
50000

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

Russia
Germany
Iran
United Kingdom
Italy
France
Poland
Spain
Ukraine
Turkey
Kazakhstan
Egypt
Netherlands
Algeria
Uzbekistan
Czech Republic
Belgium[1]
Greece
Romania
Belarus
Austria
Finland
Portugal
Hungary
Sweden
Turkmenistan
Denmark
Bulgaria
Switzerland
Norway
Ireland
Slovakia
Azerbaijan
Lithuania
Iceland
Croatia
Liechtenstein
Slovenia
Estonia
Latvia

no data
no data
no data
no data
no data

[1] CO$_2$ 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)

1 CLIMATE CHANGE

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_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.
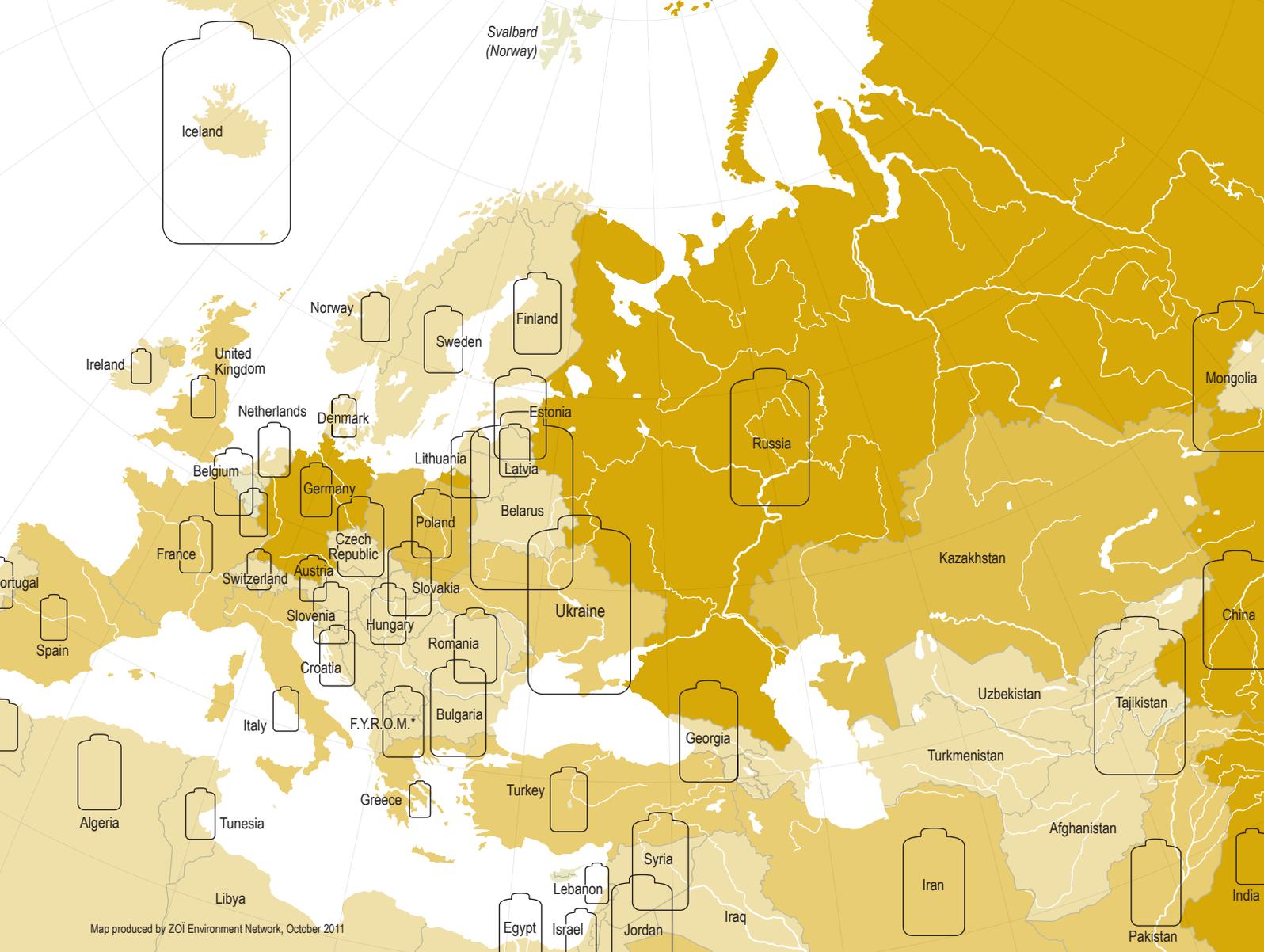
Map produced by ZOÏ Environment Network, October 2011
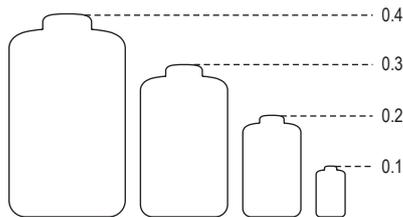
UNEP thematic priorities - 2. Resource efficiency

