Institute for Environmental Security

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Géraud de Ville & Ronald A. Kingham

Report for the European Space Agency

December 2011

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Cover Design and Report Layout: Géraud de Ville
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See: http://earth.eo.esa.int/cgi-bin/satimgsql.pl?show_url=837&startframe=0

Published by:

Institute for Environmental Security
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url: www.envirosecurity.org

December 2011
ISBN/EAN: 978-94-6055-000-3
NUR: 906

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Foreword - About this Report

The European Union has been developing a Common Foreign and Security Policy over the last several years and, more recently, an ambitious climate policy. In 2008, a report by the European Commission and the EU's High Representative for Foreign and Security Policy, Javier Solana, considered the impact of climate change on international security and, in particular, Europe's own security, thereby indicating potential EU responses.

The report said that Climate Change is a threat multiplier which exacerbates existing trends, tensions and instability in developing countries.[1] These tensions may include conflict over resources such as land, water, food and energy. The expected increase in the frequency and severity of natural disasters plus the slow-onset of environmental degradation threaten the human security of local populations.

On the institutional side, the Lisbon Treaty which entered into force on 1 December 2009, has brought in new rules that reflect the political, economic and social changes the European Union is facing today. Of particular interest is the creation of the new position, the High Representative of the Union for Foreign Affairs and Security Policy, who is also one of the Vice-Presidents of the Commission and who also exercises authority over the new European External Action Service (EEAS) and over the Union delegations in third countries and at international organisations. The EEAS is expected to raise the EU's profile in international arenas by providing the Union with a Foreign Affairs portfolio. It is also noteworthy that the Treaty of Lisbon for the first time recognises space as a separate EU competence.

The set up of the second Barroso Commission and the more recent creation of the EEAS show a clear trend towards more coordinated external action, climate change being one facet along with crisis response.

Space technology, and Earth observation in particular, has a strong role to play in serving such policies, with a well established record in natural disaster management and scientific evidence of Climate Change. The European Space Agency (ESA) intends to maximise its contribution to such policies, especially in emerging areas such as environmental diplomacy.

This report was prepared at the request of the Agency in order to provide the ESA with information on the evolution of EU external action in the fields of climate, environment, development and security. The main purpose is to advise the Agency on the latest developments in the EU external action in these policy areas.

Because of its extensive experience in working on these issues with an integrated approach, the IES was asked to provide information on the following specific aspects:

1. **Issues**: The Effects of Climate Change and the Consequences for EU External Policies in the Fields of Climate, Environment, Development and Security

2. **Policies**: The Evolution of EU External Policies in the Fields of Climate, Environment, Development and Security - New Trends and Possible Initiatives

3. **Earth Observation**: New Opportunities for the Contribution of Earth Observation Programmes for the Implementation of EU External Policies

4. **Institutions**: The Roles and Responsibilities of EU Institutions in External Relations in the Fields of Climate, Environment, Development and Security

5. **Networking**: Partnership Opportunities with European Professional Organisations, NGOs and Others in the Fields of Climate, Development, Environment and Security

To accomplish the above, the report is organised into two main parts plus an annex. Following a Preface on EU, Space and Security and an introduction on integrating environment, development and security

[1] Paper S113/08 from the High Representative and the European Commission to the European Council on Climate Change and International Security, 14 March 2008

policy, Part I covers ten specific issue areas plus a cross-cutting chapter on peace and security issues. For each of the specific topics we present a brief description of the global issues involved (particularly from an integrated environmental security perspective), then highlight key international and EU policies and initiatives on the topic and finally put forward information and ideas regarding the (potential) role of Earth Observation / Remote Sensing.

In addition, in Part I, we include chapters on Africa and on the Arctic as two regions of particular importance for EU external policy where the interplay between climate change, environment, development and security is especially timely. This is of course also the case in many other areas and eco-regions of the world (for example, the Black Sea, the Guiana Shield in South America, the Mekong River Basin, and the Mediterranean region, etc.) but the two areas selected are among those where IES could provide the most useful overviews in light of other recent and related activities including our work on environmental security in Africa and the joint ESA-IES workshop on "Europe's Arctic Course: The Future of Space Cooperation in the Arctic Region" held at the ESA headquarter in Paris in December 2010.

Regarding Earth Observation/Remote Sensing (EO/RS) we emphasise that the role of space is not only to help in monitoring the implementation of EU external action but – and at least equally important – also to provide needed data and analysis on the issues as a basis for the design and development of new EU foreign and security policies.

Part II of the report provides up-to-date information on the current set up and functions of the main EU institutions and the bodies within them most relevant to the focus of this report. The extensive guide is accompanied by an introduction on the historical evolution of the roles and responsibilities of the EU institutions under various treaties and especially since the coming into force of the Treaty of Lisbon.

In the Annex I we present the results of a survey conducted among a number of international, governmental and non-governmental organisations and think tanks regarding their views on the role of RS/EO and their interest in establishing / further developing relations with the ESA.

The report as a whole should serve as a guide to ongoing institutional and policy developments in EU external action as well a useful handbook for the ESA and others who wish to increase the effectiveness of their interaction with the EU in the fields of climate change, environment, development and security.

Acknowledgements

The authors wish to especially thank IES Fellow Ikaros Moushouttas for his extensive review and comments on the draft resulting in this final paper, IES President Wouter Veening for his valuable contributions to the policy analysis and recommendations and IES Vice-Chair, Tom Spencer, for contributing the insightful introduction to Part II.

The authors are also grateful to the following persons for reviewing and contributing ideas for the report at various stages: Marc Baltes, Jérôme Béquignon, Paul Arthur Berkman, Margaret Brusasco-McKenzie, Michael Renner and Bernard Snoy.

Thanks also go to the following persons who provided additional research: Roshan Balakrishnan, Silvia Benassi, and Jonathan Solomon of IES and Thomas Kukuk and Anna Schärtel of GAF AG.

We also appreciate the time given by those who responded to the survey (see list in the Annex) and those who provided input through interviews including: Roya Ayazi, Secretary General, NEREUS; Martin Vissers and Niels Wielaard, SarVision; Joost Carpay, Coordinator ESA, PB EO Delegate and Jeroen Glazener, Coordinator Brussels Programs, Netherlands Space Office (NSO); and Julien Beclard, PhD Candidate, ULB.

Finally, we wish to acknowledge the support for this project provided by the European Space Agency. It has been a pleasure working with the ESA and we are most grateful for having the opportunity to carry out this assignment.

The views expressed in this report are those of the authors, IES and the persons quoted and not necessarily those of the ESA or any other organisation.

Key Recommendations

For European space policy to evolve further and for it to be effective in helping to address critical global issues real European leadership is needed, the sometimes competing goals of meeting economic interests, on the one hand, and broader social, environmental and security needs, on the other hand, should be reconciled and the missions and roles of the key actors should be clarified and refined within an overriding harmonious construct.

Earth Observation/Remote Sensing (EO/RS) play an important role not only in helping to monitor the effectiveness of EU external action but also in providing needed data for the formulation of EU foreign and security policies and actions.

European space programmes should therefore equally be directed toward obtaining the data and analysis needed to inform policy makers about where and how policy action is needed and helping develop the best policy responses *a priori* as well as toward monitoring the implementation of policies *a posteriori*.

In our view, there are important hurdles to overcome for EU space policy to become effective in helping to address the scientific, political, social and economic aspects related to European Union external action on climate, environment, development and security and in an integrated way. Key conclusions and suggestions highlighted in this report include the following:

Space policy and programmes

- EU space policy development should be accompanied by specific institutional adjustments such as the creation of a Directorate-General for Space and the appointment of a commissioner specifically dedicated to space. At a minimum, the centre for EU space policy should be re-located from the Research, Transport and Industry DGs to the EU External Action Service (EEAS) or, at least it should be co-guided by that service as well;
- The ESA, while remaining as an international organisation independent from the EU, should coordinate closely with the EEAS and together they should provide sound leadership regarding the use of Earth Observation / Remote Sensing in the key areas such as climate change and international security, global environment and development policies and conflict prevention / crisis management;
- The EU/EEAS and NATO need to work more closely together in articulating a coordinated space policy;
- Communication to the general public about the uses of space should be enhanced to increase its support for ambitious space programmes for the benefit of people affected by climate, environment, development and security threats.

Climate Change

- Space programmes should be designed and deployed to assist with both climate change mitigation and adaptation. In addition to the ESA's Climate Change Initiative (CCI) which provides vital data sets on the Essential Climate Variables (ECV) to meet the needs of the UNFCCC and IPCC and in addition to the Sentinel satellites associated with the GMES initiative aimed at providing essential data on the atmosphere, land use and oceans, the space community should also continue to give increased attention to the need for monitoring the impact of global warming on environmental and human security to assist decision makers in predicting, monitoring and responding to such impacts especially in areas where high vulnerability and low coping capacities heighten the possibility of climate change contributing to or exasperating local and regional conflicts.

- The space community should be aware that as a global agreement on a successor to the Kyoto Protocol may remain difficult to achieve for some time, there is an increased interest in forging regional agreements where Earth Observation can play an important role.

Forests

- In the 2010 Norway-Indonesian REDD arrangement involving US$ 1 billion to help reduce greenhouse gas emissions due to deforestation and forest fires, especially on the peatlands, monitoring, reporting and verification (MRV) is essential for success. The ESA / Norwegian Space Centre could play a role in helping to structure the MRV part of the Norway-Indonesian deal especially since the definition of forest and forest cover, peatland and peatland forest will be crucial in the monitoring of emissions and the exclude leakages between forest categories and between forests and other sources of greenhouse gas emissions.
- In Central Africa several important investments in improved Earth Observation data acquisition are underway. Two areas related to data access need to be addressed though. More efforts are needed to foster a policy of open data and making data readily available from receiving stations and data providers to domestic users by strengthening the infrastructure for data dissemination (e.g. internet, GEONETcast).
- Given that the Amazon Basin is seen by some climate scientist as the potential stage for a tipping point in which the forest changes from being a major sink of CO_2, and (also) becomes a source, there is a need for a gathering of the major space agencies to combine forces in monitoring forest cover/deforestation, rainfall and other relevant parameters in the Amazon Basin. Considering the interest of the EU in a stable climate, introducing forest credits in the ETS and the investments by the EIB and AIDCo/EDF, the Cotonou Agreement with the ACP countries and the ALA budget lines, ESA would have to be a major participant in such a gathering.

Natural Resources

- As maritime transportation is a major vector for global trade, mapping sea routes and detecting vessels are paramount in the fight against trade in illegally extracted natural resources. To work effectively, the system has to be complemented by a solid verification mechanism and to allow civil society organisations to take part to that monitoring by having access to that imagery. In addition, satellite information must be sufficiently timely and robust to support law enforcement. Recognising the security challenge associated with illegal natural resources exploitation, the ESA is supporting research projects related to situation awareness and monitoring for law enforcement purposes including with respect to illegal exploitation of natural resources – projects which should help develop an increased role for EO regarding illegal extraction and trade in natural resources.

Agriculture and Food

- Reliability and frequency of the information on food production respectively yield monitoring and prediction depends on fast available EO data. Continuity and reliability of the data access are key to this information. Further on the users and decision makers not only within the EU but also in the countries affected by food shortages must understand the information provided and draw the correct conclusions. Therefore not only the number of sensors, enhancement of spatial resolution for more detailed results and the financial and technical enabling of such services and products is important. The capacity building on all levels of stakeholders within and outside the EU to generate a large user bases making sound decisions based on the available information is key to the success of these activities.
- Months before the current Horn of Africa drought forecasters were sounding the alarm with the issuing in August 2010 of a brief on food security in East Africa by the Famine Early Warning Systems Network (FEWS NET). Forecasters consider that communication problems between scientists and decision-makers explain why the alerts went largely unheeded. Space agencies,

aid agencies and others concerned need to work to address such communication problems more effectively.

Hazards and Disasters

- According to Helen M. Wood and Linda V. Moodie "The world community could better mitigate the human and economic losses caused by disasters if data from current and planned Earth Observation (EO) satellites were used more effectively in disaster management support. Today, meteorological satellites are widely used to detect and track severe storms and to support other weather-driven events. However, operational applications of data from these and other EO satellites to support management of other types of disasters (e.g., oil spills, harmful algae blooms, earthquakes, forest fires) is significantly less common. And although there have been a great many research and operational demonstrations, which illustrate the potential usefulness of EO satellite data for other hazards, a thorough understanding of the requirements of the diverse range of users is needed as a first step toward planning for operational support services derived from EO satellite data."

Hazardous Waste

- While there are limitations to the use of satellite data to monitor moving objects like ships, elements of GPS, GLONASS or Galileo systems are relevant. There is a need for the ESA and others to work together to move the initiative to tracking position, direction and speed of shipments of hazardous waste. The results of the above mentioned series of pilot research projects launched by the ESA under the heading "Out of Europe Timely Situation Awareness for Law Enforcement and Intelligence Applications" including on the subject of the transport of hazardous wastes, should help demonstrate the role Earth Observation can play in the environmental treaty verification and law enforcement.

Arctic

- As suggested by Professor Paul Berkman of the Scott Polar Research Institute at the ESA-IES workshop on "The Future of Space Co-operationi in the Arctic Region" (December 2010) there is a need for an integrated remote sensing programme for real time tracking of the positions, numbers and sizes of Arctic Ocean faring vessels for operational and scientific interpretations. Satellite sensors needed would include Surface-Vessel Reflection, Automatic Identification System, Sea- Ice Parameters, Ocean-Atmosphere Coupling, and others. This could be an international effort involving European, Russian, US, Canada, China, Japan and other space agencies. Such a programme could also include a cost recovering mechanism where users of an Arctic trade route would help pay for the services. While many of the infrastructure and technology components suggested are already fully operational or will be available in the near future when various GMES programmes become operational there is still a need for system engineering to bring the various components together so they can be used in operational decisions.

Preface - EU, Space and Security

Evolution of EU Space Policy

The history of the EU Space Policy (EUSP) reflects the history of the European Union (EU) as much as the history of the U.S. Space Policy (USSP) and of the National Aeronautics and Space Administration (NASA) reflects the history of the U.S. in the last fifty-plus years.

While the latter was a product of the Cold War and the rivalry with the Soviet Union after that country successfully launched the Sputniks in 1957 and 1958, with foreign policy and security objectives high on the super powers' agendas, the European countries were unable to match the U.S. and Soviet efforts. In France, however, a boost to rocket/missile development was given by the determination of General Charles de Gaulle, who came to power during the Sputnik launches, to develop an independent nuclear capability. Germany, with its legacy of the past (V-2's!), was very receptive to a collaborative European space programme. With a major push by European industry, which saw space as a key sector for technological development and economic success, all this contributed to the formal establishment of the European Space Agency in 1975.

Until the recent adoption of the Lisbon Treaty, there was no explicit reference to space in the EU treaties. This situation did not prevent the EU from gradually being more concerned with space, but the Union's space policies imperatively had to be linked to an existing legal competence of the EU and/or the EC.[2] During the last twenty years, the evolution of the EU treaties has shown an enlargement of the EU/EC competences in space policy which, to a large extent, have gone beyond the purely economic dimension and have helped increase the involvement of the EU/EC in space and its applications.[3]

On 22 May 2007, participants to the fourth Space Council[4] adopted a Resolution on the European Space Policy.[5] Relatively broad, the Resolution recognises that the space sector is a strategic asset that contributes to the independence, security and prosperity of Europe, and includes activities in the areas of research, technological development, and the exploration of space, as well as in security and defence.

Space as a separate EU competence was however only recognised as such in December 2009 in the Treaty of Lisbon. According to Article 189, the main objectives of the EU space policy are to promote "scientific and technical progress, industrial competitiveness and the implementation of its policies." [6]

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[2] J. WOUTERS, "Space in the Treaty of Lisbon", in K-U SCHROGL, C. MATHIEU, N. PETER (eds.), *Yearbook on Space Policy. From Policies to Programmes*, Wien, Springer-Verlag, 2009, p.116

[3] J. BECLARD, "With the Head in the Air and the Feet on the Ground: EU's Actorness in International Space Governance", FNRS/ULB, To be published

[4] The Space Council was created following a Framework Agreement between the European Community and the European Space Agency aiming at the progressive development of an overall European Space Policy. Signed in November 2003 and entered into force in May 2004, the Framework Agreement sets out the basis for joint projects, common management structures and closer working arrangements between the European Commission and the European Space Agency

[5] Council of the European Union, *Space Council Resolution on the European Space Policy*, Competitiveness (Internal Market, Industry and Research) Council Meeting, Brussels, 22 May 2007

[6] Article 189 §1-3 of the Treaty of the Functionning of the European Union:

1. *To promote scientific and technical progress, industrial competitiveness and the implementation of its policies, the Union shall draw up a European space policy. To this end, it may promote joint initiatives, support research and technological development and coordinate the efforts needed for the exploration and exploitation of space.*
2. *To contribute to attaining the objectives referred to in paragraph 1, the European Parliament and the Council, acting in accordance with the ordinary legislative procedure, shall establish the necessary measures, which may take the form of a European space programme, excluding any harmonisation of the laws and regulations of the Member States.*
3. *The Union shall establish any appropriate relations with the European Space Agency.*

To do so, the Treaty stresses that the Union "shall establish any appropriate relations with the European Space Agency", thereby confirming the importance of its cooperation with ESA.

In April 2011, the European Commission released the Communication "Towards a space strategy for the European Union that benefits its citizens"[7], which reflects the crucial role of space for the economy and society. The Commission's priorities include the two flagship programmes: Galileo and GMES, the protection of space infrastructures or Space Situational Awareness (SSA), and space exploration. The communication also calls for the development of an industrial space policy in close cooperation with EU Member States and the European Space Agency.

Security Challenges

A key message of this report is to argue that EU Space Policy should not merely promote "scientific and technical progress and industrial competitiveness", but should also promote, or even give priority to, the major security challenges of our time, which especially include the threat of climate change and its impacts around the world.

Speaking at the fourth annual Conference on European Union space policy (8-9 November 2011), ESA Director General, Jean Jacques Dordain regretted that, unlike other space powers, security and defence is not a driver for space, thereby threatening Europe's leadership in space. He praised the Polish government's willingness to address that issue during its current presidency of the EU.

Security can be a driver for space just as much as space can be a driver for security. Space is indeed much more than an economic sector and deserves to be used to increase security locally and globally. Even the greatest security threat facing man and nature, nuclear war, should be considered in this respect. The case of India and Pakistan described below shows the relevance of the ESA and its satellite programmes to assist the EU Common Foreign & Security Policy (CFSP) and Common Security & Defence Policy (CSDP) in timely confronting such threats.

The need to better integrate space, security and defence was highlighted in a 2008 European Parliament Resolution[8] that recommended to increase the administrative and financial capacities of the European Defence Agency for the management of space-related activities. The Resolution also urged the EU to launch a strategic dialogue with the North Atlantic Treaty Organization (NATO) on space policy and missile defence.

A March 2010 meeting of the European Parliament Security and Defence Committee (SEDE) featuring representatives of the European Union Satellite Centre (EUSC), the European Space Agency (ESA) and the European Defence Agency (EDA) similarly referred to the need for space support of CFSP and the European Security and Defence Policy (ESDP) and for the coordination among all the relevant actors. Erwin Duhamel Ir, Head, Security Strategy and Partnership Development Office, European Space Agency identified the following challenges:

- The need for more timely access to space data to perform operations;
- The need to decrease our dependence on foreign sources. The EUSC uses commercial imagery mostly of non-EU origin (largely US). For instance, during the first days after the Haiti earthquake, less than 30% of the satellite imagery available to the GMES Emergency and Security Service were produced by European satellites;
- The need for a more integrated approach. European space-based security services are usually developed in a monothematic framework (e.g. Earth Observation, telecommunications or navigation);
- The need for more responsive services.

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[7] Communication COM(2011) 152 final from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions - Towards a space strategy for the European Union that benefits its citizens, Brussels, 4 April 2011

[8] European Parliament Resolution 2008/2030(INI) of 10 July 2008 on Space and Security

Some of the issues outlined above are being addressed by the European Framework Cooperation (EFC) Initiative, launched in 2009, which aims to bring an answer to the question of dual use (civil-military) by increasing synergies between the EDA, the European Commission (defence and security research) and the European Space Agency (critical space technologies). The new framework first translated into a project for countering road-side bombs set up by the EDA in April 2010.

Water stress between India & Pakistan and the threat of glacial melt

The case for increased civil-military cooperation in space assets can be illustrated by the challenges posed by India and Pakistan: the two nuclear powers with a history of armed conflicts are facing growing water competition in a context of diminishing water supplies threatened by on-going climate change.

The international community cannot ignore that there is an objective risk of nuclear war, in part triggered by climate-induced tensions over water[9] between the two countries, adding to existing tensions over territory (Kashmir) and historical ethnic and religious differences.

The fact that India and Pakistan are also part of a larger geo-political context, including Afghanistan further points to the need for strengthened cooperation between the EU, ESA and NATO on space policies, programmes and projects.

As the global champion in combating climate change and a key player in the international climate negotiations, the EU has major cooperation schemes with both Pakistan and India to assist with bringing these countries towards a climate-friendly energy path. Similarly, the EU assists them in adapting to the water, food and energy security threats from on-going climate change and thus promoting social and political stability, also as a factor to help prevent risk of nuclear conflict.

EU development cooperation should continue to include actions to improve the water and river management, allowing Pakistan and India cope with floods, droughts, pollution, deforestation, and the other environmental security issues that cause destabilisation in the region, of which Afghanistan is also very much a part.[10]

NATO is heavily involved in Afghanistan and extremely concerned about stability in Pakistan. ESA's SMOS (Soil Moisture & Ocean Salinity), Cryosat and GOCE (Gravity Field and Steady-State Ocean Circulation Explorer) satellites are producing unique information on sea-level change, ice/glacier dynamics, conditions of oceans, which are all affected by climate change and which are key components of the environmental, water, food and energy security globally and in this region.

The situation with respect to the glaciers on the Tibetan Plateau and the Himalayas is of particular interest from a security perspective and should be monitored with the best available space technology - not the least because of the inaccessibility of the terrain.

Space-based intelligence, especially on the ice & snow situation in the 3 Poles (Arctic, Antarctic, Tibet) in relation to the regional water stress mentioned above and the potential dramatic sea level rise that would result from the melting of the Greenland and Antarctic ice sheets, should be a major input into the EU CFSP and CSDP. It could underpin the EU External Action in a two-way manner: early warning by satellite information could instigate policy and established policy should drive the demand for space information. This is again an argument for EU – NATO cooperation.

The remote glaciers of the Himalayan mountains have been the subject of much controversy, yet little research. Mason Inman looks at the clues scientists have garnered on the fate of these glaciers from ground- and space-based studies. New analyses from gravity-sensing satellites and a soon-to-be-launched precision radar satellite will enable researchers to gain a better understanding of these changes. A pair of satellites launched in 2002 and known as GRACE — for Gravity Recovery and Climate Experiment — can detect subtle changes in the Earth's

[9] In Pakistan water availability has become part of the protocol for the use of nuclear devices (personal communication to the Institute for Environmental Security by Maj Gen (ret) Muniruzzaman, President of the Bangladesh Institute for Peace and Security Studies)

[10] Using the example of Pakistan, Commissioner Kristalina Georgieva (International Cooperation, Humanitarian aid and Crisis Response) said at the EU Space Conference of 8-9 November 2011, that satellite communication and mapping are essential in cases of disasters

gravity field, caused by on-the-ground variations in water, ice or plant life. In theory, GRACE should be able to detect the loss of ice in mountains such as the Himalayas.

Scientists may use another eye in the sky — the satellite Cryosat-2 — to inform them of these changes. Launched by the European Space Agency (ESA) in April 2010, Cryosat-2 uses radar to detect changes in the heights of glaciers and ice sheets, and should be able to detect centimetres of change over an interval of months to a year, according to Mark Drinkwater, head of ESA's Mission Science Division.

Towards a common foreign and security response for South Asia

Given the tremendous environmental and hard security risks between India and Pakistan and the wider volatile geo-political context, the ESA could draw up a map or a series of maps with actual data and projections of data on the thinning/melting of the Tibetan Plateau glaciers (Cryosat) affecting downstream parties, in particular India and Pakistan. These maps should also feature sea level change (GOCE), creating salination and loss of territory due to sea level rise in these two countries.

Interpretations then should be given by hydrologists and agronomists assessing the water and food security impacts and by environmental security experts assessing the conflict potential of increasing insecurity in water, food, shelter, energy, etc.

These assessments should be presented to the policy analysts of both EEAS and NATO to develop a genuinely common foreign and security policy response. Efforts should be particularly focused on deploying an appropriate foreign policy response, profiling development cooperation including climate change adaptation and disaster risk reduction programmes.