Number of enterprises (companies) with certified environmental management systems (ISO 14001*)

10 000
5 000
1 000
100
10

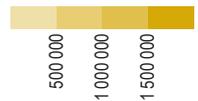*ISO 14001 provides the requirements for an environmental management system

Energy efficiency 2007/2008

Primary energy intensity (in kilogram oil equivalent per 2005 PPP dollar)

- - - - 0.4
- - - - 0.3
- - - - 0.2
- - - - 0.1

Total resource extraction* in 2007 (in kilotonnes)

* Extraction of biomass, fossil fuels and minerals

500 000   1 000 000   1 500 000

11 205 Spain	**9 825** Italy	**5 800** Germany	**5 400** United Kingdom	**4 865** Sweden	**3 629** France

1 704 Switzerland	**1 454** Romania	**1 315** Czech Republic	**1 140** Hungary	**1 132** Netherlands	**991** Finland	**808** Denmark	**597** Poland	**564** Portugal	**550** Austria	**530** Belgium

475 Norway	**422** Israel	**415** Turkey	**379** Egypt	**351** Slovenia	**340** Slovakia	**300** Greece	**294** Ireland	**267** Lithuania	**231** Croatia	**223** Russia	**182** Estonia	**122** Belarus	**122** Serbia and Montenegro	**101** Latvia

97 Bulgaria	**60** Tunisia	**60** Ukraine	**53** Syria	**53** Luxembourg	**47** Cyprus	**44** Pakistan	**39** Jordan	**34** Bosnia and Herzegovina	**32** Azerbaijan	**30** Kazakhstan	**26** Morocco	**22** Liechtenstein	**13** Algeria

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).
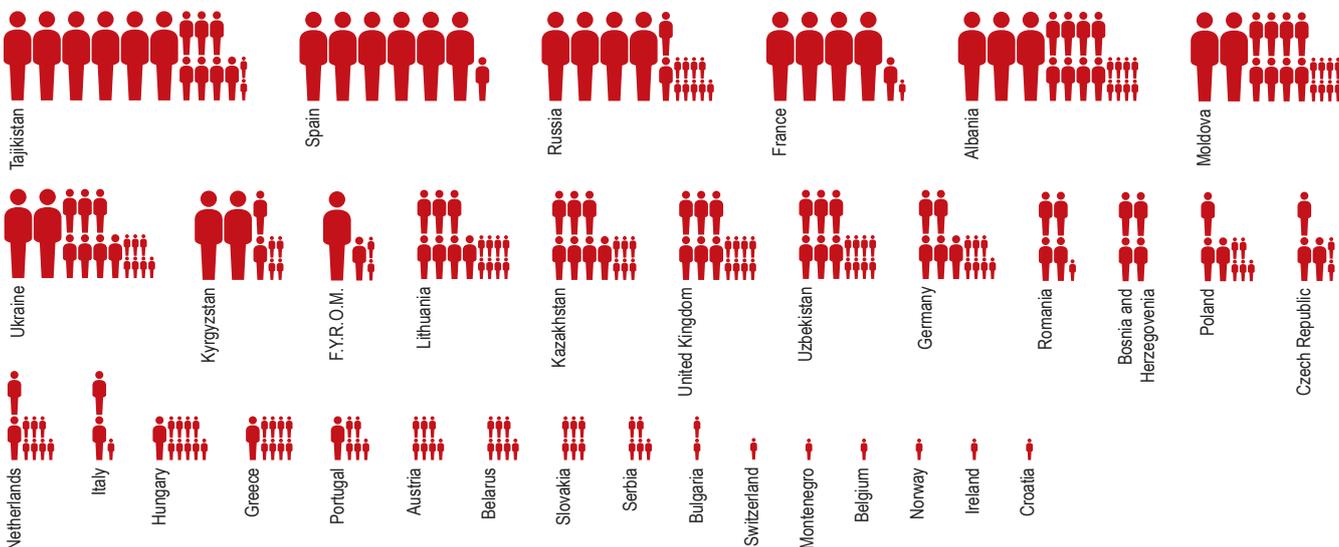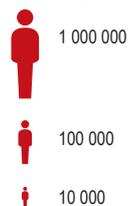
Greenland
(Denmark)

Svalbard
(Norway)

Iceland

Piper Alpha

Northern Ireland

Norway

Sweden

Finland

Ireland

United Kingdom

Estonia

Buncefield fire
Aberfan

Flixborough

Denmark

Latvia

Russia

Kyshtym disaster

Netherlands

Rus.

Lithuania

Torrey Canyon

Amoco Cadiz

Belgium

Enschede

Germany

Poland

Belarus

Basque Country

Portugal

Lux.

France

Sandoz

Czech
Republic

Switzerland

Austria

Slovakia

Chernobyl

Ukraine

Kazakhstan

Spain

Toulouse

Seveso

Slovenia

Ajka

Hungary

Transnistria

Croatia

Italy

Serbia

Baia Mare
Romania

Moldova

Kyrgyzstan

China

Bosnia and
Herzegovina

Kosovo

Bulgaria

South Ossetia

Abkhazia

Chechnya

Uzbekistan

Tajikistan

Montenegro

Albania

Georgia

Kashmir

F.Y.R.O.M.*

Armenia

Azerbaijan

Turkmenistan

Morocco

Greece

Turkey

Nagorno-Karabakh

Tribal areas

Algeria

Tunisia

Northern Cyprus
Cyprus

Lebanon

Syria

Iran

Afghanistan

Libya

Palestinian Territories
Egypt

Israel

Jordan

Iraq

Pakistan

India

Belochistan

Map produced by ZOÏ Environment Network, August 2011

UNEP thematic priorities - 3. Disasters and conflicts

Conflict 2008 or later

Conflict between 1989 and 2007

Tensions, frozen conflicts

Insurgencies or riots 2010 or 2011

Nuclear power plants

Major industrial disasters

Nuclear

Mining

Energy

Chemical

Oil spill

Total affected people by natural and industrial disasters since 1990

1 000 000

100 000

10 000

Tajikistan

Spain

Russia

France

Albania

Moldova

Ukraine

Kyrgyzstan

F.Y.R.O.M.