Funding challenges

Monitoring climate change and environmental trends is a matter of security. The US Department of Defence (DOD) is well aware of this and is worried about the decline of US Earth Monitoring capabilities according to a recent CNAS report.[11] In fact, by 2016, only seven of NASA's current 13 earth monitoring satellites are expected to be operational, leaving a crucial information gap that will hinder national security planning according to experts. Global Monitoring for Environment and Security (GMES) represents both an opportunity and a necessity for the EU to play a major role on the global scene.

Unfortunately, the European Commission has recently proposed to remove GMES from the next multi-annual financial framework (2014-2020), arguing that GMES is, or threatens soon to be, over budget. In an effort to reverse this decision, the European Space Agency has declared it would take the case to the European Parliament. If the decision is not reversed, it means that the Commission will fund its share of GMES through 2013, but not beyond, during the period when the Sentinel satellites will be put into use.[12]

The Lisbon Treaty confirms the central role of the Union as a political driver on space policy, but the EU seems to remain ill-equipped to deal with long-term programmes. Space programmes are typically constructed in the long term (20-30 years) but the budget of the Union is revised every 7 years. The history of Galileo and GMES shows that the political and economic situation can jeopardise the completion of these programmes.

A solution to the lack of funding might be to gain increased public support through better communication. The general public doesn't seem to recognise how space services impact their daily lives and society as a whole. Raising awareness of the general public might allow the EU and ESA to develop ambitious space programmes more easily with the public backing. NASA's effectiveness in public relations (also thanks to the entertainment industry) helps explain why it is still the international

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[11] Ch. PARTHEMORE and W. ROGERS, "Blinded: The Decline of U.S. Earth Monitoring Capabilities and Its Consequences for National Security", CNAS, 2011

[12] P. B. DE SELDING, "ESA Protests Earth Observation Program's Removal from Multiyear Budget Proposal", *Space News,* 22 July 2011, Source: http://www.spacenews.com/civil/110722-esa-protests-gmes-removal-budget.html (last consulted 10 November 2011)

public's reference for space activities. That experience should be a source of inspiration to better promote the excellent services operated and proposed by the ESA and the EU

Institutional challenges

EU Space policy developments have not yet been accompanied by the relevant institutional adjustments, such as the creation of a Directorate-General and the appointment of a commissioner specifically dedicated to space. Indeed, this domain is still managed transversally across three different DGs: Research, Transport and Enterprise & Industry. In addition, commentators have observed that the space personnel turnover within the Commission is very high. It has been said that people tend to see space as a career experience before moving on to other sectors. Setting up a Directorate-General for Space would encourage people to stay and favour the recruitment and retaining of experienced specialists within the Commission.

At a more fundamental level is the question of who is pushing European space ambitions? The 2007 Space Council and the Lisbon Treaty attempted to clarify the question. However, one could symptomatically notice that after the adoption in 2007 of a European Space Policy, Member States have chosen to limit the scope of the EU's action and opted for the status quo by drastically limiting the autonomy of the EU and by preserving as much as possible their sovereignty. If this is an indication by the Member States of how far they want to involve Europe in space, further advancement will, to a large extent, depend upon political will more than anything else.[13]

Partly because of these internal struggles and uncertainties, the EU and its Member States have been distracted from maintaining their competitive advantage over emerging economies. This is illustrated with the case of Europe's flagship programme Galileo which has run into several delays and recently the tensions around the financing of GMES which puts the European industry into difficulty. In a sector where space actors represent powerful economic and industrial interests and in a situation where the EU's relationship with the European Space Agency have not been further clarified, the challenges ahead are numerous and complex. Unresolved tensions between the ESA and the Commission may also have to do with differences in their approaches. Whereas the ESA and its members may be focused on financial returns on Member States' investments (also known as the 'juste retour'), the Commission is more concerned about open competition in public procurement. Both are valid but the EU and the ESA should put higher value on the benefits to society of using space technology to address pressing climate, environment, development and security threats.

For European space policy to evolve further and for it to be effective in helping to address critical global issues real European leadership is needed, the sometimes competing goals of meeting economic interests and broader social, environmental and security needs should be reconciled and the missions and roles of the key actors should be clarified and refined within an overriding harmonious construct.

[13] J. BECLARD, "With the Head in the Air and the Feet on the Ground: EU's Actorness in International Space Governance", FNRS/ ULB, To be published

Part I - Issues, Policies & Opportunities

1. Introduction - Integrating Environment, Development and Security

1.1. Environment

The 6th Environmental Action Plan (EAP) is a decision of the European Parliament and the Council adopted on 22 July 2002[14], setting out the framework for environmental policy-making in the European Union for the period 2002-2012 and outlining actions that need to be taken to achieve them.

The 6th EAP focuses on four priority areas:

- Climate change
- Nature and biodiversity
- Environment and health
- Natural resources and waste

It aims to promote full integration of environmental protection requirements into all Community policies and actions and provides the environmental component of the Community's strategy for sustainable development. The link is made between environment and European objectives for growth, competitiveness and employment.

Instruments for the 6th EAP include seven thematic strategies in the fields of soil, marine environment, air, pesticides, urban environment, natural resources and waste recycling.

Furthermore, the 6th EAP establishes strategic approaches to meet the environmental goals and sets objectives and priority actions on international issues. The strategic approaches include among others: the development of Community legislation and its effective implementation and enforcement, the integration of environment protection requirements in other Community policies and the promotion of sustainable production and consumption patterns, improving collaboration with enterprises and informing individual consumers, enterprises and public purchasers about the environmental impact of processes and products.

A final assessment on the 6th EAP presented in August 2011 concluded that the Environment Action Programme has helped environment legislation to tackle almost all areas of the environment. Major accomplishments include the extension of the Natura 2000 network to cover almost 18% of the EU's land area, the introduction of a comprehensive chemicals policy, and policy action on climate change. Stakeholders did indicate that progress needs to be made in implementing agreed EU objectives and rules in improving biodiversity protection, soil and water quality. In addition, the decoupling of resource use from economic growth has not led to a decrease in overall resource use.

Commissioner Janez Potočnik commented: "Our goal now is to move from remediation to prevention of environmental degradation. The final assessment of the Programme will prompt the launch of a wide public debate to define the orientations for EU environment policy over the next years."

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[14] Decision (EC) N°1600/2002 of the European Parliament and of the Council of 22 July 2002 laying down the Sixth Community Environment Action Programme

1.2. Development

Europe is one of the world's biggest aid donors with more than half the money spent to help poor countries coming from the European Union and its member states. But effective development policy is about more than providing assistance for things such as clean water and surfaced roads, important though these are. The Union also uses trade to drive development by opening its markets to exports from poor countries and by encouraging them to trade more with each other.

The primary and overarching objective of EU development policy is to eradicate poverty in a sustainable way. The Millennium Development Goals (MDGs) are key to the policy. The eight MDGs were adopted by world leaders in 2000 with a 2015 deadline and range from halving extreme poverty and halting the spread of HIV/AIDS, to providing universal primary education. The EU has asked national authorities to set financial targets for development funding so as to demonstrate their commitment to the MDGs. A 2005 progress report found that all countries had made financial contributions, but that more were needed. The world is on track to halve poverty by 2015. 120 million people were lifted out of poverty between 2000 and 2005. But in other areas, targets will not be met by 2015. These include lowering child and maternal mortality levels and providing clean drinking water.

EU development policy aims to give disadvantaged people in the third world control over their own development, which means attacking the sources of their vulnerability. These can include poor access to food and clean water, education, health, employment, land, social services, infrastructure or a sound environment. It also means disease eradication and access to cheap medicines to combat scourges like HIV/AIDS. EU policy aims to reduce the debt burden that diverts scarce resources from vital public investments back to rich lenders in industrialised countries.

The Union also tries to promote self-help and poverty eradication strategies which enable developing countries to consolidate the democratic process, expand social programmes, strengthen their institutional framework, expand the capacities of the private and public sectors, and reinforce respect for human rights, including equality between men and women.

1.3. Integrating the Environment into EU Economic and Development Co-operation

Since 2005 the European development policy[15] requires that environment and sustainable management of natural resources be treated as a crosscutting issue to be integrated into all development activities. It can also be included as a focus of action in country and regional support strategies, for example through support for:

- management and protection of forests, water, marine resources and biodiversity
- access to sustainable energy
- climate change , desertification and soil degradation
- sustainable management of chemicals and waste
- sustainable production and consumption

This has resulted, among other things in the publication of an Environmental Integration Handbook [16] published by Europaid in 2007. The document promotes environmental mainstreaming and proposes solutions to integrate the environment into the various phases of development aid, such as the programming and the aid delivery phases.

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15 The European Consensus on Development. See: http://ec.europa.eu/development/icenter/repository/Consensus_on_Development_November_2005_en.pdf

16 European Commission, "Environmental Integration Handbook for EC Development Cooperation", Europaid, 2007

1.4. Foreign and Security Policy

In parallel with its growing economic power, the EU has created its own foreign and security policy with the aim of speaking and acting as one in world affairs. Regional conflicts in Europe and elsewhere in the 1990s and the fight against terrorism persuaded EU leaders to create formal instruments for both diplomacy and intervention.

The basis for the EU's Common Foreign and Security Policy (CFSP) remains 'soft' power: the use of diplomacy - backed where necessary by trade, aid and peacekeepers - to resolve conflicts and bring about international understanding.

The European Security Strategy "A secure Europe in a better world" was approved by the European Council on 12 December 2003. It aims to defend its security and promote its value through three strategic objectives:

- Addressing the threats, including terrorism, the proliferation of weapons of mass destruction, regional conflicts, international criminality. The EU recognises that no solution is purely military and civilian intervention is an important contributor to the reduction of such threats. The EU has therefore developed a unique combination of civilian and military response instruments in its CFSP.
- Building security in its neighbourhood, with the resolution if the Arab/Israeli conflict being labelled a strategic priority for Europe.
- An international order based on effective multilateralism. The EU's efforts in pushing for a successor to the Kyoto Protocol witness its engagement for multilateralism. However, despite its efforts, multilateralism is being threatened by the emergence of various gatherings such as the G20 or the G2. In addition, European elite have recently shown division and lack of coordination in responding to key issues such as the conflict in Libya, the economic and debt crisis and the problem of illegal migration.

1.5. Integrating Environment and Development with Security

The European Union acknowledges the need to integrate environment and development with security. For instance, this is reflected in the European Security Strategy which recognises that security is a precondition for development.

There are many ways in which EU external action takes an integrated approach to environment, development and security. Key examples, which are covered in detail in this report, include the EU Green Diplomacy Network (GDN), Global Monitoring for Environment and Security (GMES) and the Informal Steering Group on Climate Change & International Security (ISG).

2. The EU and Multilateral Environmental Agreements

2.1. The Need for International Action

Most environmental problems have a transboundary nature and often a global scope, and they can only be addressed effectively through international co-operation. For this reason, the EU Treaty (and before it the EC Treaties) establishes that one of the key objectives of Community policy on the environment is to promote measures at international level to deal with regional or worldwide environmental problems.

The Community takes an active part in the elaboration, ratification and implementation of multilateral environmental agreements. The EU Treaty explicitly foresees the possibility for the European Community to participate in international environmental agreements, together with its Member States.

2.2. International Agreements in the 6th Environment Action Programme

The four priority areas listed in the 6th Environment Action Programme of the EU - climate change, nature and biodiversity, environment and health and quality of life and natural resources and wastes - include an essential international dimension. In all these cases, the EU's strategic objectives can only be achieved if a series of key international environmental agreements are actively supported and properly implemented, both at Community level and worldwide.

The Action Programme contains also a specific provision on international action, which recalls the objective of aiming for swift ratification, effective compliance and enforcement of all international conventions and agreements relating to the environment where the Community is a Party.

2.3. The EC as a party to International Environmental Agreements

The Community has already ratified several international environmental agreements, whether at global level (multilateral agreements negotiated under the auspices of the UN), at regional level (e.g. in the context of UNECE or the Council of Europe), and sub-regional level (for instance for the management of seas or transboundary rivers).

Likewise, the matters addressed by these agreements are very wide, and include among other the following areas: biodiversity and nature protection, climate change, protection of the ozone layer, desertification, management of chemicals and waste, transboundary water and air pollution, environmental governance (including impact assessments, access to information and public participation), industrial accidents, maritime and river protection, environmental liability. For instance, the European Community is a member to several UN treaties, such as the UN Convention on Biological Diversity (CBD), the UN Convention to Combat Desertification (CCD) and, very importantly, the UN Framework Convention on Climate Change (UNFCCC) and the Vienna Convention with the Montreal Protocol on Ozone Depleting Substances.

The EU has also shown international environmental leadership. Initiatives such as the EU Water Initiative use a participative approach to promote cooperation among stakeholders at the international level.

2.4. List of Agreements

A detailed table listing the international environmental agreements to which the Community is already a Party or a Signatory is available online. International environmental agreements, with their corresponding Protocols, have been classified by chronological order. The table contains relevant details on signature, conclusion, publication in the Official Journal, plus a link to the relevant webpage of each Convention and to the list of Parties.

In addition, for ease of reference, the main agreements have also been grouped below according to the general environmental themes. For each Convention below, you will also find a link pointing to the corresponding page of the chronological table of agreements to which the Community is a Party or a Signatory, mentioned above.

Themes	Agreements
Air	Geneva Convention on Long-range Transboundary Air Pollution (CLRTAP)(1979) and its protocols (Secretariat)
Biotechnology	Cartagena Biosafety Protocol (2000) to the Rio CBD Convention on Biological Diversity (1992) (Secretariat)
Chemicals	PIC Rotterdam Convention on Prior Informed Consent (1998) (Secretariat)
	POP Stockholm Convention on Persistent Organic Pollutants (2001) (Secretariat)
Civil Protection and Environmental Accidents	Helsinki Convention on Industrial Accidents (1992)
	Barcelona Convention (1976) as amended and its protocols
	Helsinki Convention on the Baltic Sea (1992) (Secretariat)
	OSPAR Convention (1992) (Secretariat)
	Bonn Agreement (1983) (Secretariat)
	Lisbon Agreement (1990) (Secretariat)
Climate Change and Ozone Depletion	UNFCCC Framework Convention on Climate Change (1992) Kyoto protocol (1997) (Secretariat)
	Vienna Convention for the Protection of the Ozone Layer (1985) and Montreal protocol as amended
Governance	Aarhus Convention (1998) on access to environmental information
	Espoo Convention on Environmental Impact Assessment (1991)
Industry	Helsinki Convention on Industrial Accidents (1992)
Land use	Alpine Convention (1991) (Secretariat)
Nature and Biodiversity	Rio CBD Convention on Biological Diversity (1992) and Cartagena Biosafety Protocol (2000)
	Bonn CMS Convention on the Conservation of Migratory Species (1979) (Secretariat)
	Bern Convention on European Wildlife and Habitats (1979)
	Convention for the protection of Vertebrate Animals used for Experimental and other Scientific Purposes (1986)
	Alpine Convention (1991) and its Protocols (Secretariat)
	Convention on the Conservation of the marine fauna and flora of the Antartic (1980)
Soil	UNCCD Convention to Combat Desertification (1994) (Secretariat)

Themes	Agreements
Waste	Basel Convention on hazardous wastes (1989) (Secretariat)
Water	Helsinki Convention on Watercourses and International Lakes (1992) (Contact)
	River basin conventions (Danube (1987), Elbe (1990), Oder (1996), Rhine (1999))
	Barcelona Convention (1976) as amended and its protocols
	OSPAR Convention as amended (1992) (Secretariat)
	Bonn Agreement (1983) (Secretariat)
	Helsinki Convention on the Baltic Sea (1992) (Secretariat)

2.5. The Role of Earth Observation

Verification provisions in international agreements have strongly influenced the development of international law through the last decades and satellite data plays an important role in treaty monitoring as is illustrated in the following extracts from one of the main papers from the European Space Policy Institute (ESPI) conference on Current Legal Issues for Satellite Earth Observation in April 2011 in Vienna.[17]

Jana Jentzsch points out that verification permits the parties to an agreement or mission to determine whether they are complying with their obligations. This is often confused with the term "monitoring". However, the latter refers merely to the technical process of information gathering for a concrete purpose, while it does not relate to the compliance judgment. Monitoring refers to efforts of detecting, identifying, and measuring developments and activities of interest. Therefore, "treaty monitoring" refers to the technical process of information collection whereas "verification of treaties" refers to the legal process of both the observance process and deciding about its results.

Jentzsch also notes that in the last 50 years there has been a striking multiplication in the number of multilateral environment treaties. More than 210 environmental agreements are listed by the United Nations Environment Programme (UNEP); more than 200 of those were adopted after 1951 and approximately 75 % of these were agreed upon after the 1972 UN Conference on the Human Environment in Stockholm. Though, when environmental protection is at stake, binding treaties and strong verification provisions are still relatively rare. Most environmental agreements do not contain any specific reference to verification. However, some of the very new accords do provide for some necessary elements: instead of developing a specific set of rules in an annex or the accord itself, verification is implicitly contained in a wider system for implementation review. For example, the Kyoto Protocol to the United Nations Framework Convention on Climate Change attaches great relevance to research and development and the establishment of observation systems.

Jentzsch concludes that, "Although often not sufficient by itself, satellite imagery already constitutes a major tool for the verification of international obligations and the strengthening of international security. The fact how international obligations can be verified also determines the credibility and effectiveness of the respective agreement or obligation. Through the adoption of intrusive verification provisions, which e.g. also provide for challenge inspections in cases of serious suspicions, the motivation and ratio of member states to adhere to the agreement can be increased. Satellite imagery should be explicitly mentioned in the respective treaties, agreements and mandates, as international

[17] J. JENTZSCH, "Use of Satellite Data for Treaty Monitoring", in Current Legal Issues for Satellite Earth Observation: Treaty Verification and Law Enforcement through Satellite Earth Observation, from The European Space Policy Institute (ESPI) conference on Current Legal Issues for Satellite Earth Observation in April 2011 in Vienna, ESPI, Report 25, August 2011

verification institutions should not have any doubt that they can decide about ordering imagery from commercial sources. (…) the international legal community should continue to promote the need for clear verification provisions and the integration of satellite imagery into the respective verification regimes".

3. Climate Change

Climate science available since the publication of the IPCC 4th Assessment indicates both that current climate conditions are changing more quickly than had been predicted, and that past changes have tended to be more abrupt than gradual. Melting of the summer sea ice in the Arctic, and accelerated melting of the Greenland ice sheet (GIS) are the two most visible signs of current changes, and are consistent with other current evidence and paleo-climatological trends. Marine and land releases of methane are greatly increasing, a result of warming waters and melting permafrost in arctic regions, while in equatorial zones mountain glaciers are rapidly disappearing even when air temperature changes are only marginal. Climate change already has dire consequences for glacier and snow-fed rivers on which communities - and sometimes entire regions - are dependent. The impact of glacial melt is already being felt, for instance, in the Hindu Kush-Himalayan Region where glaciers are sources of freshwater reserves which provide headwaters for major river systems in Asia - a lifeline for almost half of humanity. In addition, the combination of these changes with the melting of polar ice sheets is increasing sea levels, which in time will threaten low-lying land areas and islands.

IPCC models did not include significant feedback effects, and resolution of ice sheet (glacier) models was fairly rudimentary compared to atmospheric and ocean circulation models. New warnings concerning climate tipping points that are near, or may already have been crossed were already presented in 2009 at the American Geophysical Union's Chapman Conference. Unfortunately, the state of the science has often outpaced the ability of policy makers and negotiators to keep abreast of shifting conditions and new understandings.

Recent research also suggests that a focus on air temperatures and abrupt changes during the end of the Younger Dryas Period (11,500 years ago) may be misleading. The ice core records from Greenland and Antarctic provided the clearest and most reliable records of climate conditions dating back tens of thousands of years. Other proxy records of climate (eg sediment cores) lacked the resolution of ice cores, so abrupt changes outside the Arctic have not been studied as intensely.

Subsequent work by non-glaciologists (including archaeological records) strongly indicates that abrupt changes in non-temperature related systems has occurred at numerous times since the Younger Dryas, most notably at 3.2, 4.2 and 5.2 thousand years before present. Although not seen in the ice core records, severe and abrupt changes in precipitation patterns affected wide areas of more southern latitudes. This includes the end of the African Humid Period (when much of what is now the Sahara Desert was forested), sudden loss of the Mediterranean Westerlies, and abrupt loss of monsoons in Western India and Ethiopia (including up to 80% loss of water in the Nile River). Archaeological records of the Akkadian Empire in northern Mesopotamia suggest that the changes in precipitation were sudden enough to have forced large-scale migration from the region and a collapse of regional kingdoms. These records suggest that we have been too focused on temperature changes and evidence as seen from ice cores, and that the climate system may be far more sensitive to abrupt shifts than was earlier believed.

Vulnerability to climate change varies widely across regions. Many poor developing countries are among the most vulnerable to climate change but also have the least resources to cope with it.

European regions that are particularly vulnerable to climate change include:

- Southern Europe and the Mediterranean basin (due to heat and droughts)
- the Alps (due to rapid melting of snow and ice)
- coastal zones, deltas and floodplains (due to sea level rise, intense rainfall, floods and storms)
- Europe's far north, the Arctic and Outermost regions (due to increased global warming).

Extreme weather events such as heat waves and floods pose a direct risk to the health and safety of people, with the very young, the elderly, the disabled and low-income households particularly vulnerable. Diseases and viruses are also expected to migrate due to changing climate patterns, and creating another challenge to human health and safety.

Damage to property and infrastructure imposes heavy costs on society and the economy. Sectors that rely strongly on certain temperatures and precipitation levels, such as agriculture, forestry, energy and tourism, will be particularly affected.

Climate change is happening so fast that many plant and animal species will struggle to cope. Warming of 1.5° C-2.5° C beyond today's levels would put as many as 20-30% of plant and animal species at increased risk of extinction.

3.1. International Action

The Intergovernmental Panel on Climate Change is the leading body for the assessment of climate change. It was established by the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO) to provide the world with a clear scientific view on the current state of knowledge in climate change and its potential environmental and socio-economic consequences. In 1988, the UN General Assembly endorsed the action by WMO and UNEP in jointly establishing the IPCC. Being a scientific and intergovernmental body, the IPCC brings rigorous and balanced scientific information to decision makers.

In parallel, the political arena for negotiations on climate change is the United Nations Framework Convention on Climate Change (UNFCCC). Entered into force in 1994, the convention sets and overall framework for intergovernmental efforts to tackle the challenge posed by climate change. It is based on the recognition that the climate system is a shared resource whose stability can be affected by industrial and other emissions of carbon dioxide and other greenhouse gas (GHG).

The adoption of the Kyoto Protocol, in 1997, recognised that developed countries are principally responsible for the current high levels of GHG emissions in the atmosphere as a result of more than 150 years of industrial activity and therefore placing a heavier burden on developed nations under the principle of "common but differentiated responsibilities". The Protocol therefore set binding targets for 37 industrialised countries and the European Community for reducing GHG emissions. These amount to an average of five per cent against 1990 levels over the five-year period 2008-2012.

Recent climate negotiations led to the adoption, in 2010, of the Cancun Agreements. In theory, the Agreements provide real opportunities to advance global cooperation in adaptation, forests, climate finance and technology transfer. To effectively have a chance to keep global warming below 2°C, all opportunities outlined in the Agreements need to be implemented accordingly. This necessity calls for a fair, ambitious and binding Agreement during COP 17 in Durban.

Time is of crucial importance for at least three reasons. As the Kyoto Protocol is about to expire (in 2012), failure in Durban could create a damaging gap in the climate change mitigations' efforts. In addition, the political cost of failure in Durban would be enormous, putting an end to the climate negotiations momentum for good after difficult negotiations in Copenhagen (COP 15) and the adoption of timid, unbinding, agreements in Cancun (COP 16). Failure to reach a binding agreement within the UNFCCC would similarly damage its reputation and its status as the privileged arena for climate change negotiations. Lastly, the financial and debt crisis have deeply affected states' ability to react to shocks. Ongoing and looming economic crises make governments increasingly vulnerable politically. They are threatened by the rise of populist, short-termist and isolationist movements (Tea Party in the US, far-right parties in Europe). Analysts fear that the next round of elections in Europe and the US might favour the emergence of and reinforce existing populist ideas of climate deniers in governments. No doubt their presence in government would make it even more difficult to reach an internationally binding climate agreement. This is despite the fact that "three out of four Americans believe that the Earth has been gradually warming due primarily or at least partly as the result of human activity and want the government to so institute regulations to stop it."[18] Moreover, a study by Jon Krosnick of the Woods Institute says that in the US republican candidates concerned about climate change almost

[18] "Large Majority of Americans Support Government Solutions to Address Global Warming", report on survey conducted by Woods Institute Senior Fellow Jon Krosnick, See: http://woods.stanford.edu/research/americans-support-govt-solutions-global-warming.html (last consulted 30 November 2011)

always defeat democratic candidates and those candidates who say climate change is nonsense have greatly reduced chances of winning elections.

For all these reasons, and because climate change is already well underway, the international community needs to increase its efforts to reach an agreement in Durban.

The role of science is key in this process. The scientific understanding of abrupt changes has also led to interest in developing foresight and early warning systems. Strategic foresight (sometimes also referred to as strategic environmental intelligence) relies upon detection of weak signals to give warning of impending, abrupt changes. Complex dynamical systems typically exhibit fluctuations or "flickers" as they reach tipping points, and increasingly security analysts are attempting to develop system that can process real-time environmental information to warn of possible changes. In scientific terms, this refers to non-equilibrium dynamics as a complex system approaches a catastrophic bifurcation. In practical terms, this means understanding how smaller changes in a system can provide warning so adequate preparation can be attempted in advance. Major and abrupt environmental changes will create disruptions to which it will be difficult to respond, and security services typically work in preparing for potential risks, not wanting simply to respond to existing problems and security threats. The Global Energy and Environmental Strategic Ecosystem (GlobalEESE), sponsored by the US Department of Energy (USDOE), and the Global Futures Forum (GFF), sponsored by USDOE and the US Department of State, have for several years already been developing international, unclassified information systems to detect weak signals and communicate potential risks to policymakers. Similar projects, such as SECURENV in the European Union, also aim to provide database integration of possible environmental futures.

3.2. EU Action

The European Union was a driving force in international negotiations that led to agreement on the two United Nations climate treaties, the UN Framework Convention on Climate Change (UNFCCC) in 1992 and the Kyoto Protocol in 1997.

The Kyoto Protocol requires the 15 countries that were EU members at the time ('EU-15') to reduce their collective emissions in the 2008-2012 period to 8% below 1990 levels. Emissions monitoring and projections show that the EU-15 is hopefully on track to meet this target.

In 2007 EU leaders endorsed an integrated approach to climate and energy policy and committed to transforming Europe into a highly energy-efficient, low carbon economy. They made a unilateral commitment that Europe would cut its emissions by at least 20% of 1990 levels by 2020. This commitment is slowly being implemented through a package of binding legislation.

The EU has also offered to reduce its emissions by 30% by 2020, on condition that other major emitting countries in the developed and developing worlds commit to do their fair share under a future global climate agreement. This agreement was originally expected to take effect at the start of 2013 when the Kyoto Protocol's first commitment period will have expired, but it is by no means clear whether it will in fact materialise, making it harder for the EU to achieve a 30% cut by 2020.

The Cancún Agreements, adopted at the end of the UN Climate Conference in Mexico (December 2010), represents an important - yet insufficient - step on the road to building a comprehensive and legally binding framework for climate action for the period after 2012.

As the champion of a globally and legally binding climate regime, the EU will negotiate in Durban to that end. However, it may not be possible to reach agreement on a meaningful reduction of CO_2 emissions, as CO_2 is intimately connected with the use of fossil energy (especially oil and gas), still a vital ingredient for almost all national economies and militaries.

It is therefore of great importance to also look a at non-CO_2 greenhouse gas emission and other climate change driving agents, such as Black Carbon, formed through the incomplete combustion of coal, biofuel and biomass (agricultural waste). They lead to high concentrations of particles in the

atmosphere (aerosols) with a strong heating effect over surfaces with large extents of snow and ice, such as the Arctic and the Himalayas/Tibetan Plateau.

The latter is also named the "Third Pole", as it has the largest cover of snow and ice in the world after the Arctic and the Antarctic. As the plateau is warming about three times the global average and as Black Carbon is one of the major factors in this and primarily coming from sources in the region itself (China and India), the EU may want to also assist in promoting a regional convention on combating Black Carbon which could be more easily achievable than a new global regime.

3.2.1. *European Climate Change Programme*

The EU Council of Environment Ministers acknowledged the importance of taking further steps at Community level by asking the Commission to put forward a list of priority actions and policy measures.

The Commission responded in June 2000 by launching the European Climate Change Programme (ECCP). The goal of the ECCP is to identify and develop all the necessary elements of an EU strategy to implement the Kyoto Protocol.

The development of the first ECCP (2000-2004) involved all the relevant groups of stakeholders working together, including representatives from the Commission's different departments (DGs), the Member States, industry and environmental groups.

Launched in October 2005 at a major stakeholder conference in Brussels, the Second European Climate Change Programme (ECCP II) explored further cost-effective options for reducing greenhouse gas emissions in synergy with the EU's Lisbon Strategy for increasing economic growth and job creation.

The ECCP II consists of several working groups:

- ECCP I review (with 5 subgroups: transport, energy supply, energy demand, non-CO2 gases, agriculture)
- Aviation
- CO2 and cars
- Carbon capture and storage
- Adaptation
- Reducing greenhouse gas emissions from ships

A number of specific actions, identified under the first phase of the ECCP, that needed further study in terms of emission reduction potential and cost-effectiveness, have also been developed (e.g. the E2MAS energy audit and management scheme and the Motor Challenge Initiative).

With regard to renewables, the second phase of the ECCP has focused on the promotion of renewables in heating applications (RES-H). The Commission has analysed the potential for increased uptake and the ways in which both existing (such as the Directive on energy performance of buildings) and new measures can contribute to the promotion of RES-H.

3.2.2. *Climate and Energy Package*

In March 2007 the EU leaders endorsed an integrated approach to climate and energy policy that aims to combat climate change and increase the EU's energy security while strengthening its competitiveness.

To kick-start this process, the EU Heads of State and Government set a series of demanding climate and energy targets to be met by 2020, known as the "20-20-20" targets. These are:

- A reduction in EU greenhouse gas emissions of at least 20% below 1990 levels
- 20% of EU energy consumption to come from renewable resources

- A 20% reduction in primary energy use compared with projected levels, to be achieved by improving energy efficiency.

As mentioned above the EU leaders also offered to increase the EU's emissions reduction to 30%, on condition that other major emitting countries in the developed and developing worlds commit to do their fair share under a global climate agreement.

In January 2008 the European Commission proposed binding legislation to implement the 20-20-20 targets. This 'Climate and Energy Package' was agreed by the European Parliament and Council in December 2008 and became law in June 2009.

The core of the package comprises four pieces of complementary legislation:

- A revision and strengthening of the Emissions Trading System (ETS), the EU's key tool for cutting emissions cost-effectively. A single EU-wide cap on emission allowances will apply from 2013 and will be cut annually, reducing the number of allowances available to businesses to 21% below the 2005 level in 2020. The free allocation of allowances will be progressively replaced by auctioning, and the sectors and gases covered by the system will be somewhat expanded.
- An 'Effort Sharing Decision' governing emissions from sectors not covered by the EU ETS, such as transport, housing, agriculture and waste. Under the Decision each Member State has agreed to a binding national emissions limitation target for 2020 which reflects its relative wealth. The targets range from an emissions reduction of 20% by the richest Member States to an increase in emissions of 20% by the poorest. These national targets will cut the EU's overall emissions from the non-ETS sectors by 10% by 2020 compared with 2005 levels.
- Binding national targets for renewable energy which collectively will lift the average renewable share across the EU to 20% by 2020 (more than double the 2006 level of 9.2%). The national targets range from a renewables share of 10% in Malta to 49% in Sweden. The targets will contribute to decreasing the EU's dependence on imported energy and to reducing greenhouse gas emissions.
- A legal framework to promote the development and safe use of carbon capture and storage (CCS). CCS is a family of technologies that capture the carbon dioxide emitted by industrial processes and store it in underground geological formations with the aim to prevent it from contributing to global warming. Although the different components of CCS are already deployed at commercial scale, the technical and economic viability of its use as an integrated system has yet to be shown. In addition, CCS requires large-scale energy inputs, which may undermine the entire concept. The EU plans to set up a network of CCS demonstration plants by 2015 to test its viability, with the aim of commercial update of CCS by around 2020. Revised EU guidelines on state aid for environmental protection, issued at the same time as the legislative package was proposed, enable governments to provide financial support for CCS pilot plants.

On 26 May 2010, the European Commission published a communication[19] which revisits the analysis of the implications of the different levels of ambitions (20% and 30% targets) and assesses the risk of carbon leakage.

The climate and energy package creates pressure to improve energy efficiency but does not address it directly. This is being done through the EU's energy efficiency action plan.

3.2.3. *Roadmap 2050*

Over the past two decades, European emissions have gone down by 16%, whereas the economy has grown 40% over the same period. If current policies are fully implemented, the EU might succeed to achieve its targets for 2020 of reducing emissions to 20% below 1990 levels and improving energy efficiency by 20%.

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[19] Communication COM(2010) 265 final from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - Analysis of options to move beyond 20% greenhouse gas emission reductions and assessing the risk of carbon leakage, Brussels, 26 May 2010

With its "Roadmap for moving to a competitive low-carbon economy by 2050", the European commission is looking beyond these 2020 objectives and setting out a plan to meet the long-term target of reducing domestic emissions by 80 to 95% for Europe's emissions - power generation, industry, transport, buildings and construction, as well as agriculture - to make the transition to a low-carbon economy over the coming decades.

As a part of the Europe 2020 strategy for smart, sustainable and inclusive growth, the Roadmap for moving to a competitive low-carbon economy in 2050 is contributing to the Resource Efficient Europe Flagship Initiative[20] intended to put the EU on course to using resources in a sustainable way.

3.2.4. Other Climate Change Mitigation Efforts

Greenhouse Gas Monitoring and Reporting

Given the UNFCCC and the Kyoto Protocol requirements, there is a need for thorough monitoring and regular assessment of EU greenhouse gas emissions[21] and the measures taken by the EU and its Member States in the field of climate change policy need to be analysed in good time. Therefore, it is appropriate for the European Commission to provide for effective co-operation and coordination in relation to the compilation of the EU greenhouse gas inventory, the evaluation of progress, the preparation of reports, as well as review and compliance procedures enabling the EU to comply with its reporting obligations under the Kyoto Protocol, as laid down in the political agreements and legal decisions taken at the seventh Conference of the Parties to the UNFCCC in Marrakech ("the Marrakech Accords").

The European Environment Agency assists the Commission, as appropriate, with monitoring activities, especially in the scope of the EU inventory system, and in the analysis by the Commission of progress towards the fulfilment of the commitments under the UNFCCC and the Kyoto Protocol.

Low Carbon Technologies

Another aspect of DG CLIMA's work is to provide support for the uptake of new technology from the pilot scale to the commercial scale, for instance by bridging finance. DG CLIMA's demonstration support initiative, the NER300 funding programme provides substantial funding for the large-scale demonstration of low carbon energy technologies in Europe and is the world's largest programme in this area.

Other low carbon technology initiatives in the Commission include: the European Economic Recovery Programme and the Strategic Energy Technology Plan (SET Plan).

Transport

As greenhouse gas emissions have been increasing for most modes of transport, the EU has so far put a range of policies in place aiming to lower emissions from the sector. These include:

- the inclusion of aviation in the EU Emissions Trading System (ETS);
- a strategy to reduce emissions from cars and vans, including emissions targets for new vehicles;
- a target to reduce the greenhouse gas intensity of fuels;
- rolling resistance limits and tyre labelling requirements;
- public procurement adaptations to take account of life time energy use and CO_2 emissions.

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[20] Communication COM(2011) 21 from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - A resource-efficient Europe - Flagship initiative under the Europe 2020 Strategy, Brussels, 26 January 2011

[21] Decision N°280/2004/EC of the European Parliament and of the Council of 11 February 2004 concerning a mechanism for monitoring Community greenhouse gas emissions and for implementing the Kyoto Protocol

In addition to these measures influencing vehicle emissions, it is also necessary to ensure that account is taken of the impact of transport policy actions and measures on greenhouse gas emissions. This helps to ensure consistent signals to transport users and vehicle manufacturers and to achieve greenhouse gas emission reduction at lowest cost.

Fluorinated Gases

Greenhouse cases covered by the Kyoto Protocol are amongst other, three groups of fluorinated greenhouse gases (the so-called "F-Gases"): hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF6). Fluorinated Greenhouse Gases are used in several types of products and applications, mainly as substitutes of ozone-depleting substance such as chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs) and halons which are being phased out under the Montreal Protocol. Although F-Gases have no ozone-depleting properties, most of them have a high global warming potential.

The "F-Gas Regulation"[22], supplemented by 10 implementing acts (Commission Regulations), lays down specific requirements for the different stages of the whole life cycle of F-Gases, from the production to end of life. Consequently different actors are affected, including producers, importers and exporters of F-Gases, manufacturers and importers of certain F-Gas containing products and equipment and operators of the equipment.

The aim of the F-Gas regulation is to reduce emissions of fluorinated greenhouse gases through:

- better containment of F-Gases in their applications
- recovery of F-Gases from products and equipment reaching their end of life
- training and certification of technical personnel and companies working with F-Gases
- reporting of production, import and export data within the EU
- labelling of certain products and equipment containing those gases
- the prohibition of placing on the market some products containing F-Gases and the control of use in some specific applications.

The European Commission is currently carrying out a wide-ranging evaluation of the Regulation. A report on the results of this evaluation are to be published in 2011.

Forests

The Working Group on forest related sinks, set up in 2002 under the European Climate Change Programme (ECCP), produced a report[23] that outlines the most promising measures that can increase the contribution of forest to the mitigation of climate change. Forest-related actions are also considered in the second phase of the ECCP, launched in 2005.

Increasing the share of renewable energy sources (RES) is crucial for the reduction of greenhouse gas emissions. Forestry can contribute by providing biomass, mostly for electricity and heat production. The Commission has adopted in December 2005 a Biomass action plan[24] in which the contribution of EU forests to generate energy from biomass plays an important part.

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[22] Regulation (EC) N°842/2006 of the European Parliament and of the Council of 17 May 2006 on certain fluorinated greenhouse gases

[23] ECCP - Working Group on Forest Sinks, Final Report, Conclusions and recommendations regarding forest related sinks & climate change mitigation, See: http://ec.europa.eu/clima/policies/forests/docs/forest_sinks_final_report_en.pdf

[24] Communication COM(2005) 628 final from the Commission - Biomass action plan, Brussels, 7 December 2005

The European Commission presented a Communication on deforestation[25] which sets out the EU's response to the challenge of climate change. It proposes that at the UNFCCC (United Nations Framework Convention on Climate Change) negotiations on the future climate regime, the EU calls for halting global forest cover loss by 2030 at the latest and reducing gross tropical deforestation by at least 50% by 2020 from current levels. This objective would provide major climate change and biodiversity benefits by 2020. (more)

Agriculture

On 5 May 2010, the European Parliament adopted a resolution[26] on EU agriculture and climate change, noting that agriculture is one of the main sources of two major greenhouse gases (nitrous oxide and methane) contributing to climate change while also being vulnerable to its adverse impact.

Therefore, EP members called for the future CAP to encourage practices that contribute to improving the efficiency of agriculture and its potential to reduce GHG emissions, and to improving carbon sequestration.

3.2.5. Adaptation to Climate Change

Adaptation means anticipating the adverse effects of climate change and taking appropriate action to prevent or minimise the damage they can cause.

In April 2009 the European Commission presented a policy paper known as a White Paper which presents the framework for adaptation measures and policies to reduce the European Union's vulnerability to the impacts of climate change.

The framework focuses on the following key areas:

- building a stronger knowledge base since sound data is vital in the development of climate policy
- taking climate change impacts into consideration in key EU policies
- financing climate change policy measures
- supporting wider international efforts on adaptation by helping for example non-EU countries to improve their resilience and capacity to adapt to climate change.

On 23 March 2010, the European Parliament presented its Report on the Commission White Paper: 'Adapting to climate change: Towards a European framework for action'[27]. The report stresses that:

In the Motion for a European Parliament Resolution on the Commission White Paper: 'Adapting to climate change: Towards a European framework for action', the European Parliament "emphasises the importance of satellite-based services, notably for rescue activities in the event of natural disasters (and) calls on all those involved to make GMES fully operational as soon as possible" (§18);

In addition, the report stresses that macro-adaptation is a fundamental undertaking which would allow (us) to improve our current emergency management systems by combining satellite and ground based observations, for nowcasting of severe events and is linked to mitigation but does not identify with it (Explanatory statement).

Of particular interest are the opinions formulated by the Committees consulted in the reporting process:

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[25] Communication COM(2008) 645 final from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - Addressing the challenges of deforestation and forest degradation to tackle climate change and biodiversity loss, Brussels, 17 October 2008

[26] Resolution 2009/2157(INI) of the European Parliament of 5 May 2010 on EU agriculture and climate change

[27] Report 2009/2152(INI) of the European Parliament on the Commission White Paper: 'Adapting to climate change: towards a European framework for action', 6 May 2010

- PECH Committee Opinion28: "The committee calls on the Commission to carry out studies designed to assess the phenomenon of green algae and their impact on the fishing industry; calls, further, for a study to be carried out on the influence that changes in currents as a result of climate warming have on the movement of certain marine species" (adopted by 15/0/0);
- ITRE Committee Opinion29: The Committee "emphasises the importance of satellite-based services for rescue activities in the event of natural disasters; welcomes in this regard the quick support provided by the GMES system to civil protection authorities after the dramatic earthquake in Haiti; calls on all those involved to make the GMES system fully operational as soon as possible".
- TRAN Committee Opinion30: The Committee "calls on the Commission, as a matter of the greatest possible urgency, to improve the knowledge and observation of climate impacts through the European Environment Agency, the Joint Research Centre and the European Drought Observatory, making use of the new satellite monitoring technologies and intelligent transport systems whenever possible". Furthermore, it "calls specifically on the Commission to pay particular attention to mapping and assessing the impact in mountain and coastal areas, where it is predicted that the rising temperatures and sea levels could bring about significant changes in the tourism sector (adopted by 31/2).

Attention to climate change adaptation was given a boost with the publication in November 2011 of a new IPCC report on extreme weather predicting that certain types of weather extremes will grow more numerous and more intense as human-induced global warming worsens in the coming decades.

Human vulnerability to such extremes is growing as well due to rising urban populations especially in developing countries, flawed decisions about land use, like unchecked coastal development, and increased threats to food and water security.

If global agreements on mitigating climate change are hard to achieve, some observers suggest international action on strengthening the ability of especially poor countries to adapt and cope with the consequences of global warming is perhaps more attainable.

Given the potential for climate change to contribute to and exasperate local and regional conflicts there is increasing interest among foreign and military policy makers to address climate change adaptation issues.

It remains to be seen how far this type of analysis penetrates EU external action in the months and years ahead but there is clearly an important role for earth observation to play with regard to predicting, monitoring and helping policy makers in responding to the impacts of climate change in addition to the more traditional role in scientific measurements related to the causes of global warming and the monitoring of efforts to mitigate climate change.

3.2.6. EU Process on Climate Change and Security

The debate on climate change and security has grown at a rapid pace over the past five years. The key development in the EU position on this issue was the Solana Report on "Climate Change and International Security" (CCIS) which was published in March 2008[31]. The Report recognises that the risks brought by climate change are not just of a physical nature, they also include political and security risks that directly affect European interests. The report provides three main recommendations concerning:

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[28] Contact: Kriton Arsenis (S&D), tel: +32 2 284 5873

[29] Contact: Marisa Matias (GUE/NGL), tel: +32 2 284 5669

[30] Contact: Dominique Vlasto (EPP), tel: +32 2 284 5161

[31] Paper S113/08 from the High Representative and the European Commission to the European Council on Climate Change and International Security, 14 March 2008

- enhancing capacities at the EU level for analysis and early warning;
- multilateral leadership in promoting common understanding about security risks of climate change;
- dialogue, information exchange and cooperation with third countries.

The development of the Solana Report provided the infrastructure for European responses on the subject, in the form of a Road Map to Copenhagen, linking EU Presidencies and interested Member States in an informal Steering Group. This system of consultation between the Member States, led by December 2008 to a concentration on more detailed analysis of the security implications at regional level; integration of these analyses into the early warning mechanisms and an intensified dialogue with third countries and organisations. The major act of consultation was held in March 2009 at the Asean Regional Forum attended by India and China as well as Canada, Australia and the US.

In its conclusions on EU Climate Diplomacy[32] of 18 July 2011, the Council reiterates that climate change is a global environmental and development challenge that has also important security implications by exacerbating tensions over land, water, food and energy prices and creating migratory pressures and desertification.

In this context, the Council underlines that the time has come to further step-up efforts on climate diplomacy to address climate change at all political levels and to strengthen the EU voice and activities internationally, including through regional initiatives, by complementing and facilitating efforts being deployed under the UNFCCC, including in the run-up to the Durban Climate Conference.

Climate change and environmental deterioration, the Council continues, are key threat factors to be monitored by EU early warning mechanisms. Therefore, the EU will continue to raise global awareness of the security risks to, and threat multiplier nature of, climate change, particularly in vulnerable regions.

The Council action on 18 July was taken just prior to and in support of the 20 July 2011 United Nations Security Council debate on the "Maintenance of international peace and security: impact of climate change" led by Germany which held the Presidency of Security Council in July. With this debate, Germany wanted to create a firmly established place on the Security Council agenda for climate and security. The debate centred around the security-related effects of climate change: rising sea-levels and the resultant security risks, as well as food security.[33]

The Council conclusions in July 2011 state that "The Joint Reflection Paper from the High Representative and the Commission, "Towards a renewed and strengthened European Union Climate Diplomacy" sets out three strands for action on EU climate diplomacy" adding that "energy security should also be reflected in climate outreach".

The Joint Reflection Paper dated 9 July 2011 outlines the three strands under the following headings:

- 1st strand: Promotion of climate action
- 2nd strand: Supporting implementation of climate action
- 3rd strand: Climate Change and international security

Under the latter heading the paper says that:

"The adverse effects of climate change in a geopolitical context will be increasingly felt in the coming decades. While climate change alone does not cause conflict, it is leading to increased competition for scare natural resources, further weakens fragile governments and exacerbates migratory pressures. More extreme weather events may lead to increased demands for EU Member States to provide humanitarian aid including civil / military co-operation, in disaster relief operations in third states. (...)

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[32] Council conclusions on EU Climate Diplomacy, 3106th Foreign Affairs Council Meeting, Brussels, 18 July 2011

[33] United Nations Security Council, 6587th meeting, 20 July 2011

"The European Union's external action should further strengthen dialogue and co-operation with third countries and international organisations in promoting a better understanding and predictability of inter-linkages between climate change, development, environmental degradation, natural resources, migration or conflict. (...)

"Based on the initial results of the four regional studies on Central America, South East Asia, South West Asia and Indian-Pacific Ocean Island States' region more detailed regional studies on security implications of climate change are needed. As a next step pilot "early warning" reviews of countries or regions susceptible to the effects of climate change leading to security risks should be carried out with a view to developing mitigating strategies and actions drawing on the wide range of EU instruments available. In the medium term, we should strive to cover all key regions and closely follow-up results and recommendations. This should dovetail with preventive action in the EU cooperative partnerships with vulnerable countries or regions, serving in parallel international security, development and climate adaptations. EU support for adaptation and mitigation measures can contribute to easing climate related tensions around the world."

The paper concludes with 13 recommendations related to all three of the mentioned strands including recommendation number 12 which states the need to "Strengthen exchanges with Member States through the informal Steering Group on climate change and international security, as a platform to keep in touch with civil society, academic and think tanks and discuss related best practices and key emerging issues."

The Informal Steering Group on Climate Change and International Security (ISG) was set up in 2009 in the context of the Joint Paper by the High Representative and the Commission on Climate Change and International Security (March 2008) but during the reorganisation within the institutions and the establishment of the EEAS it did not meet for a period of several months until 13 October 2011.[34]

That meeting was chaired by Mr Marc Van Bellinghen, Deputy Head of the Conflict Prevention, Peace-building and Mediation Division of the EEAS, in association with the Global Issues Division and DG CLIMA.

The report of that meeting clearly stresses the "need to operationalise the FAC recommendations by working out a detailed action plan for the short and medium term. Closer cooperation and coordination between all actors (MS, EEAS, COM), both at headquarters level and locally through the EU delegations with the support of MS, is key for achieving progress in the 3 strands of action called for by the reflection paper. (…) Work on this will also be helped by additional resources made available by the EEAS."

The report also states that "Going forward, it is essential to build on existing capabilities and structures such as the Green Diplomacy Network (to be revamped reflecting the post-Lisbon institutional landscape and heightened ambitions for EU climate diplomacy) or the analytical and policy work on climate security. Recent EU climate diplomacy initiatives on which to build also include the renewed deliberations of climate change and its implications for international security within the UN Security Council, well attended climate outreach events to progressive African states in Copenhagen on 2 September (arranged by DK) and Brussels on 14 October (arranged by EEAS and the Commission). Another asset on which to build is the traditional area of demarches in preparation of the Conferences of the Parties in the UNFCCC process (such as the current demarche in preparation of the Durban conference) and other important climate conferences."