Lithuania

Kazakhstan

United Kingdom

Uzbekistan

Germany

Romania

Bosnia and
Herzegovina

Poland

Czech Republic

Netherlands

Italy

Hungary

Greece

Portugal

Austria

Belarus

Slovakia

Serbia

Bulgaria

Switzerland

Montenegro
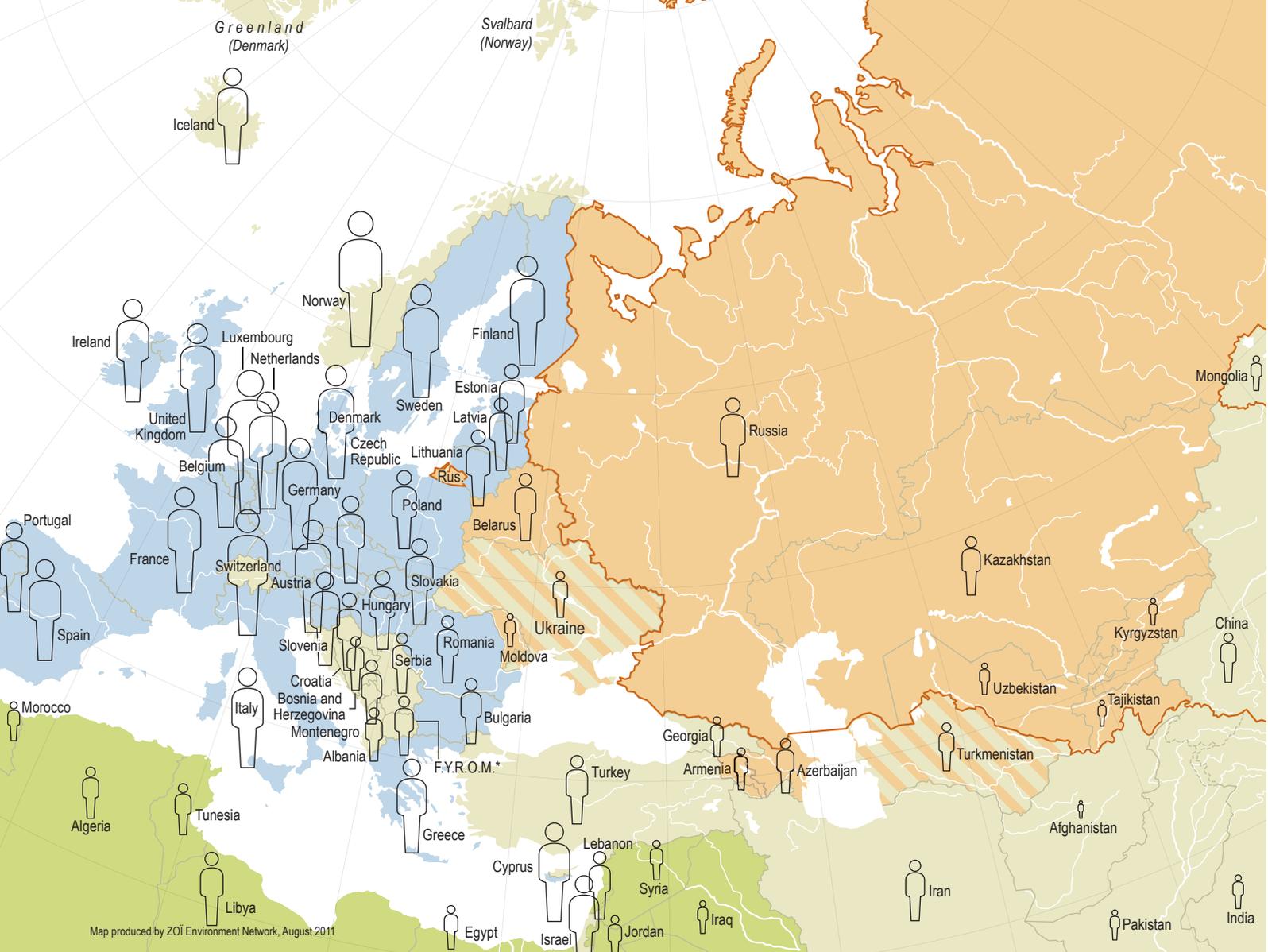
Belgium

Norway

Ireland

Croatia

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).
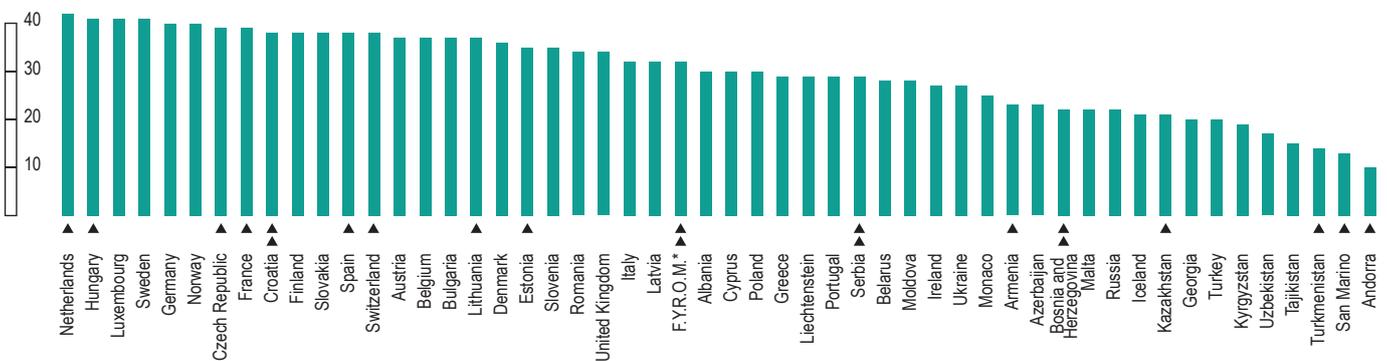
Greenland (Denmark) · Svalbard (Norway)