It was concluded that "The ISG would need to reflect the above mentioned developments (i.e. the broader mandate and heightened expectations) and hence review its operational goals and functioning." A core group led by the EEAS and the Commission will endeavour to work out details of the action plan to be presented to the plenary in the beginning of 2012 (Jan or Feb).

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[34] Meeting of the Informal Steering Group on Climate Change & International Security, Brussels, 13 October 2011 - Summary and Conclusions, MD VI - Department VI C1, Conflict Prevention, Peace-Building & Mediation Division, EEAS, Brussels, 16 November 2011, EEAS/MCC/qn (2011) 1332260

Regarding the nexus between climate change and international security, which constituted the initial main focus of the ISG, participants stressed the need to widen and deepen understanding of the issues at stake in recognition of the fact that this is still a new topic for many partner countries that had not drawn a lot of attention locally (examples given by the Asian/Pacific and Latin American desks). As of now the security dimension of climate change is not as widely covered in bilateral policy dialogues with third countries as it could be.

EUMS and SITCEN indicated that climate change-induced security threats are issues that draw increased attention from the intelligence community and are subject of ongoing analytical work (together with other environmental threats such as pollution of increasingly scarce water resources).

Several Member States expressed their preference for widening the scope of work of the ISG from the previous main focus on the nexus between climate change and international security to a broader coverage encompassing all 3 strands of action prioritised by the FAC.

The next meeting of the ISG may be held back to back with a DG Research sponsored conference on climate change and water security in the Middle East in January 2012.

The revitalisation of the ISG and the determination to elaborate an operational action plan – together with the plans to upgrade the Green Diplomacy Network – demonstrate the increased importance given to the climate change and security nexus generally and the need to move beyond discussion to practical action in particular.

3.3. The Role of Earth Observation

Earth Observation's possibilities for supporting climate change policies range from observing climate change impacts, such as glacial melt, to monitoring human-induced emissions and providing space-based evidence for policy implementation and policy monitoring with respect to both climate change mitigation and adaptation.

With its 20/30-20-20 goal (20% emissions reduction or 30% if the rest of the world joins, compared to 1990) and a minimum of 20% renewables for its energy supply by 2020, the EU is still leading the way in international climate policy. A stringent climate policy is, by definition, beneficial in the long-term by ensuring less waste, pollution, use of energy and other material inputs and thus more competitiveness and inter-generational equity. At the same time it may be very expensive in the short term and therefore has to be as cost-effective as possible to be politically defensible. Precise identification of sources and sinks both within the EU geography and "Out of Europe" e.g. for its Clean Development Mechanism (CDM) operations is therefore necessary. Remote sensing is indispensable and the ESA has to increase its efforts in providing the data and the interpretation together with the EU scientific institutions (Joint Research Centre/Institute for Environment & Sustainability), and the European Environmental Agency.

It may be useful to look at the California Global Warming Solutions Act which also established a (state-wide) cap for GHGs by 2020 based on 1990 emissions. A quote from a recent message by the Smithsonian/NASA Astrophysics Data System on this act says: "Verifying the effectiveness of regional greenhouse gas emissions controls requires high-precision, regional-scale measurement methods combined with models that capture the principal anthropogenic and biogenic sources and sinks. The existing database in the Los Angeles Basin is extremely sparse, and new methods are required that provide high spatial and temporal resolution. We present a novel approach for monitoring the spatial distribution of the greenhouse gases in the L.A. basin using high resolution remote sensing spectroscopy."[35]

The space community should be aware that as a global agreement on a successor to the Kyoto Protocol may remain difficult to achieve for some time, there is an increased interest in forging regional agreements where Earth Observation can play an important role.

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[35] CLARS Fourier Transform Spectrometer, see: http://adsabs.harvard.edu/abs/2010AGUFM.A21H..05F (last consulted 10 November 2011)

The role of Earth Observation satellites in combating climate change was discussed at the United Nations climate change conference already in 2007. Earth Observation can provide baseline mapping by high resolution optical satellite sensors like Landsat's Thematic Mapper, Spot's HR, Terra's ASTER, IRS-P6's medium resolution AWIFS, Envisat's MERIS and Terra's MODIS instruments.[36] Satellite radar sensors flown aboard ESA's Envisat and ERS satellites are also able to produce reliable high-quality images of tropical rainforest because of their ability to peer through clouds, haze and smoke.

Germany's Remote Sensing Solutions (RSS) is also using EO satellites to monitor land cover change and the impact of fires in tropical peat lands and emissions of carbon dioxide emissions caused by peat fires and peat decomposition. The company uses Envisat's Advanced Synthetic Aperture Radar (ASAR), in combination with optical sensors, to improve biomass estimates of pristine and degraded forest ecosystems for REDD baseline assessment and monitoring.

Because of the stakes involved and the leading position of the EU in post-Kyoto negotiations in 2008-2009, the European Space Agency has launched the Climate Change Initiative (CCI) to "systematically generate, preserve and give access to long-term data sets of the "Essential Climate Variables" (ECV) to meet the needs of the UNFCCC and IPCC". The first 11 ECVs selected for the ESA CCI are aerosol properties, cloud properties, fire, greenhouse gases (CO_2, CH_4), glaciers, land cover, ocean colour, ozone, sea ice, sea-level and sea surface temperature. In addition, two more ECVs are forthcoming: soil moisture and ice sheets.

GMES will also provide much needed data with its focus on atmosphere, land use and oceans. For instance, the pre-operational GMES atmosphere monitoring service (MACC) monitors the global distributions and long-range transport of greenhouse gases such as carbon dioxide and methane, and reactive gases such as tropospheric ozone and nitrogen dioxide. It evaluates how these constituents influence climate and estimates their sources and sinks. Starting at the end of 2011 with the launch of the Sentinel satellites part of the GMES initiative, major advances in earth observation are expected to gradually offer methods for several ECV's that are not addressed yet.

Again, Earth Observation is important not only in the context of better understanding and predicting changes in the Earth's climate and in providing data needed in the formulation and implementation of climate change mitigation efforts but EO is also vitally important in detecting threats caused or exasperated by the effects of climate change as well as providing information for the development and implementation of future climate change adaptation policies and measures especially in the context of the nexus between climate and security.

[36] European Space Agency, see: http://www.esa.int/esaCP/SEMS3HBL2AF_index_0.html (last consulted 10 November 2011)

4. Forests

Home to much of the world's biodiversity, forests have significant values, both as a provider of goods (food, medicine, timber, construction materials, etc) and services (purifying air, preserving watersheds, stabilising soil and preventing erosion, etc).[37] "Deforestation, particularly in the tropics, (...) has negative impacts on biodiversity, local communities and indigenous peoples, sustainable long-term economic growth, air quality and other environmental and socio-economic goods and services."[38]

Forests have a critical role to play in the fight against global warming. "They are the largest storehouse of carbon on Earth and, after coal and oil, are the third biggest source of carbon emissions."[39] Scientists estimate that deforestation is responsible for emitting 2.9 billion tonnes of carbon per year. For comparison, total emissions from fossil fuels are currently above eight billion tonnes of carbon per year.

Forests also absorb the greenhouse gases that fuel global warming. A recent study undertaken as part of the Australian Climate Change Science Program estimates that the world's established forests remove 2.4 billion tonnes of carbon per year from the atmosphere. This is the equivalent of one third of current annual fossil fuel emissions. CSIRO co-author of the paper "A Large and Persistent Carbon Sink in the World's Forests", Dr Pep Canadell explains that "what this research tells us is that forests play a much larger role as carbon sinks as a result of tree growth and forest expansion."

Forests therefore offer a unique resource for addressing climate change. "Fewer forests mean larger amounts of greenhouse gases entering the atmosphere—and increased speed and severity of global warming."[40]

Deforestation is clearing Earth's forests on a massive scale. Forests still cover about 30 percent of the world's land area, but swaths the size of Panama are lost each and every year. The world's rain forests could completely vanish in a hundred years at the current rate of deforestation.[41]

Forests are also impacted by climate change - rising temperatures make forests drier, more susceptible to fires, and vulnerable to pests and diseases. The Intergovernmental Panel on Climate Change (IPCC) estimates that at least a third of the world's remaining forests may be adversely affected by changing climate.[42]

A workable solution to the problem is to carefully manage forest resources by eliminating clear-cutting to make sure that forest environments remain intact. The cutting that does occur should be balanced by the planting of enough young trees to replace the older ones felled in any given forest. The number of new tree plantations is growing each year, but their total still equals a tiny fraction of the Earth's forested land.[43]

4.1. International Action

4.1.1. Reducing Emissions from Deforestation and Forest Degradation (REDD)

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[37] WWF, see: http://wwf.panda.org/what_we_do/footprint/climate_carbon_energy/forest_climate/forests_and_climate_change/ (last consulted 10 November 2011)

[38] WWF, *Ibid*.

[39] WWF, *Ibid*.

[40] National Geographic, see: http://environment.nationalgeographic.com/environment/global-warming/deforestation-overview.html (last consulted: 10 November 2011)

[41] National Geographic, *Ibid*.

[42] WWF, *Op. cit*.

[43] National Geographic, *Op. cit*.

The UN-REDD Programme is the United Nations Collaborative initiative on Reducing Emissions from Deforestation and forest Degradation (REDD) in developing countries. The Programme was launched in September 2008 to assist developing countries prepare and implement national REDD+ strategies, and builds on the convening power and expertise of the Food and Agriculture Organization of the United Nations (FAO), the United Nations Development Programme (UNDP) and the United Nations Environment Programme (UNEP).

Reducing emissions from deforestation and forest degradation, or REDD, is an effort to make trees worth more standing than cut down by providing developing countries with economic incentives to protect their forests. When done right, in a way that safeguards the rights of local communities and indigenous peoples, REDD can not only benefit the climate, but also biodiversity and local livelihoods.[44]

The recent work of the Australian Climate Change Science Program suggests that emissions from deforestation are much larger than previously thought. Therefore, the potential benefits of avoiding deforestation through the UN-backed REDD scheme are much larger than previously appreciated. In addition, one of the discovery of the study was the large capacity of tropical forest re-growth to remove atmospheric CO2. "We estimate that tropical forest regrowth is removing an average of 1.6 billion tonnes of carbon per year. Unfortunately, some countries have not looked on forest regrowth as a component of REDD, and so are missing a very important opportunity to gain even further climate benefits from the conservation of forests", Dr Canadell said.

4.1.2. *The World Bank Forests Strategy*

Forests resources are crucial to the World Bank's mission of eradicating poverty because of their contribution to the livelihoods of the poor, the potential they offer for sustainable economic development, and the essential global environmental services they provide. The World Bank is testing opportunities to mitigate climate change and to protect standing forests through carbon finance, as well as exploring investments needed to make avoided deforestation work given the other functions that forests serve. The investments include afforestation, reforestation and restoration of degraded forests. The mechanism being considered for these investments is the Forest Investment Program being developed under the Strategic Climate Fund.

4.1.3. *Carbon Fund*

The Forest Carbon Partnership Facility (FCPF), which became operational in June 2008, is a global partnership focused on reducing emissions from deforestation and forest degradation, forest carbon stock conservation, sustainable management of forests and enhancement of forest carbon stocks (REDD+). The FCPF assists tropical and subtropical forest countries develop the systems and policies for REDD+ and provides them with performance-based payments for emission reductions. It complements the UNFCCC negotiations on REDD+ by demonstrating how REDD+ can be applied at the country level.

On 31 May 2011, a new fund from the World Bank's Forest Carbon Partnership Facility (FCPF) was launched. The new fund (known as the Carbon Fund) is designed to pay developing countries for reducing carbon emissions caused by the destruction of their forests.

Four industrialised countries (Germany, Norway, United Kingdom, United States of America), the European Commission, The Nature Conservancy, CDC Climat and BP Technology Ventures Inc., have to date pledged a total of US$156 million to the Carbon Fund, which is expected to eventually provide performance payments to countries for curbing deforestation while investors in the fund will receive some form of forest carbon offset in return for their investment.[45]

4.1.4. *Forests Investment Programme*

[44] WWF, *Op. cit.*

[45] FERN, see: http://www.fern.org/node/4967 (last consulted 10 November 2011)

The FIP supports developing countries' efforts to reduce deforestation and forest degradation (REDD) and promotes sustainable forest management that leads to emission reductions and the protection of carbon reservoirs. It achieves this by providing scaled-up financing to developing countries for readiness reforms and public and private investments, identified through national REDD readiness or equivalent strategies.[46]

4.2. EU Action

In the EU, the responsibility for forest policy falls on individual Member States. There is nevertheless a long tradition by the EU of supporting forest-related activities such as sustainable forest management in co-operation with Member States. An example of this is the Commission's work in monitoring forest health and preventing forest fires (the "Forest Focus" Regulation).

Internationally, it takes part in the United Nations Forum on Forests and works on a range of forest-related issues to develop and promote the Union's environmental objectives.

In October 2008 the Commission presented a set of proposals on illegal logging and a Communication on deforestation to help protect forests around the world.

4.2.1. *Forestry Strategy*

The Council Resolution of 15 December 1998 on a Forestry Strategy[47] for the European Union established a framework for forest-related actions in support of sustainable forest management (SFM), based on the coordination of the forest policies of the Member States and Community policies and initiatives relevant to forests and forestry. It takes into account the commitments made by the EU and its Member States in the relevant international processes, in particular the UN Conference on Environment and Development in 1992 (UNCED) and its follow-up conferences, and the Ministerial Conferences on the Protection of Forests in Europe (MCPFE) (Strasbourg 1990, Helsinki 1993, Lisbon 1998 and Vienna 2003).

The Strategy emphasises the importance of the multifunctional role of forests and SFM for the development of society, and identifies a series of key elements, which form the basis for its implementation. It states that forest policy lies in the competence of the Member States, but that the EU can contribute to the implementation of SFM through common policies, based on the principle of subsidiarity and the concept of shared responsibility. It also emphasises the implementation of international commitments, principles and recommendations through national or sub-national forest programmes or equivalent instruments, and active participation in all forest-related international processes, and stresses the need to improve coordination, communication and co-operation in all policy areas of relevance to the forest sector.

4.2.2. *Forest Action Plan*

The EU Forest Action Plan[48] was adopted on 15 June 2006. It builds on the report on implementation of the EU Forestry Strategy and consequent conclusions by the Council. The overall objective of the EU Forest Action Plan is to support and enhance sustainable forest management and the multifunctional role of forests. It is based on the following principles:

- national forest programmes as a suitable framework for implementing international forest-related commitments;

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[46] CIF, see: http://www.climateinvestmentfunds.org/cif/node/5 (last consulted 10 November 2011)

[47] Council Resolution 1999/C 56/01 of 15 December 1998 on a forestry strategy for the European Union

[48] Communication COM(2006) 302 final from the Commission to the Council and the European Parliament - An EU Forest Action Plan, Brussels, 15 June 2006

- the increasing importance of global and cross-sectoral issues in forest policy, calling for improved coherence and coordination;
- the need to enhance the competitiveness of the EU forest sector and good governance of EU forests;
- respect for the principle of subsidiarity.

4.2.3. *Illegal Logging*

The European Union's policy to fight illegal logging and associated trade was defined back in 2003 with the Forest Law Enforcement Governance and Trade (FLEGT) Action Plan.[49] The key regions and countries targeted in the FLEGT Action Plan, which together contain nearly 60% of the world's forest and supply a large proportion of internationally traded timber, are Central Africa, Russia, Tropical South America and Southeast Asia. The FLEGT Action Plan covers both supply and demand side measures to address illegal logging, and was endorsed by the EU Council of Ministers in November 2003.

The FLEGT Action Plan has led to two key pieces of legislation:

- FLEGT Regulation[50] adopted in 2005, allowing for the control of the entry of timber to the EU from countries entering into bilateral FLEGT Voluntary Partnership Agreements (VPA) with the EU;
- EU Timber Regulation[51], proposed by the Commission in October 2008 and adopted by the European Parliament and by the Council in October 2010, as an overarching measure to prohibit placing of illegal timber and timber products on the internal market.

However, the EU response has not been limited to legislative measures. The EU has sought to increase demand for legal and sustainable timber and timber products by encouraging both private and public sector procurement policies that give preference to legally harvested timber and timber products.

In the public sector these form part of a broader effort to "green" public procurement policies. An increasing number of EU Member States are adopting green public procurement policies requiring timber and timber products to be from legal and sustainable sources. Countries implementing such policies include Belgium, Denmark, France, Germany, Netherlands and the UK.

Many EU private sector timber trade and retail federations and companies have made commitments through Codes of Conduct to eliminate illegally harvested timber from their supply chains. In addition some banks have put in place policies to ensure their clients are not associated with illegal logging activities.

Capacity-building is an important element of the FLEGT Action Plan, particularly for developing countries. The Commission is working with the EU Member States to provide such capacity-building through its development co-operation instruments including support to NGOs and private sector actions.

4.2.4. *Deforestation*

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[49] Communication COM(2003) 0251 final from the Commission to the Council and the European Parliament - Forest Law Enforcement, Governance and Trade (FLEGT) - Proposal for an EU Action Plan, Brussels, 21 Mai 2003

[50] Council Regulation (EC) N°2173/2005 of 20 December 2005 on the establishment of a FLEGT licensing scheme for imports of timber into the European Community

[51] Regulation (EU) N°995/2010 of the European Parliament and of the Council of 20 October 2010 laying down the obligations of operators who place timber and timber products on the market

The European Commission has presented a Communication on deforestation[52] which sets out the EU's response to the challenge of climate change. It proposes that at the UNFCCC (United Nations Framework Convention on Climate Change) negotiations on the future climate regime, the EU calls for halting global forest cover loss by 2030 at the latest and reducing gross tropical deforestation by at least 50% by 2020 from current levels. This objective would provide major climate change and biodiversity benefits by 2020.

The Commission proposes to work in the international negotiations on climate change towards the development of a Global Forest Carbon Mechanism, a financial mechanism through which developing countries would be rewarded for emissions reductions achieved by taking action to reduce deforestation and forest degradation.

Simultaneously, the Communication identifies possible ways for the EU to contribute to such a mechanism. It also addresses policies that need to be reinforced in the fields of trade, energy, agriculture, food security and development co-operation in order to ensure a coherent policy response to address deforestation and forest degradation. With this regard, European initiatives such as the Global Monitoring for Environment and Security (GMES) and the Tropical Ecosystem Environment observation by Satellite (TREES) project can play an important role in monitoring land-use changes and deforestation trends.

The Communication warns that at EU level an appropriate level of funding is required from 2013 to 2020 to fight deforestation. For instance, funding is required to improve governance and to resolve technical issues (such as monitoring using satellite and other technologies).

Additionally, the Communication stresses that if technological development in data software, satellite and communications technology have made tools for forest monitoring cheaper and more accessible, remaining gaps need to be addressed with high priority. In-country capacity needs to be developed to establish high-quality national monitoring and verification systems to measure progress and assure compliance. In mastering this challenge, the Commission believes that one could draw on EU initiatives and methodologies already implemented by the Joint Research Centre or other programmes - such as GMES, the Global Earth Observation System of Systems, and Global Observations of Forest and Land Cover Dynamics.

4.3. The Role of Earth Observation

The EU has been rather reluctant in the past to admit the role of especially tropical forests in climate change mitigation, citing technical hurdles, but basically not wanting to divert policy action away from mitigation efforts in the field of energy within the EU as this would increase the competitiveness of the European industry on the world market. This EU position was 'helped' by ideological postures of several major NGOs that "the forests of the South should not be used to pay for pollution sins of the North". Slowly, but with a boost from the Cancún outcome on the REDD+ mechanism (Reduction of Emissions from Deforestation and Forest Degradation), the EU is now warming up to include forests in the implementation of its commitments and obligations under the UNFCCC, and is considering allowing carbon credits from forests to enter in the Emission Trading Scheme (ETS) as from 2013.

A key country in the forest/climate politics is Indonesia, generally estimated to be the third largest emitter of greenhouse gases in the world after China and the U.S., due to its deforestation and forest fires, especially on the peatlands. Potentially the most important recent initiative to slow down these emissions is the 2010 Norway-Indonesian REDD deal of US$ 1 billion. This deal 'coincides' with the Indonesian 2-year moratorium on issuing permits for conversion of natural forests or peatlands into plantations or timber concessions, for the years 2011 and 2012, and fits in the official policy to slash emissions by 26 percent by 2020 compared to 1990.

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[52] Communication COM(2008) 645 final from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - Addressing the challenges of deforestation and forest degradation to tackle climate change and biodiversity loss, Brussels, 17 October 2008

For Norway these deals (previous ones are with Brazil and Guyana) are performance-based: payments to Guyana are suspended as deforestation is estimated to be increasing; monitoring, reporting and verification (MRV) are therefore essential, as also stipulated by Cancún, with remote sensing of forest cover and forest carbon playing an central role.

As Norway is a Member of ESA (and not of the EU), special attention of ESA to the Indonesia deal is warranted. In 2009 the Institute for Environmental Security brought together Mr. Per Erik Skrovseth from the Norwegian Space centre with SarVision (Wageningen University) to discuss the application of the GEO Forest Carbon Tracking-programme (FCT) to the Guiana Shield Initiative in Guyana. As SarVision also has intimate knowledge and experience in the radar-based monitoring of forests and peatlands in Indonesia, it has trained various experts in the Indonesian Ministry of Forests, has been working with law enforcement officials in Kalimantan, and is closely associated with prof Martin Herold, now also at Wageningen University and central in the GEO FCT-programme, it could be worthwhile to bring these parties together to see how the MRV part of the deal can best be executed. It is strongly advised to also involve Wetlands International in the consultations because of their scientific and practical expertise on the ecology and management of peatlands with the full participation of local communities.

It has to be realised that 'space evidence' has not been welcome with many Indonesian authorities, bureaucrats and plantation managers as it showed the massive violations of forest, nature reserve and peatland protection laws. There are reports that remote sensing experts have been marginalised in the Ministry of Forests.

The major issue does not seem to be the further expansion and refinement of the satellite observations – how desirable and necessary that is - but the fight against what in Indonesian Bahasa is called korupsi, kolusi, nepotis (KKN, no translation required). ESA/Norwegian Space Centre could play a role here in helping to structure the MRV part of the Norway-Indonesian deal.[53]

In the Congo Basin, the Central African Forests Commission (COMIFAC) has been assessing the capacities for monitoring carbon stocks and fluxes in the Congo Basin. This was the topic of an international conference held in Brazzaville on 2-4 February 2010 and attended by EC-JRC.[54]

One of the key findings of the conference is that Central Africa has suffered from poor spatial data acquisition policies. Only Landsat data have been routinely available, with limitations on quality in recent years. The near future is however looking brighter with several investments in improved data acquisition: GMES, AFD, free CBERS data for African users, ALOS-PALSAR radar data, GEO Forest Carbon Tracking initiative and the construction of a satellite ground receiving station in Libreville will all participate in Central Africa's catching up in the years to come.

Two areas related to data access need yet to be addressed: fostering a policy of open data and making data readily available from receiving stations and data providers to domestic users by strengthening infrastructure for data dissemination (e.g., internet, GEONETcast).

The largest tropical forest complex in the world is of course the Amazon, stretching over 9 countries (Brazil, Bolivia, Colombia, Ecuador, French Guiana, Guyana, Peru, Suriname, Venezuela), with Brazil ranking as the 4th largest emitter of greenhouse gases in the world, especially because of the deforestation and the fires in the Brazilian Amazon and the large amounts of cattle in the country. Brazil's space agency INPE is considered to be one of the best satellite-based tracking institutions in the world and its DETER system (Real-time Detection of Deforestation) seems to be quite effective in assisting law enforcement agencies is combating illegal logging and forest clearing. Via the INDICAR system, the environment agency IBAMA tries to overcome problems of cloud cover and a financial agreement with JAXA to get real-time ALOS radar images is currently being negotiated.

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[53] The definition of forest and forest cover, peatland and peatland forest will be crucial and what matters in the end is the change in total emissions against an agreed base-line for the country as a whole, so as to exclude leakages between forest categories and between forests and other – anthropogenic – sources of greenhouse gas emissions

[54] See: http://osfac.net/workshop/fr/default.html (last consulted 10 November 2011)

It is a bit typical of Brazil not to look outside its borders, so an additional effort is needed to get a full picture of the forest-related emissions in the whole of the Amazon Basin. In the Guiana Shield Initiative, founded by IUCN Netherlands and currently implemented by the UNDP with major funding from the European Commission (AIDCo) and with the Institute for Environmental Security with its partner SarVision organising the monitoring component (ALOS images), we also look at the forest situation in the countries north of Brazil (the three Guianas, Venezuela and Colombia). The total area, including the Brazilian part, is 2.5 million km2 of the 6 million of the Basin as a whole.

The Andean Amazon or the Tropical Andes (Colombia, Peru, Ecuador and Bolivia) is extremely rich in biodiversity and contains the origin and many of the major tributaries of the Amazon River. Deforestation is increasing due to colonisation with subsistence agriculture, destructive gold mining and illicit crop cultivation and the (planned) construction of major infrastructure in the framework of the IIRSA programme (Initiative for the Integration of Regional Infrastructure in South America), to which the European Investment Bank is a major lender (over US$ 500 million since 1997 to infrastructure loans in South America, although not all of them formally through IIRSA). As the building of infrastructure (roads) has potentially a considerable impact upon the sensitive ecology of tropical rainforests, strict controls have to be applied which require strict monitoring to be enforced. Monitoring also from space is important in view of the extended territories involved, but this seems not to be the case, especially not in the Tropical Andes.

The Amazon Basin is seen by some climate scientist as the potential stage for a tipping point in which the forest changes from being a major sink of CO2, and (also) becomes a source as it did during the droughts of 2005 and 2010, when billions of trees died and started decomposing.[55] This of course is a very scary perspective and we could imagine a gathering of the major space agencies to combine forces in monitoring forest cover/deforestation, rainfall and other relevant parameters in the Amazon Basin. Considering the interest of the EU in a stable climate, introducing forest credits in the ETS and the investments by the EIB and AIDCo/EDF, the Cotonou Agreement with the ACP countries and the ALA budget lines, ESA would have to be a major participant in such a gathering.

[55] S. L. LEWIS et al., “The 2010 Amazon Drought” Science, 4 February 2011: Vol. 331 no. 6017 p. 554, see: http://www.sciencemag.org/content/331/6017/554.abstract (last consulted 10 November 2011); and D. CARRINGTON, “Mass tree deaths prompt fears of Amazon 'climate tipping point'” The Guardian, 3 February 2011, see: http://www.guardian.co.uk/environment/2011/feb/03/tree-deaths-amazon-climate (last consulted 10 November 2011)

5. Biodiversity

"Biodiversity — manifested in forests, coral reefs, marine blue waters and all other ecosystems — is often proclaimed as a crucial component of human well-being: we are clearly harmed if fish stocks dwindle to extinction; there are plants whose gene pool might be useful to us. And large-scale destruction of the rainforests would accelerate global warming. But for environmentalists these "instrumental" — and anthropocentric — arguments are not the only compelling ones. For them, preserving the richness of our biosphere has value in its own right, over and above what it means to us humans."[56]

According to the Secretariat of the Convention on Biological Diversity, "Biological diversity - or biodiversity - is the term given to the variety of life on Earth and the natural patterns it forms. The biodiversity we see today is the fruit of billions of years of evolution, shaped by natural processes and, increasingly, by the influence of humans. It forms the web of life of which we are an integral part and upon which we so fully depend.

Biodiversity therefore encompasses the variety of ecosystems such as those that occur in deserts, forests, wetlands, mountains, lakes, rivers, and agricultural landscapes. In each ecosystem, living creatures, including humans, form a community, interacting with one another and with the air, water, and soil around them.

"It is the combination of life forms and their interactions with each other and with the rest of the environment that has made Earth a uniquely habitable place for humans. Biodiversity provides a large number of goods and services that sustain our lives."[57]

Recent calculations estimate the total number of species on Earth to 8.7 million - with 6.5 million species found on land and 2.2 million dwelling in the ocean depths. Furthermore, a study published by PLoS Biology, says a staggering 86% of all species on land and 91% of those in the seas have yet to be discovered, described and catalogued.

Co-author Boris Worm of Dalhousie University noted that the recently updated Red List issued by the International Union for the Conservation of Nature assessed 59,508 species, of which 19,625 are classified as threatened. This means the IUCN Red List, the most sophisticated ongoing study of its kind, monitors less than 1% of world species.

However, "the news is not good. We continue to lose biodiversity at a rate never before seen in history - extinction rates may be up to 1,000 times higher than the historical background rate (...) Business as usual is no longer an option if we are to avoid irreversible damage to the life-support systems of our planet."[58]

Additionally, "the conservation of biodiversity makes a critical contribution to moderating the scale of climate change and reducing its negative impacts by making ecosystems - and therefore human societies - more resilient. It is therefore essential that the challenges related to biodiversity and climate change are tackled in a coordinated manner and given equal priority."[59]

5.1. International Action

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[56] M. REES, "We're all in this together" The Times, 26 May 2009

[57] Convention on Biological Diversity, "Sustaining Life on Earth", see: http://www.cbd.int/convention/guide/

[58] A. DJOGHLAF, Executive Secretary, Convention on Biological Diversity in Global Biodiversity Outlook 3, Convention on Biological Diversity, 2010, see: http://gbo3.cbd.int/

[59] B. KI-MOON, Secretary General, United Nations in Global Biodiversity Outlook 3, Convention on Biological Diversity, 2010, see: http://gbo3.cbd.int/

The UN Convention on Biological Diversity (CBD), signed in 1992 among the vast majority of the world's governments, sets out commitments for maintaining the world's ecological underpinnings as we go about the business of economic development. The Convention establishes three main goals: the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits from the use of genetic resources.

Nineteen years after its adoption, the CBD has developed into a complex web of meetings (Conferences of the Parties), thematic programmes and initiatives. Additional protocols have also been adopted such as the Cartagena Protocol on Biosafety (2000) and the recent Nagoya Protocol on Access and Benefit-sharing (2010). Today, the Convention on Biological Diversity is the largest international convention on biodiversity as it counts 193 parties, including the European Community.

At the occasion of the tenth meeting of the Conference of the Parties to the CBD in Japan in October 2010, the 193 Parties to the Convention adopted an agreement on a global strategy to combat biodiversity loss over the next decade. This includes the adoption of a new ten year Strategic Plan, enhanced efforts by all Parties to mobilise financial resources to implement the plan and the approval of a new international protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilisation.

5.2. EU Action

The EU is committed to halting biodiversity loss in Europe and significantly reducing the rate of loss worldwide.

The European Community and its Member States are contracting parties to the UN Convention on Biological Diversity and EU Heads of State and Government undertook in 2001 to halt the decline of biodiversity in the EU by 2010 and to restore habitats and natural systems. In 2002, they also joined some 130 world leaders in agreeing to significantly reduce the rate of biodiversity loss globally by 2010.

Several EU policies and legislation are already in place to address the challenge, but efforts to implement them need to be replicated on a much larger scale. In particular, the EU wants to expand Natura 2000, a set of areas where plant and animal species and their habitats must be protected. It already includes more than 26,000 sites across the EU.

5.2.1. EU Biodiversity Strategy

The European Commission has recently adopted an ambitious new strategy to halt the loss of biodiversity and ecosystem services in the EU by 2020.

There are six main targets, and 20 actions to help Europe reach its goal. Biodiversity loss is an enormous challenge in the EU, with around one in four species currently threatened with extinction and 88% of fish stocks over-exploited or significantly depleted. The six targets cover:

- Full implementation of EU nature legislation to protect biodiversity
- Better protection for ecosystems, and more use of green infrastructure
- More sustainable agriculture and forestry
- Better management of fish stocks
- Tighter controls on invasive alien species
- A bigger EU contribution to averting global biodiversity loss

The strategy is in line with two commitments made by EU leaders in March 2010. The first is the 2020 headline target: "Halting the loss of biodiversity and the degradation of ecosystem services in the EU by 2020, and restoring them in so far as feasible, while stepping up the EU contribution to averting global biodiversity loss"; the second is the 2050 vision: "By 2050, European Union biodiversity and the ecosystem services it provides - its natural capital - are protected, valued and appropriately restored for

biodiversity's intrinsic value and for their essential contribution to human well-being and economic prosperity, and so that catastrophic changes caused by the loss of biodiversity are avoided."

It is also in line with global commitments made in Nagoya in October 2010, in the context of the Convention on Biological Diversity (CBD), where world leaders adopted a package of measures to address global biodiversity loss over the coming decade.

5.2.2. *Natura 2000*

Natura 2000 is an EU-wide network of nature protection areas established under the 1992 Habitats Directive.[60] The aim of the network is to assure the long-term survival of Europe's most valuable and threatened species and habitats. It is comprised of several Areas of Conservation (SAC) designated by Member States under the Habitats Directive, and also incorporates Special Protection Areas (SPAs) which they designate under the 1979 Birds Directive.[61] Natura 2000 is not a system of strict nature reserves where all human activities are excluded. Instead, it aims to ensure that future land management is sustainable, both ecologically and economically. The establishment of this network of protected areas also fulfils a Community obligation under the UN Convention on Biological Diversity.

For each Natura 2000 site, national authorities have submitted a standard data form (SDF) that contains an extensive description of the site and its ecology. The spatial data submitted by each Member State is integrated into a spatial database and, after validation with a specifically developed GIS tool, linked to the descriptive data.

5.2.3. *Recent Policy Developments*

In May 2006, the European Commission adopted a communication on "Halting Biodiversity Loss by 2010 – and Beyond: Sustaining ecosystem services for human well-being".[62] The Communication underlined the importance of biodiversity protection as a pre-requisite for sustainable development, as well as setting out a detailed EU Biodiversity Action Plan to achieve this.

The EU Biodiversity Action Plan addresses the challenge of integrating biodiversity concerns into other policy sectors in a unified way. It specifies a comprehensive plan of priority actions and outlines the responsibility of community institutions and Member States in relation to each. It also contains indicators to monitor progress and a timetable for evaluations. The European Commission has undertaken to provide annual reporting on progress in delivery of the Biodiversity Action Plan.

In June 2009, the Environment Council adopted conclusions[63] on the mid-term assessment of implementing the EU Biodiversity Action Plan and towards an EU Strategy on Invasive Alien Species.

In January 2010, a Communication[64] from the European Commission set out possible future options for biodiversity policy in the EU for the period after 2010. The Communication proposes a long-term (2050) vision for biodiversity, with four options for a mid-term (2020) target ranging from merely reducing the rate of loss of biodiversity and ecosystem services in the EU to completely halting the loss of biodiversity and ecosystem services in the EU, restoring them insofar as possible and stepping up the EU's contribution to averting global biodiversity loss. To achieve its objectives, the Commission points out that it will need to address several implementation, policy, knowledge and data gaps.

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[60] Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora

[61] Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds

[62] Communication COM(2006) 216 final from the Commission - Halting the loss of biodiversity by 2010 - and beyond. Sustaining ecosystem services for human well-being, Brussels, 22 May 2006

[63] Council Conclusions N°11412/09 of 25 June 2009 - A mid-term assessment of implementing the EU Biodiversity Action Plan and Towards an EU Strategy on Invasive Alien Species

[64] Communication COM(2010) 4 final from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - Options for an EU vision and target for biodiversity beyond 2010, Brussels, 19 January 2010

On 15 March 2010, the Environment Council[65] agreed on a new long-term vision and mid-term headline target for biodiversity in the EU for the period beyond 2010. On this occasion, the Council chose to follow the most ambitious target set out in the Commission Communication and further developed the EU position ahead of the international negotiations on biodiversity under the United Nations CBD.

In Autumn 2010, the European Parliament adopted two resolutions:

1) a resolution on EU legislation aiming at the conservation of biodiversity[66]

2) a resolution on the EU strategic objectives for the CBD COP10[67]

More recently, the Environment Council adopted its conclusions[68] on the Outcome of and follow-up to the Nagoya Conference.

5.3. The Role of Earth Observation

The ninth Conference of the Parties to the CBD was held in Bonn, Germany from 19 to 30 May 2008 and was attended by almost 7000 participants from 191 countries. ESA hosted a side event at COP9, in which speakers from various UN agencies highlighted the overarching role that Earth observation (EO) satellites play in providing vital information to implement and assess the progress of several UN treaties related to biodiversity.

Representatives from the Ramsar Convention on Wetlands, the UN Convention to Combat Desertification (UNCCD) and the UNESCO World Heritage Convention expressed their satisfaction and confirmed the usefulness of EO data. Earth observation allows users to realise land cover mapping, assess changes in marine and fresh water environments and analyse the surface temperature of oceans.

Introducing the GlobWetland project, funded through the ESA dues, Nick Davidson from the Ramsar Convention stressed that "often made up of complex and inaccessible terrain, monitoring ecological changes in wetlands without the use of satellite data is very difficult. The project produces land-use cover and change detection maps for use by wetland managers and policymakers. ESA EO has considerable power and potential in providing the intelligence behind making sound decisions on management and policy."

As explained above, Europe uses GIS in the framework of its Natura 2000 legislation. By way of this method, it is possible to calculate an overall figure for the Natura 2000 network in the EU, which takes into account the overlaps of sites designated under the Birds (SPAs) and those under the Habitats (SCIs) directives. GIS therefore appears both useful and necessary to implement conservation policies and monitor the evolution of protected areas.

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[65] Council Conclusions N°7536/10 of 15 March 2010 on EU and global vision and targets and international ABS regime

[66] Resolution 2009/2108(INI) of the European Parliament of 21 September 2010 on the implementation of EU legislation aiming at the conservation of biodiversity

[67] Resolution B7-0535/2010 of the European Parliament on the EU strategic objectives for the 10th Meeting of the Conference of the Parties to the Convention on Biological Diversity (CBD), to be held in Nagoya (Japan) from 18 to 29 October 2010

[68] Council conclusions on Convention on Biological Diversity: Outcome of and follow-up to the Nagoya Conference, 11-29 October 2010, 3061st Environment Council meeting, Brussels, 20 December 2010

6. Natural Resources

A recent report from the WTO defines natural resources as "stocks of materials that exist in the natural environment that are both scarce and economically useful in production or consumption, either in their raw state or after a minimal amount of processing."[69] That means, in general terms, the sum of all forestry products, fish, fuels and mining products.

Natural resources commodities are the backbone of the global economy. According to the WTO, the dollar value of world exports of natural resources increased more than six-fold between 1998 and 2008, rising from US$ 613 billion to US$ 3.7 trillion. The value of global fish exports rose from US$ 53 billion in 1998 to US$ 98 billion in 2008, while exports of forestry products increased from US$ 52 billion to US$ 106 billion.

Natural resources exploitation can contribute to a population's wealth when they are managed sustainably and transparently for the benefit of the entire community. However, as the global population continues to rise, and the need for resources increases, there is significant potential for conflict over natural resources to intensify in the coming decades, a report from IISD and UNEP argues[70]. In case of over-exploitation, weak governance and corruption, resources-sharing tends to be lower, fall into the hands of criminal actors and lead to social tensions. Moreover, illegal exploitation of natural resources can have a very detrimental effect on the local environment and further impoverish communities depending upon it.

Specialists argue that "natural resources are never the sole source of conflict, and they do not make conflict inevitable. But the presence of abundant, primary commodities, especially in low-income countries, exacerbates the risks of conflict and, if conflict does break out, tends to prolong it and makes it harder to resolve."[71]

International market players, such as the European Union, have the potential to play a positive role in regulating the exploitation of natural resources by forcing its industry to buy from legal sources, monitoring the main extraction sites and transport routes (e.g. using remote sensing and communication technologies), suing companies that do not comply with this rule and promoting a development model based on the sustainable use of natural resources.

6.1. International Action

6.1.1. Resource efficiency

Without trying to achieve exhaustivity, some of the most important international initiatives for resource efficiency are listed below:

- International Panel for Sustainable Resource Management, by the International Resource Panel (IRP). The IRP was launched in November 2007 and is expected to provide the scientific impetus for decoupling economic growth and resource use from environmental degradation.
- The 10 year Framework of Programmes on Sustainable Consumption and Production of the Marrakech Process, a global multi-stakeholder process to promote Sustainable Consumption and Production (SCP)

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[69] World Trade Report, 2010

[70] R. MATTHEW, O. BROWN and D. JENSEN, "From Conflict to Peacebuilding: The Role of Natural Resources and the Environment", UNEP, Nairobi, February 2009

[71] I. BANNON, P. COLLIER, editors, "Natural Resources and Violent Conflict. Options and Actions", The World Bank, Washington, D.C., 2003, p.ix

- The 3R Initiative that aims to promote the "3Rs" '(reduce, reuse and recycle) globally so as to build a sound-material-cycle society through the effective use of resources and materials. It was agreed upon at the G8 Sea Island Summit in June 2004 as a new G8 initiative.
- The Circular economy approach
- The Global Environment Outlook
- TEEB, the Economics of Ecosystems and Biodiversity – Report for Business

6.1.2. Illegal Trade in Natural Resources

At present, no hard international law framework exists to address natural resources spoliation. "Corruption is not within the core mandate of the World Trade Organization, currently the international mechanism with the strongest binding complaints procedure. Efforts to introduce corruption in the Doha round of negotiations - notably by mandating transparency in public procurement contracting - failed to rally consensus."[72]

Some treaties and declarations directly or indirectly approach the problem, although they do not yet constitute enforceable international anti-corruption norms as such:

- UN General Assembly Resolution 1803 (XVII) on Permanent Sovereignty Over Natural Resources (1962) states that the "right of peoples and nations to permanent sovereignty over their natural wealth and resources must be exercised in the interest of their national development and of the well-being of the people of the State concerned".
- UN General Assembly Resolution 3281 (XXIX). The Charter of Economic Rights and Duties of States (1974) declares that "every State has and shall freely exercise full permanent sovereignty, including possession, use and disposal, over all its wealth, natural resources and economic activities.
- Article 21 of the African Charter on Human and Peoples' Rights (ACHPR) asserts that all those living in signatory states "shall freely dispose of their wealth and natural resources," that "dispossessed people have a right to recovery of the property and compensation," and that each state has the obligation to avoid "foreign economic exploitation" that would prevent its people from "fully benefit from the advantages derived from their natural resources."
- There is a growing move to recognise criminal liability in international law for individuals, in particular in the Rome Statute of the International Criminal Court (ICC). Articles 75,77 and 79 of the Rome Statute together allow for the "forfeiture of proceeds, property, and assets derived directly or indirectly" from a crime, for these forfeited assets to be placed in a trust fund for victims, and for the ICC to order a convicted person to "directly make appropriation to victims" or "where appropriate, order reparations."
- The OECD Anti-Bribery Convention requires states to introduce measures "in accordance with [each state party's] legal principles, to establish the liability of legal persons" acting transationally.
- The United Nations Global Compact, a "voluntary international corporate citizenship network," affirms that "Businesses should work against all forms of corruption, including extortion and bribery."
- The United Nations Convention Against Corruption calls for national-level measures and international co-operation in the prevention and prohibition of corrupt practices, and is the first agreement to provide for international co-operation in the recovery of stolen assets.
- The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).
- The African Convention on the Conservation of Nature and Natural Resources.

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[72] Open Society Justice Initiative, *Legal Remedies for the Resource Curse. A Digest of Experience in Using Law to Combat Natural Resource Corruption*, Open Society Institute, New York, 2005

- The Lusaka Agreement on Co-operative Enforcement Operations Directed at Illegal Trade in Wild Fauna and Flora.
- The Protocol Against the Illegal Exploitation of Natural Resources which is included in the Pact on Security, Stability and Development in the Great Lakes Region of the International Conference of the Great Lakes Region.
- Treaties in Relation to Natural Resources as Commodities
- International Tropical Timber Agreement, 1994
- International Cocoa Agreement, 2010

It is worth mentioning that since 2008, the US Lacey Act (16 U.S.C. §§ 3371-3378) prohibits trade in wildlife, fish, and plants that have been illegally taken, possessed, transported or sold. It now stands as one of the broadest and most comprehensive forces in the US federal arsenal, and worldwide, to combat wildlife crime. The Lacey act condemns as a criminal offender someone or a company that knowingly engages in illegal trafficking of timber or in timber products and knows that such timber or timber products was harvested in violation of any foreign law or regulation. In addition, the bill introduces a misdemeanour offence for instances where the importer in the exercise of due care should have known the illegality of the harvested timber.

6.2. EU Action

6.2.1. *Thematic Strategy on the Sustainable Use of Natural Resources*

On 21st December 2005 the European Commission proposed a Strategy on the Sustainable Use of Natural Resources used in Europe. The objective of the strategy is to reduce the environmental impacts associated with resource use and to do so in a growing economy. Focusing on the environmental impacts of resource use will be a decisive factor in helping the EU achieve sustainable development.

This is the third Thematic Strategy that the Commission adopted following the provisions of the 6th Environmental Action programme (6 EAP). The Action Programme addressed the issue of resources and called for the development of a Thematic Strategy on the sustainable use of natural resources (Resource Strategy). The objective can be described as: "ensuring that the consumption of resources and their associated impacts do not exceed the carrying capacity of the environment and breaking the linkages between economic growth and resource use".

The Strategy led to the completion of the following studies:

- Analysis of the key contributions to resource efficiency
- Preparatory study for the review of the thematic strategy on the sustainable use of natural resources
- Potential of the Ecological Footprint for monitoring environmental impacts from natural resource use
- Significant natural resource trade flows into the EU and their environmental impacts

In addition, the European Commission is financing a number of other ongoing studies under the framework contract on Sustainable Management of Resources.

6.2.2. *Resource efficiency*

Europe 2020 is the EU's growth strategy for the coming decade, pushing the EU to become a smart, sustainable and inclusive economy. Under the Europe 2020 strategy the flagship initiative for a

resource-efficient Europe[73] points the way towards sustainable growth and supports a shift towards a resource-efficient, low-carbon economy.

One of the building blocks of this initiative is the European Commission's Roadmap for a resource-efficient Europe[74]. The Roadmap sets out a vision for the structural and technological change needed up to 2050, with objectives to be reached by 2020 and suggestions about how they could be met. The Roadmap proposes ways to increase resource productivity and decouple economic growth from resource use and its environmental impact. Areas where policy action can make a real difference are a particular focus. Cross-cutting themes such as consumption and innovation will also be in the spotlight, and key resources will be analysed from a life-cycle or value-chain perspective. (See table at the end of this section)

Other EU reference documents and ongoing or planned policy developments include:

- EU policy background on natural resources
- Commission Communication on Tackling the challenges in commodity markets and on raw materials[75]
- Multi-annual Financial Framework 2014-2020
- Cohesion Policy Reform
- Action Plan towards a sustainable bio-based economy by 2020
- Eco-Innovation Action Plan, 2011
- EU Horizon 2020
- Green Paper on Green Jobs
- Review of the EIA Directive

6.2.3. *Illegal Trade in Natural Resources*

The EU does not have, at present, a general policy forbidding trade in illegally extracted natural resources. This means that natural resources transiting or ending their journey in Europe may still come from illegal sources. Measures have however been taken with regard to some commodities.

Timber

The EU adopted its Forest Law Enforcement Governance and Trade (FLEGT) policy as part of its involvement in the World Summit on Sustainable Development in order to pursue its own objective of encouraging sustainable forest management, both within and outside the EU. The internal EU legal framework for this scheme is a Regulation adopted in December 2005[76], and a 2008 Implementing Regulation[77], allowing for the control of the entry of timber to the EU from countries - mainly located in

[73] Communication COM(2011)21 final, from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - A resource-efficient Europe - Flagship initiative under the Europe 2020 Strategy, Brussels, 26 January 2011

[74] Communication COM(2011) 571 final from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - Roadmap to a Resource Efficient Europe, Brussels 20 September 2011

[75] Communication COM(2011) 25 final from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - Tackling the challenges in commodity markets and on raw materials, Brussels, 2 February 2011

[76] Council Regulation (EC) N°2173/2005 of 20 December 2005 on the establishment of a FLEGT licensing scheme for imports of timber into the European Community

[77] Commission Regulation (EC) N° 1024/2008 of 17 October 2008 laying down detailed measures for the implementation of Council Regulation (EC) N° 2173/2005 on the establishment of a FLEGT licensing scheme for imports of timber into the European Community

Southeast Asia and West/Central Africa - entering into bilateral FLEGT Voluntary Partnership Agreements (VPA) with the EU.