Iceland · Norway · Ireland · Luxembourg · Netherlands · United Kingdom · Belgium · Germany · Denmark · Czech Republic · Sweden · Finland · Estonia · Latvia · Lithuania · Rus. · Poland · Belarus · Russia · Portugal · France · Switzerland · Austria · Slovakia · Hungary · Ukraine · Slovenia · Romania · Moldova · Kazakhstan · Mongolia · Spain · Italy · Croatia · Bosnia and Herzegovina · Montenegro · Serbia · Albania · Bulgaria · F.Y.R.O.M.* · Greece · Turkey · Georgia · Armenia · Azerbaijan · Uzbekistan · Kyrgyzstan · China · Tajikistan · Turkmenistan · Morocco · Algeria · Tunisia · Libya · Cyprus · Lebanon · Syria · Israel · Jordan · Egypt · Iraq · Iran · Afghanistan · Pakistan · India

Map produced by ZOÏ Environment Network, August 2011

UNEP thematic priorities - 4. Environmental governance

GNI per capita, PPP (current international $)

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

- European Union (EU)
- Commonwealth of Independent States (CIS)
- Arab League
- Shanghai Cooperation Organisation

* The Former Yugoslav Republic of Macedonia

Number of ratified international environmental conventions and protocols**

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

40 / 30 / 20 / 10

Netherlands · Hungary · Luxembourg · Sweden · Germany · Norway · Czech Republic · France · Croatia · Finland · Slovakia · Spain · Switzerland · Austria · Belgium · Bulgaria · Lithuania · Denmark · Estonia · Slovenia · Romania · United Kingdom · Italy · Latvia · F.Y.R.O.M.* · Albania · Cyprus · Poland · Greece · Liechtenstein · Portugal · Serbia · Belarus · Moldova · Ireland · Ukraine · Monaco · Armenia · Azerbaijan · Bosnia and Herzegovina · Malta · Russia · Iceland · Kazakhstan · Georgia · Turkey · Kyrgyzstan · Uzbekistan · Tajikistan · Turkmenistan · San Marino · Andorra

(**) Including the following environmental conventions and protocols:
Convention for the Control and Management of Ships' Ballast Water and Sediments (2004), Stockholm Convention on Persistent Organic Pollutants (2001), Convention to Combat Desertification (1994), Convention on Biological Diversity (1992), Biosafety Protocol, United Nations Framework Convention on Climate Chane (1992), Kyoto Protocol, Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (1989), Amendment to Basel Convention, Basel Protocol on Liability and Compensation, Vienna Convention for the Protection of the Ozone Layer (1985), Montreal Protocol, London Amendment, Copenhagen Amendment, Montreal Amendment, Beijing Amendment, Convention on International Trade in Endangered Species of Wild Fauna and Flora (1973), Amendment to Article XI, Amendment to Article XXI, Convention on the Prevention of Marine Pollution by Dumping of Easte and Other Matter (1972), 1996 Protocol, Convention on Wetlands (1971), Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (1998), Kiev Protocol, Convention on the Protection and Use of Transboundary Watercourses and International Lakes (1992), Amendments, Protocol on Water and Health, Protocol on Civil Liability and Compensation, Convention on the Transboundary Effects of Industrial Accidents (1992), Convention on Environmental Impact Assessment in a Transboundary Context (1991), First Amendment, Second Amendment, SEA Protocol, Convention on Long-range Transboundary Air Pollution (1979), Gothenburg Protocol, POPs Protocol, Protocol on Heavy Metals, Sulphur Protocol, VOC Protocol, Nox Protocol, Sulphur reduction by 30% Protocol, EMEP Protocol.