In addition, the due diligence regulation adopted by the Council in 2010 requires timber operators who first place timber or timber products on the EU market to establish 'due diligence' systems to minimise the risk of illegal products entering the EU. This EU timber Regulation[78] was adopted on 20 October 2010 and became effective on 3 December 2010. (more)

Marine resources

The Committee on Fisheries in the European Parliament is working on a proposed resolution on the role of the EU in tackling illegal fishing at the global level[79]. In its explanatory statement the committee echoes a new report by the UN Office on Drugs and Crime[80] and stresses that the report makes a number of recommendations that deserve support by the EU:

- improve the investigative capacity into organised criminal activities at sea, including by expanding coordination among the many different law enforcement agencies involved (customs, financial crime, drug trafficking, etc.);
- improve transparency and traceability of fish to expose criminal activities and reduce their profits;
- monitor or, preferably prohibit, the sale of used fishing vessels to companies with untraceable beneficial owners, registered under flags of non-compliance;
- improve monitoring of fishing vessel activities and their interactions with merchant vessels;

In addition, the European Union envisions a series of policies for bringing sustainability in the exploitation of its marine resources, including:

- Reform of the Common Fisheries Policy
- Climate change adaptation in the coast and the sea (2012)
- Blue Growth (2013)
- Integrated Coastal Zone Management (2012)
- Maritime Spatial Planning (2012)

Materials and Minerals

EU policy initiatives on materials and minerals focus on tackling the challenges in commodity markets and on raw materials. In this context, the Commission has been holding a public consultation on a possible Innovation Partnership on raw materials. The consultation is now closed and results are being analysed.

6.2.4. *Natural Resources and Conflict*

UN-EU Partnership on Natural Resources, Conflict and Peacebuilding

The EU is part of an UN-EU Partnership on Natural Resources, Conflict and Peacebuilding. The project, partly financed by the EU's Instrument for Stability, aims to support countries improve natural resource management for conflict prevention and peacebuilding. In 2010, four Guidance Notes were produced, which are to be evaluated during phase II of the project (Pilot-testing and field training). (more)

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[78] Regulation (EU) N°995/2010 of the European Parliament and of the Council of 20 October 2010 laying down the obligations of operators who place timber and timber products on the market

[79] Draft report 2010/2210(INI) of the European Parliament of 5 May 2011 on combatting illegal fishing at the global level - the role of the EU

[80] UNODC. 2011. Transnational Organised Crime in the Fishing Industry. Available at http://www.unodc.org/documents/human-trafficking/Issue_Paper_-_TOC_in_the_Fishing_Industry.pdf (last consulted 30 November 2011)

GMES Services for Management of Operations, Situation Awareness and Intelligence for Regional Crises (G-MOSAIC)

Launched in January 2009 as a three-year project with a total budget of 15.3 million Euros, the G-MOSAIC (GMES Services for Management of Operations, Situation Awareness and Intelligence for Regional Crises) Collaborative Project aims to provide the European Union with intelligence data that can be applied to early warning and crisis prevention as well as to crisis management and rapid interventions. Part of G-MOSAIC's early warning and crisis prevention work include a better understanding of how environmental factors influence the dynamic of conflicts. It has developed two sets of services:

- Services designed to support the analysis of conflict using EO data for situation monitoring and flashpoint identification (Exploitation of natural resources, land degradation and population pressure). They provide conflict-related geo-spatial information for those countries which are either at risk of armed conflict or which are experiencing current and ongoing conflicts, utilising refined geographical and thematic information related to conflicts at sub-national level. The core information for these services is land use and land cover change.
- Services dealing with the identification and characterisation of potential illegal activities, in relation to their role in the development of conflict (illegal mining, illegal timber logging, illicit crops). (more)

Global Atlas and Information Centre for Conflict and Natural Resources

The Global Atlas & Information Centre provides comprehensive data on armed conflicts and the exploitation and degradation of natural resources. In partnership with the EEAS Foreign Policy Instrument Service (FPIS), it is funded through the Instruments of Stability and is a collaborative project with the United Nations.

The Global Atlas focuses on three regions (Central Asia, Horn of Africa, African Great Lakes) and has three main objectives:

- To gather spatially consistent data related to natural resources and armed conflicts
- To model the link between natural resources and conflicts and estimate the risk of conflict
- To share the data and results through a dedicated web platform

The Global Atlas is managed by the Global Security and Crisis Management Unit within JRC's Institute for the Protection and Security of the Citizen (IPSC)

6.3. The Role of Earth Observation

The importance of imaging and sensing for natural resource management has been recognised by the African Union which states that satellites "have also been shown to help in guiding management decisions in the sustainable exploitation of renewable resources, in protecting the environment and in guiding human assistance programmes."[81] The EU also recognises that satellites have an important role to play, both within and outside its borders. Under the Africa-EU Strategic Partnership (more), for example, it is stated that an emphasis needs to be placed on monitoring climate change, desertification and fires and water and food resources.

Satellite capabilities have to be used in a particular context which should be effectively integrated with other data sets and other means of interception. Some countries, for instance, increase the accuracy and profundity of data through a system termed Geospatial Intelligence (GeoInt). This system involves analysis of images and footage so that, for example, high resolution images are complemented by 3-D modelling in order to calculate terrain elevation and weather conditions. Data is therefore analysed by

[81] African Union Commission, AUC-EC Book of Projects: Science, Information, Society and Space, (Addis Ababa: African Union Commission, 2008), p. 242

specialists who increase the utility of imaging and footage by separate measurements of elevation, soil type, meteorological variables and gravity.[82] Such information can support:

- developing countries to develop effective enforcement regimes;
- EU Member States to build intelligence hotspots, overall compliance and effectiveness of measures currently in place;
- certification authorities to verify local management practices.

The European Space Agency has done relevant work on fisheries, timber and minerals. More recently its focus went to illicit crops and waste transportation. However, at present day, it has been more successful in monitoring the first stage of natural resources exploitation (collection, extraction), but less so for the second and third stages (transportation and processing). In other words, as we get closer to commercial exploitation the contribution of satellite EO decreases.

The systems set up to monitor illegal, unreported and unregulated (IUU) fishing activities and to ensure the enforcement of common fisheries policy rules may offer a basis for the monitoring of natural resources transportation activities.

The EU system for fisheries controls makes extensive use of modern technologies to ensure that fishing fleets are monitored and controlled in an effective way. This includes an obligatory vessel monitoring system (VMS) that relies mainly on Satellite Communications and Navigation Systems. VMS is, along with other systems, part of the monitoring, control and surveillance (MCS) defined by the Food and Agriculture Organization (FAO) of the United Nations in the context of fishery. The EU is also encouraging a wider use of Vessel Detection Systems (VDS), an earth observation technology which focuses on the detection, location and identification of vessels on satellite SAR imagery and with the objective to deliver this information in near-realtime. According to EU legislation[83], fisheries control authorities shall have a technical capacity to use VDS. This technology has already reached maturity and has proven to be useful as it is independent on daytime and weather as well as due to its non-cooperative nature. This makes it an ideal source of data to be combined with other data from e.g. cooperative ship reporting systems like the Automatic Identification System (AIS), where possibilities of spoofing or non-transmission exist.

Earth observation technologies are being expanded to other maritime-related sectors besides fisheries. Navies, coastguards etc. are also responsible for the detection of illegal activities and identification of those involved in illegal transportation of goods and people as well as the prevention of terrorism and border control.

As maritime transportation is a major vector for global trade, mapping sea routes and detecting vessels are paramount in the fight against trade in illegally extracted natural resources. To work effectively, the system has to be complemented by a solid verification mechanism and to allow civil society organisations to take part to that monitoring by having access to that imagery. In addition, satellite information must be sufficiently timely and robust to support law enforcement.

Lastly, recognising the security challenge associated with illegal natural resources exploitation, the European Space Agency has opened in October 2010 a tender targeted towards situation awareness and monitoring for:

- law enforcement (anti-drugs, illegal exploitation of natural resources, waste transport, people trafficking, arms trafficking, etc.)
- critical infrastructure protection
- intelligence for situation awareness

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[82] D. FIOTT, "Blind in a Dark Room? Europe's Space Capacities for Natural Resources Mapping", Madariaga Paper, Vol. 3, N°6, October 2010

[83] Council Regulation (EC) N°1224/2009 of 20 November 2009 establishing a Community control system for ensuring compliance with the rules of the common fisheries policy

The aims are to test new VHR systems (radar, optical, etc.), to verify end to end timeliness and information accuracy and to extend the cooperation with the security community.

Annex: Resource efficiency – the interlinks between sectors and resources, and EU policy initiatives

Resource/ sector	Fossil fuels	Materials and minerals	Water	Air	Land	Soils	Ecosystems: Biodiversity	Marine resources	Waste	EU Policy Initiatives
Circular Economy	Reduce, reuse, recycle, substitute, safeguard, value									Review of SCP (2012)
Energy	Reduce fossil fuels use via: -increased energy efficiency (20% by 2020); -substituting for renewable resources (20% by 2020).	-Ensure security of supply of critical raw materials (for renewables and electrification) -Reduce energy intensity of materials extraction, production & consumption.	-Use efficiently as renewable energy source; -Reduce cooling needs of power plants; -Reduce energy intensity of water treatment; -Reduce use of hot water via better appliances & water infrastructure.	-Reduce pollution with harmful substances, in particular via reduced use of fossil fuels -20% reduction of GHG emissions by 2020	-Reduce land take for biofuels; -Optimise energy infrastructure.	-Prevent soil damage by SO2 and NOx emissions; -Mitigate soil impacts of new infrastructure/ energy solutions; -Preserve peatlands.	-Reduce acidification via reduced fossil fuels use; -Avoid ecosystem damage from energy carriers extraction/ exploitation.	-Use as a renewable energy source; -Ensure sustainable use of algae for biofuels; -Prevent risks of oil spills & disasters	-Ensure energy recovery of non-recyclable waste; -Reduce energy intensity of waste treatment.	-Energy 2020: A strategy for competitive, sustainable and secure energy -Energy infrastructure priorities for 2020 and beyond - A Blueprint for an integrated European energy network -European Energy Efficiency Plan 2020 -Revision of the Energy Taxation Directive. -Energy infrastructure package -Energy Roadmap 2050 -Smart grids -Security of energy supply and international cooperation
Food	-Reduce fossil fuels use via-improved energy efficiency of food production; -Avoid adverse impacts from the substitution of fossil fuels with biofuels.	-Optimise use of minerals & materials (eg phosphorous); -Improve packaging for better preservation & recyclability.	-Optimize water use in agriculture; -Prevent flooding & droughts, i.e. by fighting climate change; -Ensure clean water availability for quality products; -Avoid pollution from fertilizers.	-Reduce GHG emissions; -Reduce SO2 & NOx emissions.	-Optimise land use to reconcile with other uses; -Use taken fertile land for agriculture; -Reduce land take (e.g. via optimal animal protein intake)	- Reverse soil loss; -Restore organic matter content in soils; -Prevent soil damage by SO2 and NOx emissions.	-Restore and preserve ecosystems to ensure pollination, water retention, etc.; -Avoid eutrophication from fertilizers.	-Restore fish stocks and eliminate by-catch; -Eliminate destructive fishing techniques; -Develop sustainable aquaculture; -Reduce pollution of coastal areas from fertilizers.	-Reduce food waste, e.g. via better labelling; -Use recyclable/ biodegradable packaging; -develop composting of biowaste.	-CAP Reform (2011) -Proposal for an Innovation. partnership on agricultural productivity and sustainability (2011) -Green Paper on phosphorous (2012) -Communication on sustainable food (2013)
Buildings	-Reduce fossil fuels use via better energy efficiency of buildings; -Build zero energy buildings; refurbish the existing stock.	-Optimise material use; -Use sustainable materials.	-Improve water efficiency of buildings and appliances	-Reduce GHG emissions from buildings; -Improve indoor air quality;	-Avoid additional land take (e.g. for urban sprawl); -Remediate contaminated sites.	-Avoid urban sprawl on fertile soil; - Minimize soil sealing	-Ensure sufficient and connected green spaces.	-Reduce impacts from acidification resulting from GHG emissions.	-Recycle construction and demolition waste (70% till 2020).	-Strategy for the sustainable competitiveness of the EU construction sector -Communication on sustainable buildings (2013) -Initiative on water efficiency in buildings (2012)
Mobility	-Reduce dependency on fossil fuels via electrification (i.a. for all cars in cities by 2050), improved multimodal logistics, better transport networks; more efficient vehicles.	-Optimise logistics of materials transportation; -Ensure security of supply of critical materials (needed for batteries).	-Use the potential of water transport to reduce emissions; -Reduce pollution from water transport.	-Reduce pollution from transport: 60% less GHG by 2050; less ground-level ozone, particulate matter, NO2; less sulphur content in marine fuels.	-Avoid land fragmentation from transport infrastructure	-Reduce land sealing from transport infrastructure	-Minimise impacts of land sealing, fragmentation, pollution; -Avoid invasive alien species spread.	-Use the potential of maritime transport to reduce emissions; -Avoid marine litter from ships	-Ensure efficient reuse and recycling of end-of life vehicles (85-95% by 2015) and ships.	-White Paper on the future of transport -Revision of TEN-T -Strategic Transport Technology Plan
EU policy initiatives	State Aid framework; Fuel quality directive; etc.	-Tackling the challenges in commodity markets and on raw materials -Proposal for an Innovation Partnership on raw materials	-Blueprint on water (2012) -Innovation partnership on water efficiency -Revision of the EQS Directive (priority substances) (2011) -Revision of the Ground Water Directive (2012)	-Low Carbon economy 2050 roadmap -Revision of the legislation on monitoring and reporting of GHG -Review. of EU air quality policy (2013)	-Communication on land use (2014)	-Guidelines on best practice to limit, mitigate or compensate soil sealing	-2020 EU biodiversity strategy -Communication on Green Infrastructure and Restoration (2012) -No Net Loss Initiative (2015)	-CFP Reform -Climate Change adaptation in the coast and the sea (2012) -Blue Growth (2013) -Integrated Coastal Zone Management (2012) -Maritime Spatial Planning (2012)	-Review of prevention, reuse, recycling and landfill of waste targets (2014)	-Roadmap to a resource efficient Europe -Multiannual Financial Framework 2014-2020 -Cohesion Policy Reform -Action Plan towards a sustainable bio-based economy by 2020 -Eco-Innovation Action Plan, 2011 -EU Horizon 2020 -Green Paper on Green Jobs -Review of EIA Directive

7. Agriculture & Food

The World Food Summit of 1996 defined food security as existing "when all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life". Commonly, the concept of food security is defined as including both physical and economic access to food that meets people's dietary needs as well as their food preferences. In many countries, health problems related to dietary excess are an ever increasing threat, In fact, malnutrition and food borne diarrhoea are become double burden.

Food security is built on three pillars[84]:

- Food availability: sufficient quantities of food available on a consistent basis;
- Food access: having sufficient resources to obtain appropriate foods for a nutritious diet;
- Food use: appropriate use based on knowledge of basic nutrition and care, as well as adequate water and sanitation.

The radical improvements in agricultural productivity over the last few decades and the fact that food production is sufficient to feed everyone on earth. However, the dramatic drought in the Horn of Africa that has already killed thousands of people and affected 13 million people shows that access to food remains an issue for a lot of human beings.

On the basis of today's knowledge, it is polemic to affirm that the Horn of Africa drought might be caused by changing climate patterns. However, climate impacts on food production has had plenty of instances in the past and are likely to worsen in the near future as a result of climate change. Indeed, unprecedented swings in rainfall and temperature patterns have caused a shift in planting seasons and in the types of crops that can be successfully grown. Ruined harvests and diminishing yields have contributed to higher food prices and food insecurity.

Dealing with the effects of climate change on food security must become a priority in climate adaptation plans. This includes enhancing agricultural productivity to make them more resilient and stabilise harvest yields. However, many poor countries, in Africa and elsewhere, do not yet have adequate institutional, financial and human resources to deal with the problem.[85]

7.1. International Action

7.1.1. *Special Programme for Food Security - FAO*

The aim of the SPFS is to improve food security within poor households through National Programmes for Food Security (NPFS) and Regional Programmes for Food Security (RPFS). All programmes are developed by the governments that participate. FAO acts as a catalyst and facilitator, its main role is to help countries identify, formulate and implement national and regional food security programmes, drawing on FAO's corporate capacities and engaging other partners and donors.

In discussions about poverty, agriculture is often overlooked, despite its central role as the economic and social backbone of most poor countries and the fact that over 70% of the world's poor live in rural areas. FAO raises awareness amongst donors and other key decision-makers on issues related to agriculture, food and nutrition.

7.1.2. *World Food Programme*

[84] See: http://www.who.int/trade/glossary/story028/en/ (last consulted 10 November 2011)

[85] Africa, Climate Change, Environment and Security Dialogue Process, Programme Outline 2011-2014, May 2011, http://www.envirosecurity.org/acces/docs/ACCES_Programme_Outline.pdf

WFP is part of the United Nations system and is voluntarily funded.

Born in 1962, WFP pursues a vision of the world in which every man, woman and child has access at all times to the food needed for an active and healthy life. It works towards that vision with the sister UN agencies in Rome -- the Food and Agriculture Organization (FAO) and the International Fund for Agricultural Development - as well as other government, UN and NGO partners.

7.1.3. UN System Network on Rural Development and Food Security - RDFS

The UN System Network on Rural Development and Food Security is a global partnership approach towards tackling rural development challenges at the country level.

Established in 1997 by the UN Administrative Committee on Coordination (today UN System Chief Executives Board for Coordination), it brings together key actors for the achievement of the shared goals of "food for all" and rural poverty reduction.

Comprising 20 UN organisations, the UN System Network is an inter-agency mechanism for follow-up to the World Food Summit (1996) and World Food Summit: five years later (2002) and supports the International Land Coalition. The Network Secretariat is managed by FAO, in close collaboration with IFAD and WFP.

7.1.4. World Bank – Food Crisis

In response to the severity of the food crisis and the need for prompt action, the World Bank Group set up the Global Food Crisis Response Program (GFRP) in May 2008 to provide immediate relief to countries hard hit by food high prices. The Bank response has been articulated in coordination with the United Nations' High-Level Task Force (HLTF) on food security. Through its response, the Bank is supporting the implementation of the joint Comprehensive Framework for Action (CFA).

7.1.5. World Health Organisation - WHO

Unsafe food causes many acute and life-long diseases, ranging from diarrhoeal diseases to various forms of cancer. WHO estimates that food-borne and waterborne diarrhoeal diseases taken together kill about 2.2 million people annually, 1.9 million of them are children.

Food-borne diseases and threats to food safety constitute a growing public health problem and WHO's mission is to assist Member States to strengthen their programmes for improving the safety of food all the way from production to final consumption.[86]

7.1.6. African Union

Many countries in Africa are adopting specific initiatives to promote resilient farming systems and increase food security. For example, communities in Zimbabwe and Ethiopia are using traditional knowledge to cope with climate change. The African Union (AU) has launched the Comprehensive Africa Agriculture Development Program (CAADP) to bring about a sustainable increase in food and agricultural productivity. Regional Economic Communities have also developed food security programs.

Many countries have adopted the AU declaration of investing 10% of the national budget in agriculture and rural development. They have also signed the CAADP Compact, and formulated National Adaptation Programs of Action (NAPA). Nevertheless, more must be done to avert the potentially disastrous consequences of climate change. The participants at the ACCES Forum in Addis Ababa thus agreed that high priority should be given to addressing the impact of climate change on food security.[87]

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[86] See: http://www.who.int/foodsafety/en/ (last consulted 10 November 2011)

[87] See: Africa, Climate Change, Environment and Security Dialogue Process, Programme Outline 2011-2014, May 2011, http://www.envirosecurity.org/acces/docs/ACCES_Programme_Outline.pdf

7.2. EU Action

7.2.1. *Adaptation to climate change*

EP resolution on EU agriculture and climate change[88] recommends measures to help EU agriculture adapt to the effects of global warming. The resolution states that the EU must develop a coherent strategy for agriculture to adapt to the two kinds of adverse climatic effects anticipated:

- overall global warming, and
- more marked variations in climate conditions resulting in an increase in extreme weather events.

It states that CAP and its reform must focus on the management of resources including optimising water resource management, choosing crop varieties, particularly those selected for their ability to resist extreme weather events, and protecting the soil from water and wind erosion by ensuring organic matter content.

7.2.2. *Food Security*

Reducing by half the number of people suffering from hunger by 2015 is a priority for the EU and the International community enshrined in the first Millenium Development Goal. Over 900 million people are estimated to be malnourished - most of them in Sub-Saharan Africa and in South Asia. Even if food prices eased in the second half of 2008, they are still very high and subject to volatility in some developing countries, affecting access to food for low income population groups.

The Food Security Thematic Programme (FSTP) aims to improve food security in favour of the poorest and the most vulnerable under a medium and long term perspective and to lead to sustainable solutions. Based on Article 15 of the EU Regulation establishing the Development Co-operation Instrument (DCI), it addresses food security at global, continental and regional levels, complements the geographical programmes and comes to the fore where geographical instruments cannot fully operate.

On 31 March 2010, the European Commission adopted a new Communication on food security[89] which constitute the basis for a common framework for action for the EU and its Member States.

The communication proposes to adopt a comprehensive approach that addresses food security challenges in developing countries in both rural and urban contexts across the internationally recognised four pillars[90] by: (i) increasing availability of food; (ii) improving access to food; (iii) improving nutritional adequacy of food intake; and (iv) enhancing crisis prevention and management.

On the latter point, the Commission stresses that "national or regional early warning systems capable of predicting imminent disasters need to be strengthened or developed where they do not exist, and better linked to decision making and response organisations. Linking weather data with nutritional information, crops and animal disease outbreaks and market prices, the systems need to draw their data from all levels, including community-level. The EU and its Member States should support decision-linked monitoring and information systems, including through the work of the Commission."

In its draft report on "an EU policy framework to assist developing countries in addressing food security challenges"[91], the Committee on Development proposes a series of measures, including:

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[88] Resolution 2009/2157(INI) of the European Parliament of 5 May 2010 on EU agriculture and climate change

[89] Communication COM(2010) 127 final from the Commission to the Council and the European Parliament - An EU policy framework to assist developing countries in addressing food security challenges, Brussels, 31 March 2010

[90] Food and Agriculture Organisation (FAO). 1996. Rome Declaration on World Food Security and World Food Summit Plan of Action

[91] Draft report 2010/2100(INI) of the European Parliament of 11 May 2011 on an EU policy framework to assist developing countries in addressing food security challenges, Committee on Development

- an EU policy framework on food and nutrition security through a human rights-based approach to sustainable smallholder agriculture;
- effective measures against food price volatility and uncontrolled land acquisition by limiting speculation in food and agricultural commodity markets;
- policy coherence for development: an analysis of the impact of EU policies on global food security.

7.3. The Role of Earth Observation

Land use/cover and agricultural monitoring are among the first applications in Satellite EO since the start of the first Landsat Satellite in the early 1970s. This civil system was basically introduced to monitor the worlds cereals production. Obviously three factors made it a success over the decades:

- The long term undisrupted availability of the systems data, which enabled change detection and monitoring
- Well adapted applications and a ever growing user community
- Finally, the robust results of the applications which are well understood by the users.

After introducing the first European / French SPOT satellites EO data was used to help change the European Communities agricultural policies in the late 1980s early 1990s triggered by the Joint Research Centre (JRC) in Ispra.

JRC contributed largely to the development and operational introduction of two monitoring tasks contributing then and now to important policy lines of the EC:

- One is the internal EU agricultural subsidies control using EO since the early 1990s assisting in monitoring and controlling the agricultural expenditures to control crop production within the Union's food market and its prices. Since the 2003/2005 reform of the agricultural policies the focus of the EU CAP (common agricultural policies) changed to emphasis the environmental animal and consumer protection side in the agricultural context (the original MARS project named Monitoring Agriculture with Remote Sensing is now called GeoCAP).
- The second focus emphasises on production monitoring inside the EU with AGRI4Cast action and outside the Union by FOODSEC action. The later contributing to the external actions of the European Community having a strong thematic relation to Climate Change and Food Security in poorer countries. It is linked to the frame of GMES and the MDGs and has a strong focus on Africa.

The use of EO always depends on elaborated crop growth and agro-meteorological models assimilating EO data, in situ data and a sound knowledge of the main crop's growth models in different climatic areas. Thereto basic information of soils and climate are generated also using EO data.

FAO elaborated a number of methodologies, which often can be based on a range of optical EO data, for areas lacking detailed national or regional soil surveys delivering cost effective and reliable information.

Reliability and frequency of the information on food production respectively yield monitoring and prediction depends on fast available EO data. Continuity and reliability of the data access are key to this information. Further on the users and decision makers not only within the EU but also in the countries affected by food shortages must understand the information provided and draw the correct conclusions.

Therefore not only the number of sensors, enhancement of spatial resolution for more detailed results and the financial and technical enabling of such services and products is important. The capacity

building on all levels of stakeholders within and outside the EU to generate a large user bases making sound decisions based on the available information is key to the success of these activities.[92]

Earth observation can provide the necessary data to forecast evolutions in weather patterns and its impacts on crop yields. Any sustainable agricultural policy should therefore use satellite systems to identify in advance weather changes that can impact food production and establish the conditions ensuring access to food to the most vulnerable communities.