Source: Worldbank (→ www.worldbank.org); Europe's environment, The fourth assessment (EEA 2007) and Convention secretariat's websites
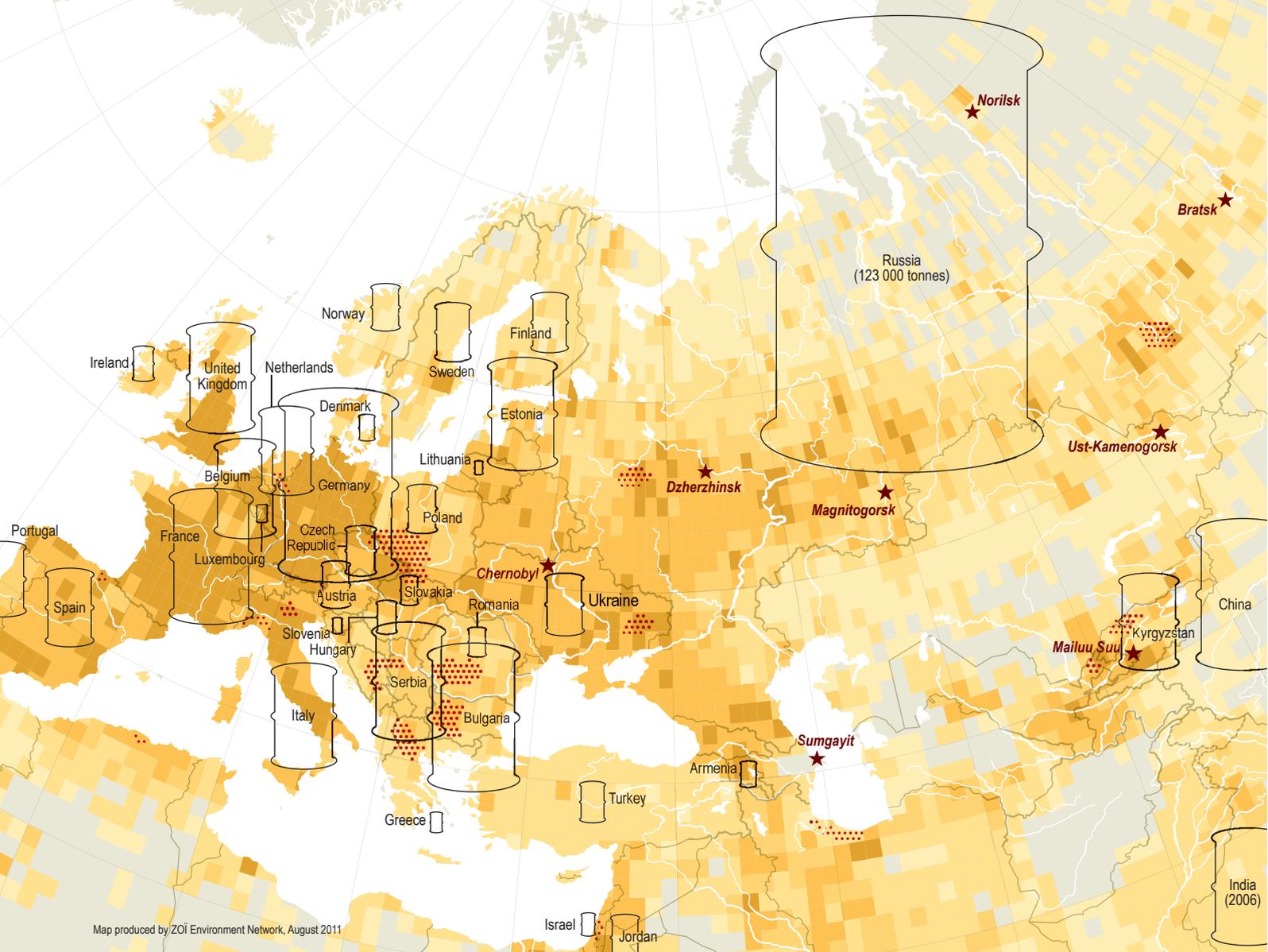
4. ENVIRONMENTAL GOVERNANCE

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.

Discarded: disaggregated data on "International spread of environmental policies" (although in a way very innovative) both because of the complexity and the potential difficulties in communicating the indicators. http://www.eea.europa.eu/data-and-maps/figures/international-spread-of-environmental-policies/trend11-3g-soer2010-eps/TREND11-3G-environment-policies-spread.eps.75dpi.png/at_download/image

Norilsk

Bratsk

Russia
(123 000 tonnes)

Ust-Kamenogorsk

Norway

Finland

Ireland

United
Kingdom

Netherlands

Sweden

Denmark

Estonia

Dzherzhinsk

Magnitogorsk

Belgium

Germany

Lithuania

Poland

Portugal

France

Czech
Republic

Luxembourg

Spain

Austria

Slovakia

Chernobyl!

Ukraine

China

Kyrgyzstan

Slovenia

Hungary

Romania

Mailuu Suu

Italy

Serbia

Bulgaria

Sumgayit

Armenia

Turkey

Greece

India
(2006)

Map produced by ZOÏ Environment Network, August 2011

Israel

Jordan

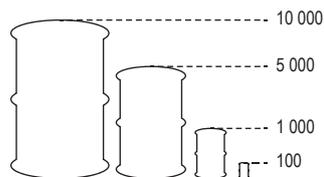## UNEP thematic priorities - 5. Harmful substances and hazardous waste

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

10   50   100   500   no data
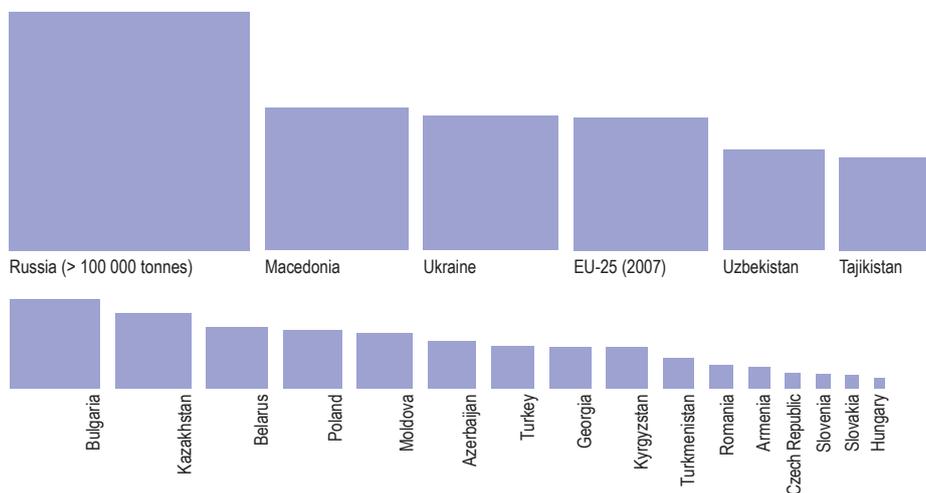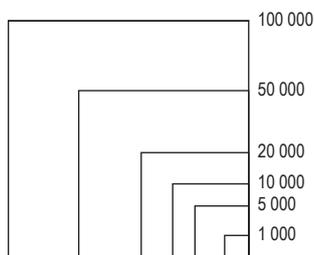
Areas of major deposition of lead, cadmium and mercury

★ World's most polluted places

Hazardous waste* generation 2008

— 10 000

— 5 000

— 1 000

— 100

* 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)

100 000

50 000

20 000

10 000

5 000

1 000

Russia (> 100 000 tonnes)

Macedonia

Ukraine

EU-25 (2007)

Uzbekistan

Tajikistan

Bulgaria

Kazakhstan

Belarus

Poland

Moldova

Azerbaijan

Turkey

Georgia

Kyrgyzstan

Turkmenistan

Romania

Armenia

Czech Republic

Slovenia

Slovakia

Hungary

Source: Norwegian Institute for Air Research (→ www.nilu.no); United Nations Statistics Division (→ http://unstats.un.org/unsd/ENVIRONMENT/hazardous.htm); The International HCH & Pesticides Association (IHPA)
(→ www.ihpa.info/how-to-be-involved/how-big-is-the-problem); Meteorological Synthesizing Centre-East (→ www.msceast.org/hms/results_map.html#top);
Blacksmith Institute: The World's Worst Polluted Places, New York 2007 (→ www.blacksmithinstitute.org/wwpp2007/finalReport2007.pdf)

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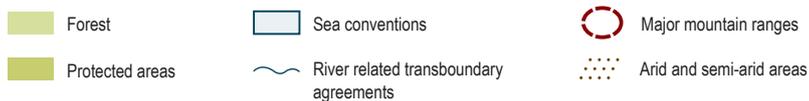
The graphic underneath the map shows a ranking of the countries with regard to their stocks of obsolete pesticides.