Indeed, forecasting is only useful if followed by appropriate adaptation policies. Looking at the current Horn of Africa drought, it has been shown that forecasters were warning about it months before with the issuing in August 2010 of a brief on food security in East Africa by the Famine Early Warning Systems Network (FEWS NET). Forecasters consider that communication problems between scientists and decision-makers explain why the alerts went largely unheeded.

[92] A. SCHÄRTEL, GAF AG

8. Water

"For billions of people worldwide, access to safe drinking water and improved sanitation is still a matter of life and death," according to a recent statement by Andris Piebalgs, EU Commissioner for Development. He added that last year the EU presented its MDG Initiative that aims to "provide an extra €1 billion for African, Caribbean and Pacific countries and has a focus on those MDGs that are most off-track, including water and sanitation" adding that "The management of water resources affects all sectors that are important for inclusive growth and sustainable development, such as energy generation, agriculture, food security, and the environment. We will therefore prioritise sustainable water management in our future development policy".[93]

Global consumption of water is doubling every 20 years, more than twice the rate of human population growth. According to the United Nations, more than one billion people, or about one-sixth of the world's population, lack access to fresh drinking water. Of these one billion, the vast majority is living in developing nations. If current trends persist, by 2025 the demand for fresh water is expected to rise by 56 percent more than the amount of water that is currently available.

Although water is one of the most common resources on the planet, only 2.5% of it can actually be consumed, and the rest is salt water. Of that 2.5%, two-thirds is confined to glaciers and permanent snow cover. Only a fraction of the world's water is liquid freshwater, and it is being diverted, depleted, and polluted so fast that, by the year 2025, two-thirds of the world's population are expected to be living in a state of serious water deprivation.[94] This problem is magnified by highly inefficient water use (principally for irrigated agriculture) in most countries.

There are reports that "Multinational corporations recognise these trends and are trying to monopolise water supplies around the world." Consequently many cases of the prices of water for citizens being increased dramatically are being reported.[95]

Trying to understand whether water scarcity may lead to conflict, a team led by Professor Aaron Wolf from the Department of Geoscience at Oregon State University, has looked at the dynamics behind water conflict. What they found out was that there is a relationship between change in a water basin and the institutional capacity to absorb that change. These changes can be hydrologic (floods, drought, agricultural production growing) or institutional (disintegration of countries, emergence of new nations). River basins are variable and treaties can deal with variability. However, climate change is going to increase variability and, with it, risks of conflicts in areas where treaties lack. This is the case in the Himalayan basins, where a billion and a half people rely on the waters that originate in the Himalayas, and where no treaty coverage exists to deal with that variability.

8.1. International Action

8.1.1. Millennium Development Goals (MDGs)

According to the MDGs, the proportion of people without sustainable access to safe drinking water should be halved by 2015, starting from a reference point of 23% in 1990. The world is currently on track to achieve and even exceed this, having reached 13% in 2008. But nearly 900 million people still do not

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[93] A. PIELBAGS, EU Commissioner for Development, EU / EWI Press Release: "World Water Day: Commission launches €40 million to improve access to water in Africa, Caribbean and Pacific" , 22 March, 2011, see: http://www.euwi.net/news/world-water-day-commission-launches-%E2%82%AC40-million-improve-access-water-africa-caribbean-and-pacific (last consulted 10 November 2011)

[94] M. BARLOW, National Chairperson of the Council of Canadians / Director, International Forum on Globalization, "World Bank and Multinational Corporations Seek to Privatize Water: The Global Water Crisis and the Commodification of the World's Water Supply", 2000, see: http://www.freshwater.net (last consulted 10 November 2011)

[95] M. BARLOW, *Ibid*.

have access to safe drinking water. 330 million of these live in sub-Saharan Africa. (The MDGs also state that the number of people without access to sanitation should be halved. The world is off track on this).

8.1.2. World Bank Water Strategy and Policies

The World Bank is one of the leading international organisations dealing with world water issues. It has a number of effective programmes in place. However, the Bank also supports many privatisation policies which may consider to run counter to the idea of a transparent, public control over water resources.

8.1.3. Global Water Partnership

The Global Water Partnership was founded in 1996 by the World Bank, the United Nations Development Programme (UNDP), and the Swedish International Development Agency (SIDA) to foster integrated water resource management (IWRM), and to ensure the coordinated development and management of water, land, and related resources by maximising economic and social welfare without compromising the sustainability of vital environmental systems.

It is based on a network of Regional Partnerships in the Caribbean, Central Africa, Central America, Central and Eastern Europe, Central Asia and Caucasus, China, Eastern Africa, Mediterranean, South America, South Asia, Southeast Asia, Southern Africa and West Africa. It currently comprises 13 Regional Water Partnerships and 73 Country Water Partnerships, and includes 2,069 Partners located in 149 countries.

8.1.4. UNDP Water and Oceans Governance Programme

Water plays a pivotal role for sustainable development, including poverty reduction. The use and abuse of and competition for increasingly precious water resources have intensified dramatically over the past decades, reaching a point where water shortages, water quality degradation and aquatic ecosystem destruction are seriously affecting prospects for economic and social development, political stability, as well as ecosystem integrity. Water Governance refers to the range of political, social, economic, and administrative systems that are in place to develop and manage water resources and the delivery of water services at different levels of society (See Water and Oceans Governance Programme).

UNDP assists countries to achieve equitable allocation, develop capacities and implement integrated approaches to water resources management through adaptive water governance to reduce poverty and vulnerability, sustain and enhance livelihoods and protect environmental resources.

8.1.5. UN Water

UN-Water strengthens coordination and coherence among UN entities dealing with issues related to all aspects of freshwater and sanitation. This includes surface and groundwater resources, the interface between freshwater and seawater and water-related disasters.

8.1.6. Global Annual Assessment of Sanitation and Drinking - Water - GLAAS

UN-Water GLAAS is an initiative implemented by the World Health Organization (WHO). The objective is to provide policy-makers at all levels with a reliable, easily accessible, comprehensive and global analysis of the evidence to make informed decisions in sanitation and drinking-water.

8.1.7. Convention to Combat Desertification in Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa (UNCCD)

The UNCCD was adopted (in Paris on 17 June 1994) to combat desertification and mitigate the effects of drought in countries experiencing serious drought and/or desertification, particularly in Africa, through effective action at all levels, supported by international co-operation and partnership arrangements, in

the framework of an integrated approach which is consistent with Agenda 21, with a view to contributing to the achievement of sustainable development in affected areas.

8.2. EU Action

EU considers the protection of water resources and of fresh water ecosystems as one of the main cornerstones of environmental protection in Europe. The EU tries to develop concerted actions to ensure an effective protection.

In addition to being a party to the UNCCD, the European Community is also a Party to the following other water related MEAs:

- Helsinki Convention on Watercourses and International Lakes (1992)
- River basin conventions (Danube (1987), Elbe (1990), Oder (1996), Rhine (1999))
- Barcelona Convention (1976) as amended and its protocols
- OSPAR Convention(1992) as amended
- Bonn Agreement (1983)
- Helsinki Convention on the Baltic Sea (1992)

8.2.1. The EU Water Framework Directive

Water resources frequently span geopolitical boundaries. Truly sustainable use and protection of resources thus often requires international and regional co-operation. The key EU legislation on water, the Water Framework Directive[96], establishes a broad management approach based on EU river basins.

The directive promotes the general protection of the aquatic ecology, specific protection of unique and valuable habitats, protection of drinking water resources, and protection of bathing water. The directive makes a distinction between surface water (ecological protection, chemical protection and other uses) and groundwater (chemical status, quantitative status). In addition, it aims to coordinate the application of other water-related directives (Urban Waste Water Treatment Directive, Nitrates Directive, Integrated Pollution Prevention and Control Directive,...) through a combined approach.

All the elements of this analysis must be set out in a plan for the river basin. The plan sets out how the objectives set for the river basin are to be reached within the timescale required.

8.2.2. The EU Water Initiative

Millions die each year from diseases related to unsafe water, or for lack of access to water. Millions more are forced to waste whole days of work or school just to fetch water from remote locations. And the numbers of those forced to emigrate by drought and climate change climb every year. To respond to the need for increased focus on water in development policies, the EU launched the EU Water Initiative (EUWI) in 2002. It is a political initiative that seeks to assist partner countries in the development and implementation of policies and strategies for the water and sanitation sector. In that framework, the EU and the ACP countries launched the ACP-EU Water Facility in 2004 with €700 million devoted to projects for the period 2005-2013.

During World Water Day, on 22 March 2011, EU Commissioner for Development Andris Piebalgs announced the launch of a pooling mechanism of €40 million in the framework of the ACP-EU Water Facility. This mechanism has been created to blend grants from the European Development Fund (EDF) with loans from the EU multilateral and bilateral finance institutions to finance projects for access to water and sanitation services in African, Caribbean and Pacific (ACP) countries. This financial instrument should increase the leverage effect of the financial aid and will trigger private sector participation. It

[96] Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy

also aims at contributing to EU support to Developing countries' efforts to reach the MDG for drinking water and sanitation.

8.2.3. *Adaptation to Climate Change*

In April 2009 the European Commission presented a White Paper on adapting to climate change which presents the framework for adaptation measures and policies to reduce the European Union's vulnerability to the impacts of climate change.

The White Paper highlights the need "to promote strategies which increase the resilience to climate change of health, property and the productive functions of land, inter alia by improving the management of water resources and ecosystems."

The accompanying Impact assessment[97] and the Policy paper on Water, Coasts and Marine issues provide an in-depth analysis of the role of water and ecosystems in the transmission of potential climate change impacts to the economy and society. The IA also describes the potential for ecosystem-based adaptation approaches and the need to properly assess the environmental impact of adaptation measures and policies.

As part of the actions included in the White Paper, Water Directors of EU Member States adopted in December 2009 a Guidance document on adaptation to climate change in water management to ensure that the River Basin Management Plans (RBMP) are climate-proofed.

As a next step, the Commission will present by 2012 a 'Blueprint to Safeguard European Waters', which, together with the analysis of all plans for 110 river basin districts, will perform a review of the Strategy for Water Scarcity and Droughts and of the vulnerability of water and environmental resources to climate change and man-made pressures.

- It will be based on an assessment of vulnerability of water resources and of adaptation measures at EU level, performed using a combination of quantitative modelling and stakeholder discussions. (Study financed by DG Environment)
- Particular attention will be paid to the role of policies and measures to boost ecosystem storage capacity for water in Europe.
- It will include recommendations for ensuring that climate change is taken into account in the implementation of the Floods Directive.
- It will assess the need for further measures to enhance water efficiency in agriculture, households and buildings.

Successful adaptation to the impacts of climate change on water depends not just on effective national and European water regulations, but also on the extent to which water management can be integrated into other sectoral policies such as agriculture, energy, cohesion and health.

Adaptation is being taken into account in the review or implementation of other relevant environmental policies, in particular biodiversity, coastal and marine environment.

8.3. The Role of Earth Observation

According to a recent UNESCO study, "Earth Observation data, when used jointly with in situ data, can provide an essential contribution for the creation of inventories of surface water resources, the extraction of thematic maps relevant for hydrogeological studies and models (land cover, surface geology, lineaments, geomorphology,...) or for the retrieval of (bio)geophysical parameters (water

[97] Commission staff working document SEC(2009) 0387 final accompanying the White paper - Adapting to climate change: towards a European framework for action - Impact assessment, Brussels, 1 April 2009

quality and temperature, soil moisture,...)."[98] For instance, studies led in the US allowed the measurement of water clarity and quality in Minnesota Lakes and Rivers using remote-sensing.[99] These techniques can be used to monitor the clarity of both freshwater systems and the marine environment and are already commonly used to detect pollutions such as the one that affected the Gulf of Mexico following the Deepwater Horizon industrial catastrophe.

On a political level, Earth Observation appears as an essential tool in the management of internationally shared water resources and aquifers, allowing the development of basin-wide approaches and facilitating international cooperation on water resources. Indeed, "Earth Observation's simultaneous area wide and transboundary coverage provides a uniform spatial information layer to correlate or extrapolate isolated field data. It thus can be a cost efficient and objective mapping and monitoring instrument."[100]

The report however mentions two main caveats:

- EO is not a stand alone tool but requires ground truthing and needs to be integrated and assimilated by means of geographical information systems (GIS), data modelling and decision support systems with other available information and data like well information or geological maps.
- Additionally and in the context of groundwater management, the report notes that EO is confined to the land surface: optical remote sensing sensors measure the reflectance of surface features, radar and thermal sensors allow only to detect and to identify features at or very close to the surface. For application to groundwater management, Earth Observation can usually work only indirectly by means of proxy information or secondary effects.

A team of scientists from Stanford led by Jessica Reeves may have found a way to cheaply and effectively monitor aquifer levels in agricultural regions. To do so, they use data from satellites that are already in orbit. The scientists used interferometric synthetic aperture radar, known as InSAR, to calculate the variation of ground elevation on uncultivated patches of land and managed to extrapolate the level of groundwater.

"Hydrologists and regulatory bodies looking for more data to better understand their groundwater system could one day set policies requiring farmers to leave a patch of land clear for InSAR data collection", Reeves said. Furthermore, the technique could be used in agricultural regions anywhere in the world, even those that lack modern infrastructure such as wells.[101]

Earth Observation is also used in raising awareness on the need to save water. The World Bank Save the Rain initiative allows web users to calculate the value of capturing and saving rainfall on rooftops anywhere in the world. The programme enables users to be aware of the amount of rainfall that can be harvested in one year and how many kilograms of different crops could be grown from the captured water.

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[98] "Application of satellite remote sensing to support water resources management in Africa: Results from the TIGER Initiative", IHP-VII, Technical Documents in Hydrology, N°85, UNESCO, Paris, 2010

[99] P. L. BREZONIK, L. G. OLMANSON, M. E. BAUER, and S. M. KLOIBER, "Measuring Water Clarity and Quality in Minnesota Lakes and Rivers: A Census-Based Approach Using Remote-Sensing Techniques", CURA Reporter, Summer 2007, see: http://water.umn.edu/Documents/Brezonik_et_al-Measuring_Water_Clarity.pdf (last consulted 15 November 2011)

[100] UNESCO, *Ibid.*

[101] S. YOUNG, "Satellite data provide a new way to monitor groundwater aquifers in agricultural regions", Stanford Report, December 13, 2010, see: http://news.stanford.edu/news/2010/december/agu-water-imaging-121310.html (last consulted 15 November 2011)

9. Hazards and Disasters

Every year millions of people are affected by droughts, floods, landslides, cyclones, earthquakes, tsunamis, wild land fires, and other hazards and disasters. Increased population densities, growing mega-cities, environmental degradation, and climate change adding to poverty, make the impact of natural hazards worse. In the past few years, natural disasters have struck with significant impact in all parts of the world, from the Indian Ocean tsunami to earthquakes in Iran and South Asia, from cyclones in Burma, the Caribbean and the Pacific to heavy flooding, mudflows and landslides in several parts of Asia and Latin America. Hundreds of thousands of people lose their lives and millions their livelihood, due to disasters caused by natural hazards. Billions worth of homes, livestock and investments are destroyed every year in such crises. By 2015 there could be an average of over 375 million people affected by climate-related disasters each year.

An estimated 97% of natural disaster-related deaths occur in developing countries and these countries bear the heaviest the burden in terms of livelihoods lost. In addition, it is often the poorest communities that suffer the most as they tend to live in greater density in badly-built housing on land at risk. They possess limited resources to deal with the risks they face. Most hazards are sudden-onset events and take people by surprise. Although it is impossible to prevent hazards, the impact of the disasters can be limited through the preparedness of the populations and investing in effective response-mechanisms at local, regional and national level.

While the number of major natural disasters in the world increased from 100 to more than 400 per year, from 1975 to 2005, it is Africa that has experienced the fastest rate of increase in the incidence of natural disasters over the last three decades, and a threefold increase in such disasters has been experienced in the last decade alone.[102] Whereas people in developed countries suffer mostly economic damages that are often insured, those in developing countries do suffer proportionally greater losses when measured as a percentage of GDP. Economic loss to disasters in Africa, estimated at US$ 10 billion, is low compared to other world regions, but is high as a proportion of Africa's GDP. In addition developing countries, such as those in Africa, tend to suffer higher levels of mortality than their developed country counterparts – itself a threat to human security and economic development.[103]

The main hazards that affect the continent are climatological and hydrological in nature. On average, these hazards affect 12.5 million people each year with drought causing the highest human and socio-economic effects. In Sub-Saharan Africa, drought and floods account for 80% of loss of life and 70% of economic losses linked to natural hazards. Other hazards to which the continent is exposed include tropical cyclones and strong winds, storm surges, extreme temperatures, forest fires, sand or dust storms, and landslides. In 2008 there were 96 disasters recorded and they included 44 floods and 9 droughts that affected 16.3 million people and incurred economic losses estimated at some US$ 1 billion.

Regarding natural disasters and conflict a 2007 report from the Worldwatch Institute stated that "When disasters occur in conflict zones, the devastation is compounded. If aid is not distributed fairly among disaster and conflict survivors, new rifts can emerge. Relief groups must be prepared to tread a fine line as they work alongside armed militaries and rebel factions. But there can be an unexpected silver lining: although disasters harm people and communities in conflict areas, the cooperation and goodwill following these events may jolt the political landscape, bringing renewed opportunities for peace. Relief and reconstruction efforts can build trust among combatants, ultimately even bringing conflicts to an end." The 2007 report examines three unique situations in conflict-affected areas following disasters, focusing on Indonesia's Aceh province and Sri Lanka, both affected by the 2004 tsunami, and on the long-contested region of Kashmir, devastated by the 2005 earthquake. The experiences of these

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[102] On this particular question, the work done by the Louvain Centre for Research on the Epidemiology of Disasters (CRED) and its Emergency Events Database EM-DAT are a useful source of information (http://www.emdat.be)

[103] J. CLOVER, UNEP, Nairobi, in "Africa, Climate Change, Environment and Security Dialogue Process, Programme Outline 2011-2014, May 2011, see: http://www.envirosecurity.org/acces/docs/ACCES_Programme_Outline.pdf (last consulted 11 November 2011)

regions yield important lessons that clarify the connections between disasters, conflict, development and peacemaking.[104]

9.1. International Action

9.1.1. *UN Platform for Space-based Information for Disaster Management and Emergency Response (UN-SPIDER)*

In its resolution 61/110 of 14 December 2006 the United Nations General Assembly agreed to establish UN-SPIDER to "ensure that all countries and international and regional organisations have access to and develop the capacity to use all types of space-based information to support the full disaster management cycle."

UN-SPIDER insists on the need to ensure access to and use of space-based systems during all phases of the disaster, including the risk reduction phase. The programme aims to achieve this by focusing on being a gateway to space information for disaster management support, by serving as a bridge to connect the disaster management and space communities and by being a facilitator of capacity-building and institutional strengthening, in particular for developing countries.

9.1.2. *Disasters and Conflicts Programme (UNEP)*

UNEP's Disasters and Conflicts Programme is coordinated by the Post-Conflict and Disaster Management Branch and is designed to provide four core services to Member States:

- Post-crisis environmental assessments
- Post-crisis environmental recovery
- Environmental cooperation for peacebuilding
- Disaster risk reduction

Additionally, as the focal point for environment within the humanitarian coordination system, UNEP formally established a programme in Humanitarian Action and Early Recovery in 2009 to mainstream environmental issues within humanitarian and early recovery operations in order to minimise possible environmental impacts and ensure they do no harm with regard to longer-term vulnerability and development.

The Disasters and Conflicts programme is delivered through several key actors within UNEP:

- The Post-Conflict and Disaster Management Branch has responded to crisis situations in more than 25 countries since 1999, delivering environmental expertise to national governments and UN partners.
- The Environment and Security Initiative (ENVSEC) is a partnership whose members include UNEP, UNDP, OSCE, UNECE, REC and NATO that provides assessments of environment and security risks, capacity-building and institutional development to strengthen regional cooperation, and the integration of environmental and security concerns and priorities into international and national policy-making. Regions where ENVSEC implements its projects are Central Asia, the South Caucasus, and Eastern and South-Eastern Europe. (more)
- The Joint UNEP/OCHA Environment Unit mobilises and coordinates the international emergency response to acute environmental risks caused by conflicts, natural disasters and industrial accidents.

9.1.3. *International Strategy for Disaster Reduction (UNISDR)*

[104] Z. CHAFE, L. MASTNY, M. RENNER, editor, "Beyond Disasters: Creating Opportunities for Peace", Worldwatch Institute, Washington, D.C., 2007

The International Strategy for Disaster Reduction (ISDR) is part of the United Nations Secretariat to serve as the focal point in the UN System for the coordination of disaster reduction and to ensure synergies among disaster reduction activities. It aims at building disaster resilient communities by promoting increased awareness of the importance of disaster reduction as an integral component of sustainable development, with the goal of reducing human, social, economic and environmental losses due to natural hazards and related technological and environmental disasters.

UNISDR leads the preparation and follow-up to the Global Platform for Disaster Risk Reduction, established in 2006 (GA resolution 61/198). The Global Platform has become the main global forum for disaster risk reduction and for the provision of strategic and coherent guidance for the implementation of the Hyogo Framework and to share experience among stakeholders.

9.1.4. *The Hyogo Framework for Action 2005-2015*

The Hyogo Framework for Action (HFA) is a 10-year plan to make the world safer from natural hazards. It was adopted by 168 Member States of the United Nations in 2005 at the World Disaster Reduction Conference which took place after the devastating Indian Ocean Tsunami. The HFA outlines five priorities for action, and offers guiding principles and practical means for achieving disaster resilience. It's goal is to substantially reduce disaster losses by 2015 by building the resilience of nations and communities to disasters.

On 2 September 2011, a special session on DRR was launched during the 29th Greater Horn of Africa Climate Outlook Forum in Entebbe (Uganda) with the aim to initiate a paradigm shift when addressing climate change and risks for sustainable development in the Region. "Despite accurate climate forecasting and early warning, drought in East Africa is having unacceptable impacts in too many countries. Therefore, it is an appropriate time to move from a 'fire brigade approach' to one based upon proactive risk reduction for sustainable development", said Youcef Ait Chellouche, Deputy Regional Coordinator for UNISDR's regional office for Africa.

9.2. EU Action

The European Union and its Member States are among the world's main humanitarian aid donors; the Humanitarian Aid department (ECHO) is the service of the European Commission responsible for this activity.

In the wake of the Asian tsunami, two studies were commissioned on EU disaster and crisis response, and on the setting up of a European Civil Protection Force. The Commission also tabled a number of proposals (notably in the field of consular protection) and undertook a review of its internal coordination mechanisms. It then set up a task force to enable the delivery of the most effective response to emergencies, crises and disasters both inside and outside the Union. This work culminated in the adoption of a communication on reinforcing EU disaster and crisis response.

More generally, through DG ECHO, the Commission aims to provide emergency assistance and relief to the victims of natural disasters or armed conflict outside the European Union. To this end, DG ECHO prepares a yearly Strategy document and defines a number of sectoral policies, including on cash, children, civil protection, civil-military relations, gender, health, protection and water & sanitation.

9.2.1. *GMES Services and Applications for Emergency Response (GMES- SAFER)*

GMES-SAFER is the EU-funded project responsible for the development of the pre-operational GMES emergency management service.

It started on 1 January 2009 for a period of 36 months to implement and validate the pre-operational versions of the GMES Emergency Response Service. In first priority, the project concentrates on rapid mapping during the response phase, with a response time objective of six hours after the emergency situation for the provision of reference mapping and of 24 hours for the provision of assessment maps.

It is foreseen that SAFER will extend the use of its products to early warning and to reconstruction.

9.2.2. *European Voluntary Humanitarian Aid Corps (EVHAC)*

In the field of external relations, the Lisbon Treaty enshrines for the first time humanitarian aid as a separate policy of the EU (Article 214, TFEU). This Treaty article specifically refers to the "European Voluntary Humanitarian Aid Corps" (EVHAC), whose objective is "to establish a framework for joint contributions from young Europeans to the humanitarian aid operations of the Union".

Recognising the growing importance of volunteering and the multiplication of actors in the EU, the European Commission[105] identifies some gaps and areas where the Voluntary Corps is likely to have an added value. These include the identification and training of volunteers, the development of common standards, good practices and modules and the measures on deployment. The Commission is expected to present a legislative proposal by 2012.

In June 2011, and following a call for proposal, DG ECHO has launched three pilot projects in cooperation with consortiums led by Save the Children UK, Red Cross France and Voluntary Service Overseas UK. Each consortium will run the first pilot projects and recruit, select, train and deploy the first 91 European Humanitarian Volunteers.

9.2.3. *Food Assistance*

On 31 March 2010, the Commission adopted a Communication[106] on Humanitarian Food Assistance that lays out a new policy framework for EU humanitarian action to strengthen efforts to tackle food-insecurity in humanitarian crises.