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

Arctic Sea

Scandinavian Mountains

North Sea

Baltic Sea

Ural

Altai

Alps

Pyrenees

Carpathian Mountains

Tien Shan

Aral Sea

Karakorum

Alai

Pamir

Caspian Sea

Black Sea

Caucasus

Kopet Dag

Himalya

Pontic Mountains

Atlas Mountains

Taurus Mountains

Alborz

Hindukush

Mediterranean Sea

Zagros Mountains

Map produced by ZOÏ Environment Network, October 2011

UNEP thematic priorities - 6. Ecosystem management

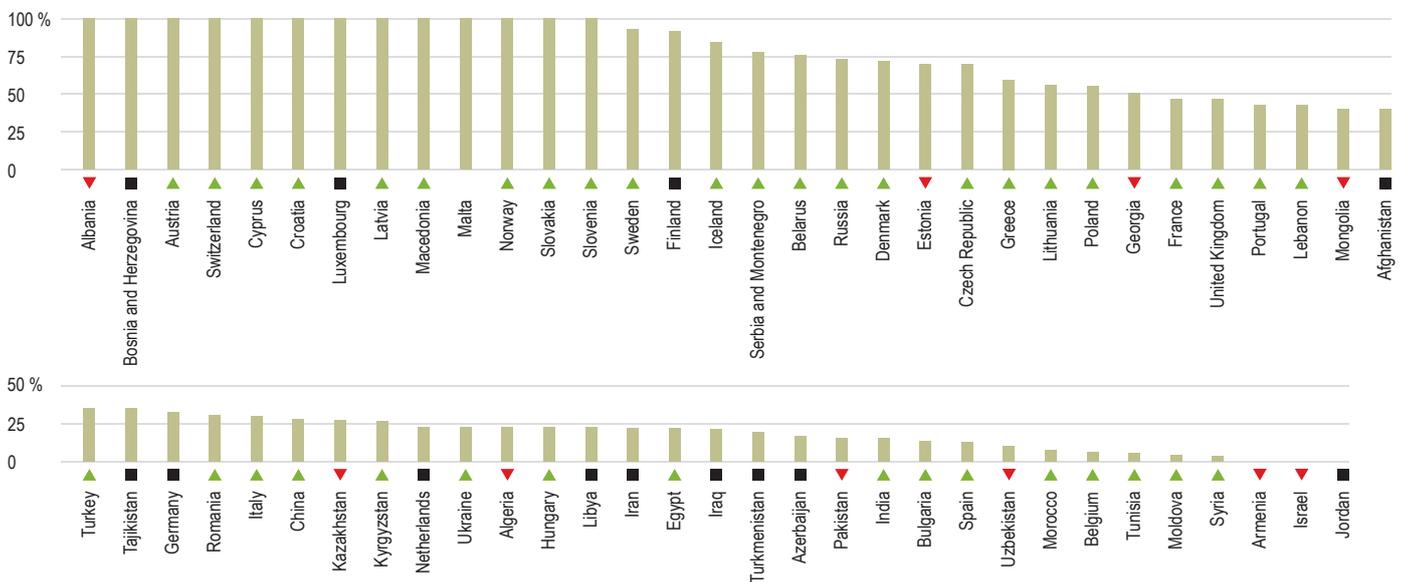|	
Forest	Sea conventions
Protected areas	River related transboundary agreements

Major mountain ranges

Arid and semi-arid areas

Water stress index* 2010 in percent

* Water Stress is calculated as the percentage of a country's territory affected by oversubscription of water resources (100 % = no water stress)

Trend in extent of forest 2005-2010

▲ more   ■ no change

▼ less

100 %
75
50
25
0

Albania, Bosnia and Herzegovina, Austria, Switzerland, Cyprus, Croatia, Luxembourg, Latvia, Macedonia, Malta, Norway, Slovakia, Slovenia, Sweden, Finland, Iceland, Serbia and Montenegro, Belarus, Russia, Denmark, Estonia, Czech Republic, Greece, Lithuania, Poland, Georgia, France, United Kingdom, Portugal, Lebanon, Mongolia, Afghanistan

50 %
25
0

Turkey, Tajikistan, Germany, Romania, Italy, China, Kazakhstan, Kyrgyzstan, Netherlands, Ukraine, Algeria, Hungary, Libya, Iran, Egypt, Iraq, Turkmenistan, Azerbaijan, Pakistan, India, Bulgaria, Spain, Uzbekistan, Morocco, Belgium, Tunisia, Moldova, Syria, Armenia, Israel, Jordan

Source: Protected Planet (→ www.protectedplanet.net); United Nations Environment Programme (UNEP) (→ www.unep.org); UNEP World Conservation Monitoring Centre (→ www.unep-wcmc.org);
Yale Center for Environmental Law & Policy, Yale University and Center for International Earth Science Information Network, Columbia University (→ http://epi.yale.edu);
Food and Agriculture Organization of the United Nations: Global Forest Resources Assessment 2010 (→ www.fao.org/forestry/fra/fra2010/en)

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=QxjjDuqt2Qk%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.