The Communication states that EU Humanitarian Food Assistance will aim to save and preserve life, to protect livelihoods, and to increase resilience for populations facing on-going or forecasted humanitarian food crises, or recovering from them. Amongst the key principles, the Communications concludes that the EU's Humanitarian Food Assistance must, as a priority, be needs-based, evidence-based and results-focused. The Communication continues: "in delivering Humanitarian Food Assistance, the Commission In delivering Humanitarian Food Assistance, the Commission should pay close attention to the comparative advantages and disadvantages of the humanitarian instrument according to the needs and the context. It will consider opportunities for mainstreaming disaster risk reduction, and disaster preparedness, within its emergency responses, and will advocate for development actors (including national governments and national civil society organisations) to respond to chronic food-insecurity with predictable, multi-annual resources. The Commission will also strive to strengthen the capacity of the humanitarian system to deliver more varied and appropriate forms of food assistance, whilst supporting all efforts to make operational coordination and governance, in the humanitarian food sector, work effectively."

Following the Communication of the Commission, on 10 May 2010, the Foreign Affairs Council of the European Union adopted its own Conclusions on Humanitarian Food Assistance.

9.2.4. *Disaster Risk Reduction*

The European Commission's humanitarian aid department (ECHO) provides rapid and effective support to the victims of disasters beyond the European Union's borders. On average, approximately 16% of ECHO humanitarian relief is a response to sudden-onset natural disasters.

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[105] Communication COM(2010) 683 final from the Commission to the European Parliament and the Council - How to express EU citizen's solidarity through volunteering: First reflections on a European Voluntary Humanitarian Aid Corps, Strasbourg, 23 November 2010

[106] Communication COM(2010) 126 final from the Commission to the Council and the European Parliament - Humanitarian Food Assistance, Brussels, 31 March 2010

The importance of disaster preparedness is clearly recognised in ECHO's mandate and in the European Consensus on Humanitarian Aid[107] adopted in 2007.

The main component of ECHO's contribution to the global Disaster Risk Reduction (DRR) efforts remains the DIPECHO programme launched in 1996. It is designed to demonstrate measures and initiatives at community-level and can serve as components of integrated disaster risk reduction strategies for a municipality, district, or even at national level. This programme covers 7 disaster-prone regions (the Caribbean, Central America, South America, Central Asia, South Asia, South East Asia and South East Africa and South West Indian Ocean) and targets highly vulnerable communities living in some of the most disaster-prone regions of the world.

ECHO's also advocates disaster preparedness for major humanitarian financing decisions. Examples of such activities include livestock shelters built after extreme cold snaps to protect against further losses of depleted herds (Peru); training and equipping of community-based fire brigades in forest fire risk zones (Indonesia); cholera preparedness and health information (Malawi); and anti-rust measures to prevent water pollution and protect pipes from the effects of volcanic ash (Ecuador).

More recently, ECHO has commissioned and evaluation on DRR mainstreaming and launched humanitarian decisions with significant preparedness components such as the 2007 Sahel Global Plan, the 2008 and 2009 decisions on regional drought preparedness in the Great Horn of Africa, or the 2008 Ad hoc decision on Myanmar following cyclone Nargis.

ECHO has actively participated to the development of the EU Strategy supporting Disaster Risk Reduction[108] in developing countries, adopted in February 2009. This Strategy has for overall objective to contribute to sustainable development and poverty eradication by reducing the burden of disasters on the poor and the most vulnerable countries and population groups, by means of improved DRR.

One of the specific objectives of the EU Strategy is to identify, assess, and monitor disaster risks - and enhance early warning. The Commission makes reference to the 7th Framework Programme for Research and the Joint Research Centre (JRC), which supports tools such as GMES that should contribute to and complement developing countries' own efforts.

9.2.5. *Global Needs Assessments*

The Commission tries to base its decisions on humanitarian aid on assessments of the needs of the people concerned, in accordance with the principles of impartiality, neutrality and independence. It identifies the neediest people in two ways: by assessing needs in the field and by making a comparative analysis of countries using national indicators.

The Commission has developed two tools to assess need:

- The Global Needs Assessments (GNA) which initially identify the most vulnerable countries using a vulnerability index. The GNA then identify countries that are effectively in a humanitarian crisis situation corresponding to the DG ECHO intervention criteria by means of a crisis index.
- The Forgotten Crises Assessments (FCA), which attempt to identify serious humanitarian crisis situations where the affected populations are not receiving enough international aid or none at all.

9.2.6. *Monitoring and Information Centre (MIC)*

The EU coordinates emergency relief and assistance for countries in need for example in the cases of devastating floods and fires. The EU's Monitoring and Information Centre (MIC) sees to it that countries

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[107] Joint Statement 2008/C 25/01 by the Council and the Representatives of the Governments of the Member States meeting within the Council, the European Parliament and the European Commission

[108] Communication COM(2009)84 final from the Commission to the Council and the European Parliament - An EU Strategy for Supporting Disaster Risk Reduction in Developing Countries, Brussels, 23 February 2009

affected get immediate help. Open 24/7, the Brussels-based centre monitors emergencies worldwide and coordinates EU resources for relief operations. Dealing with all disasters - manmade or natural - the MIC acts as a communication hub between countries. Upon receiving a request for help, duty officers alert potential donor nations and match offers of aid to the needs on the ground. Besides rounding up equipment and other supplies, the MIC can also dispatch field experts to disaster sites.

Any country affected by a major disaster - inside or outside the EU - can launch a request for assistance through the MIC. Following a formal request for assistance from a third country, different procedures are applied for the activation of the mechanism. In such cases, the Commission needs to consult the Presidency of the Council so as to determine the course of action it needs to take. For instance, if the emergency takes place in an area affected by conflict or civil unrest, the Council through the Presidency may declare it to fall under the so-called crisis management provisions (Chapter V of the TEU). In this case the Council plays the lead role in coordinating the EU response. If it is not deemed a crisis management situation, the MIC follows its general operating rules.

9.3. The Role of Earth Observation

Earth observation and programmes like the Global Monitoring for Environment and Security (GMES) Programme are essential tools in setting up an early warning system to predict and prevent natural and man-made disasters.

Satellite observation is also useful in coping with disasters once they have occurred. Recent flooding in Eastern Europe were covered by the GMES Emergency Management Service (EMS) which produced detailed quality reference maps, damage assessment maps and situation maps to show the impacts of the floods and pinpointed the impacts on the infrastructure and the population. During the 2010 earthquake in Haiti, the EMS produced up-to-date information to rescue teams about the buildings that were destroyed and on how to find the quickest and safest paths through to the victims of the disaster.

Fast, reliable and accurate information about a disaster enables better and more efficient management of rescue operations thereby minimising its impact on human lives. It is also key in planning and managing subsequent recovery operations.

The Disaster Charter

The Disaster Charter was initiated by the European Space Agency and Centre National d'Etudes Spatiales (CNES) following the Third United Nations Conference on the Exploration and Peaceful Use of Outer Space (UNISPACE) III conference in 1999.[109]

It was signed on October 20, 2000 and has been operational since November 2000. The Charter now embraces several member space agencies, namely, CNES, ESA, Canadian Space Agency (CSA), National Oceanic and Atmospheric Administration (NOAA), Indian Space Research Organisation (ISRO), Comisión Nacional de Actvidades Espaciales (CONAE), the United States Geological Survey (USGS) on behalf of US partners, namely, Digital Globe and GeoEye, the British National Space Centre (BNSC/UKSA) acting on behalf of the international Disaster Monitoring Constellation, and the China National Space Administration (CNSA). There also other non-partner organisations serving as intermediaries. The Charter has established a mechanism of cooperation amongst the disaster community worldwide. In response to authorised requests, the Charter partners provide data from their satellites free-of-charge to the states affected by natural or man-made disasters. The Disaster Charter provides a mechanism to make critical space assets available to communities affected by disasters. The afflicted states can use

[109] UNISPACE is a UN organised international meeting where UN members and space agencies gather. At UNISPACE III the use of space technology for solving regional and world problems was discussed along with the need for international cooperation and use of space applications among developing countries

the data to monitor their disasters, assess the course of the disasters, and then respond to the aftermath of these disasters.[110]

Global Disaster Alert and Coordination System

The Global Disaster Alert and Coordination System provides near real-time alerts about natural disasters around the world and tools to facilitate response coordination, including media monitoring, map catalogues and Virtual On-Site Operations Coordination Centre. Information on the GDACS website is collected from scientific and media sources in participation with three key sources:

- European Commission Joint Research Centre (more)
- United Nations Institute for Training and Research (UNITAR) Operational Satellite Application Programme (UNOSAT)
  UNOSAT is a technology-intensive programme delivering imagery analysis and satellite solutions to relief and development organisations within and outside the UN system to help make a difference in critical areas such as humanitarian relief, human security, strategic territorial and development planning. UNOSAT develops applied research solutions keeping in sight the needs of the beneficiaries and the end of the process.
- United Nations Office for the Coordination of Humanitarian Affairs (OCHA)
  OCHA is the part of the United Nations Secretariat responsible for bringing together humanitarian actors to ensure a coherent response to emergencies. OCHA also ensures there is a framework within which each actor can contribute to the overall response effort. OCHA ReliefWeb is a source for timely, reliable and relevant humanitarian information and analysis. The goal is to help readers make sense of humanitarian crises worldwide. To do this, they scan the websites of international and non-governmental organisations, governments, research institutions and the media for news, reports, press releases, appeals, policy documents, analysis and maps related to humanitarian emergencies worldwide. They then ensure the most relevant content is available on ReliefWeb and delivered through various other channels.

Disaster Management Support Project of the Committee on Earth Observation Satellites (CEOS)

The Disaster Management Support Project of the Committee on Earth Observation Satellites (CEOS)[111] began working in the 1990s with emergency management authorities and other users and data providers to develop and refine a set of requirement profiles for this important application area. The project's objective is to support natural and technological disaster management on a worldwide bases by fostering improved utilisation of existing and planned Earth observation satellite data. The final report of "The Use of Earth Observing Satellites for Hazard Support: Assessments & Scenarios" published by NOAA in 2002 remains a very valuable resource and overview.

In the report Helen M. Wood and Linda V. Moodie write that "The world community could better mitigate the human and economic losses caused by disasters if data from current and planned Earth Observation (EO) satellites were used more effectively in disaster management support. Today, meteorological satellites are widely used to detect and track severe storms and to support other weather-driven events. However, operational applications of data from these and other EO satellites to support management of other types of disasters (e.g., oil spills, harmful algae blooms, earthquakes, forest fires) is significantly less common. And although there have been a great many research and operational demonstrations, which illustrate the potential usefulness of EO satellite data for other

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[110] A. ITO, "The Disaster Charter and Highlighting Issues of Haiti Earthquake", in M. S. ARANZAMENDI, R. SANDAU, K.U. SCHROGL, editors, "Current Legal Issues for Satellite Earth Observation: Treaty Verification and Law Enforcement through Satellite Earth Observation - Privacy Conflicts from High Resolution Imaging", European Space Policy Institute, Report 25, August 2005, p.22

[111] Established in 1984, the Committee on Earth Observation Satellites (CEOS) coordinates civil space-borne observation of the Earth. Participating agencies strive to enhance international coordination and data exchange and to optimise societal benefit. Currently, 50 members and associate members made up of space agencies, national and international organisations participate in CEOS planning and activities

hazards, a thorough understanding of the requirements of the diverse range of users is needed as a first step toward planning for operational support services derived from EO satellite data.[112]

GMES and Africa: Regional Network for information Exchange and Training in Emergencies (GARNET-E)

The GARNET-E project[113] aims to address the implementation of a sustainable emergency response service in Africa, using satellite Earth Observation data. The aim is to contribute to the partial re-alignment of the "GMES Emergency Response in Africa" agenda, from technical activities focused purely on risk and poverty reduction and response using European capacities, to those more directed to building sustainable local capacities, leading to real wealth creation in Africa. GARNET-E aims to enable and enhance the ability of African states to use satellite Earth Observation for the management of natural and manmade humanitarian emergencies and to develop a network of EU and African organisations and African users, in order to build economic, technical and commercial capacity within African states, along the priority lines being identified in consultation with the African Union under the 'GMES and Africa' initiative. The project has two technical objectives:

- To exchange information, through workshops on GMES Emergency Response Core Service; and the International Charter - Space and Major Disasters;
- To improve the quality of the current GMES Service, for African emergencies, through local requirements gathering exercises; and the ingestion of in situ data in product generation.

[112] H. M. WOOD and L. V. MOODIE, "The Use of Earth Observation Satellites for Disaster Management: CEOS Disaster Management Support Project", International Society for Photogrammetry and Remote Sensing (ISPRS)

[113] For more information see C. GIANNOPAPA, "European-African Partnership in Satellite Applications for Sustainable Development: A Comprehensive Mapping of European-African Actors and Activities", ESPI Report 26, September 2010, p.90, See: http://www.espi.or.at/images/stories/dokumente/studies/ESPI_Report_26_online.pdf (last consulted 15 November 2010)

10. Hazardous Waste

Hazardous waste is waste that is dangerous or potentially harmful to our health or the environment. Hazardous wastes can be liquids, solids, gases, or sludge. It can be discarded commercial products, like cleaning fluids or pesticides, or the by-products of manufacturing processes.[114]

Waste accumulation affects the environment as hazardous substances, increases toxicity and ways in which the waste re-circulates in the air and water, causing serious harm to humans and other life. Apart from solid natural waste, there are other types of man-made wastes that are more hazardous to the environment. Cell phones, for instance are made of lead, mercury and plastic and so many millions of them get thrown away as garbage.[115]

Another problem is the fact that disposing of the junk is hazardous. For example, mercury will leach when certain electronic devices, such as circuit breakers are destroyed. Batteries are an environmental hazard. The acid leaches not only into the soil but also goes into the ground water. Disposing of them also creates their own problems as the lead is likely to remain in the ash and be released in the air.[116]

E-waste is often generated when electronic goods are discarded rather than recycled, often ending in unregulated dumps in West Africa or Asia. Nearly 50 million tons of personal computers alone are disposed of each year, the E-Waste Crime Group estimates, a number which will grow significantly in the future.[117]

The discarded electronic equipment exported to these countries, including scrapped televisions, cell phones and other electronic waste – an estimated 50 million tons of personal computers alone are disposed of each year - contains a host of hazardous constituents including lead, arsenic mercury, cadmium and other toxic metals that can have serious health and environmental impacts. The 'smash and burn' method used by poor labourers to isolate and collect the heavy metals significantly risks their health.[118]

10.1. International Action

The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, usually known simply as the Basel Convention, is an international treaty that was designed to reduce the movements of hazardous waste between nations, and specifically to prevent transfer of hazardous waste from developed to less developed countries (LDCs). It does not, however, address the movement of radioactive waste. The Convention is also intended to minimise the amount and toxicity of wastes generated, to ensure their environmentally sound management as closely as possible to the source of generation, and to assist LDCs in environmentally sound management of the hazardous and other wastes they generate.

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[114] United States Environmental Protection Agency, see: http://www.epa.gov/osw/hazard/

[115] WWF, see: http://wwf.panda.org/about_our_earth/teacher_resources/webfieldtrips/waste_disposal/ (last consulted 10 November 2011)

[116] WWF, *Ibid*.

[117] The INTERPOL meeting in Alexandra, Virginia co-hosted by the US EPA and the Swedish government, 25-27 May on the topic of e-waste exports and dumping was attended by over 100 representatives and experts from 21 countries and 12 Non Governmental Organizations and was the largest ever such gathering of involved countries and agencies. The aim was to develop a multi-national enforcement strategy to tackle the growing international problem of e-waste which poses significant environmental and health risks, in particular in developing countries in Africa and Asia. A key element of the meeting is the development of a working plan to support planned multi-national enforcement operations aimed at controlling and deterring the illegal traffic of e-waste. See: "International experts outline global strategy to tackle e-waste threat at INTERPOL meeting" at: http://www.interpol.int/News-and-media/News-media-releases/2010/PR040 (last consulted 11 November 2011)

[118] *Ibid.*

The Convention - the most comprehensive global environmental agreement on hazardous and other wastes - was opened for signature on 22 March 1989, and entered into force on 5 May 1992. The Convention has 175 Parties, including the European Community (three of whom - Afghanistan, Haiti, and the United States - have signed but not yet ratified the Convention). The convention aims to protect human health and the environment against the adverse effects resulting from the generation, management, transboundary movements and disposal of hazardous and other wastes.

Despite its ambitious scope the Basel Convention still faces many challenges, some of which were formulated by the Basel Convention Secretariat Legal Officer during the IES Conference "Illegal Trade in Natural Resources - What can Brussels do?" on 30 September 2010[119]. Issues highlighted the difficulties of some exporting states in ensuring monitoring, reporting and recording in long exportation chains and the differing legal obligations arising from different legal systems. Therefore, she said, there is a need to strengthen:

- National capacity and coordination for the control of international trade;
- Implementation and compliance mechanisms;
- Enforcement capacities/authorities - crucial role of customs, of the judiciary (courts, judges);
- Importance of technical assistance and capacity - science, compliance, enforcement - building.

Other issues associated with the Basel Convention were raised in presentations delivered to the IES Workshop on Satellite Monitoring for Legal Compliance and Enforcement of International Environmental Law in the Hague on 20 April 2010[120], including the following:

- The fact that administration enforcement and criminal law enforcement vary from one jurisdiction to another;
- The lack of internationally agreed guidelines on waste and the unenforceable definitions contained within the Basel Convention. For example, huge amounts of computers are shipped to be dumped in Ghana. As they are technically still working, they do not fall within the scope of Basel;
- Inadequate quality and reliability of data reported, for example to the EU;
- The fact that illegal traffic in wastes takes place without the consent of a State concerned; without notification to all States concerned; with consent of States concerned but through falsification, misrepresentation or fraud, and/or without conformity in a material way with the documents.

A problem similar to hazardous waste exists regarding the illegal transport of dangerous chemicals, which is a matter dealt with in the PIC and POP Conventions and for which RS and EO can also play an important role.

10.2. EU Action

10.2.1. Prevention and Recycling

[119] G. DE VILLE, "Good Deal Bad Deal. Report of the Conference Illegal Trade in Natural Resources - What can Brussels do?", Institute for Environmental Security, Brussels, November 2010, p.28

[120] See, for example, presentation by Mr Huib van Westen, Information specialist at the EU Network for the Implementation and Enforcement of Environmental Law (IMPEL) and based at the Inspectorate of the Dutch Ministry of the Environment (VROM), Christian Fischer, European Topic Centre on Sustainable Consumption and Production (ETC/SCP), and Mrs Juliette Kohler, Secretariat of the Basel Convention, and others at: http://www.envirosecurity.org/events/HELF_Meeting/HELF_Meeting.php (last consulted on 11 November 2011)

The European Commission proposed on 21 December 2005 a new strategy on the prevention and recycling of waste[121]. This strategy is one of the seven thematic strategies programmed by the 6th Environmental Action Plan.

This long-term strategy aims to help Europe become a recycling society that seeks to avoid waste and uses waste as a resource. It draws on the knowledge that the thematic strategy on resources,[122] also adopted on 21 December 2005, has generated.

Several pieces of consolidated EU waste legislation are available on the European Union CELEX site. Specific links to individual pieces of EU waste management legislation are divided into five main sub-categories:

- Framework European Union legislation on waste
- European Union legislation on waste management operations
- European Union legislation on specific waste streams
- Reporting and questionnaire legislation
- Useful links to other in/directly related legislation

Within each sub-category, the individual legislative instruments are listed in chronological order of adoption of the main pieces of legislation. Where ancillary legislation is in existence, this is listed in chronological order below the parent legislative instrument.

10.2.2. Shipment of Waste

The European Union has set up a system for the supervision and control of shipments of waste within its borders and with the countries of the European Free Trade Association (EFTA), the Organisation for Economic Co-operation and Development (OECD) and third countries which are party to the Basel Convention.

The EU Regulation (EC) N°1013/2006[123] aims at strengthening, simplifying and specifying the procedures for controlling waste shipments to improve environmental protection. It also seeks to include into Community legislation the provisions of the Basel Convention as well as the revision of the Decision on the control of transboundary movements of wastes destined for recovery operation, adopted by the OECD in 2001.

The Regulations concerns almost all types of waste shipped. Only radioactive waste and a few other types of waste do not fall within its application, insofar as they are subject to separate control regimes. Derogations concern, for example, shipments of waste generated on board vehicles, trains, aeroplanes and ships, until such waste is offloaded for recovery or disposal, etc. Such issues are also relevant in the context of transboundary movements of dangerous chemicals.

10.2.3. Shipment of Chemicals

In the EU, Council Regulation (EEC) No 2455/92[124] concerning the export and import of certain dangerous chemicals establishes a common system of notification and information for exports to third countries of chemicals which are banned or severely restricted in the Community on account of their

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[121] Communication COM(2005) 666 final from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions - Taking sustainable use of resources forward: A Thematic Strategy on the prevention and recycling of waste, Brussels, 21 December 2005

[122] Communication COM(2005) 670 final from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions - Thematic Strategy on the sustainable use of natural resources, Brussels, 21 December 2005

[123] Regulation (EC) N°1013/2006 of the European Parliament and of the Council of 14 June 2006 on shipments of waste

[124] Council Regulation (EEC) N°2455/92 of 23 July 1992 concerning the export and import of certain dangerous chemicals

effects on human health and the environment. The Regulation also implements the UNEP/FAO Prior Informed Consent (PIC) procedure and makes it mandatory for EU Member States.

10.2.4. Ship Dismantling

In view of the growing threat to the environment posed by ship dismantling activities, the European Union has multiplied its communications and legislative acts over the recent years.

On 19 November 2008 the Commission adopted a Communication on "An EU Strategy for better ship dismantling".[125] The EU strategy proposes a number of measures to improve ship dismantling conditions as soon as possible, including in the interim period before the entry into force of the IMO Convention. These include:

- starting preparation for establishing measures on key elements of the convention, such as those on surveys, certification and inventory of hazardous materials on board, as soon as possible after its adoption;
- encouraging voluntary industry action through measures such as awards for exemplary green recycling; publication of guidance, such as a list of 'clean' ship dismantling facilities;
- technical assistance and support to developing countries for safety training programmes and basic infrastructure for environmental and health protection;
- better enforcement of current waste shipment rules such as more checks at European ports; more co-operation and information exchange between EU authorities; and establishing a list of ships that are ready for scrapping.

The strategy also proposes that the Commission look at the feasibility of the following:

- developing a certification and audit scheme for ship recycling facilities worldwide and evaluating how EU ships can be encouraged to use such a scheme;
- making warships and other government vessels not covered by the Convention, subject to EU rules for clean dismantling;
- establishing a mandatory international funding system for clean ship dismantling.

Developing an EU strategy for environmentally sound ship dismantling is one element of the Commission Action Plan for an integrated maritime policy for the European Union.

On 12 March 2010, the Commission adopted a Communication presenting "An assessment of the link between the IMO Hong Kong Convention for the safe and environmentally sound recycling of ships, the Basel Convention and the EU waste shipment regulation". [126]

10.3. The Role of Earth Observation

General conclusions from the above mentioned IES workshop in April 2010 included the following:

- Remote sensing can identify waste dumps and satellite imagery can be used to track the illegal transfer of waste;
- Satellite data has a high potential for waste tracking (with GPS) and landfill monitoring – use depends on case and country to start investigations;
- Satellites could support Interpol E-waste crime group for positioning, tracing and tracking

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[125] Communication COM(2008) 767 final from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - An EU strategy for better ship dismantling, Brussels, 19 November 2008

[126] Communication COM(2010) 88 final from the Commission to the Council - An assessment of the link between the IMO Hong Kong Convention for the safe and environmentally sound recycling of ships, the Basel Convention and the EU waste shipment regulation, Brussels, 12 March 2010

- While there are limitations to the use of satellite data to monitor moving objects like ships, elements of GPS, GLONASS or Galileo systems are relevant;
- There is a need for the ESA and others to work together to move the initiative to tracking position, direction and speed of shipments of hazardous waste, where legal privacy issues also have to be made clear as it depends on the purpose of the use of the data.

According to one of the leading experts in this field, Ray Purdy, of the Faculty of Laws, University College London (UCL), research has "found that many environmental laws could actually be monitored to some degree by satellite earth observation. Environmental laws in sectors including waste, water, dangerous substances, air pollution and climate change, and land and nature protection could in some circumstances be monitored this way. However, its potential as a monitoring tool should not be over stated.[127]

Purdy adds that "If satellite Earth Observation is to be used more in legal strategies in the future, then the technology itself needs a significant user push. Companies that design, launch and sell the data should be targeting the legal community as a potentially significant market for satellite data. Clearly, Earth Observation data could be a valuable source of evidence to regulatory bodies and police, as well as the estimated eleven million lawyers practising world-wide. To successfully reach these groups, and implement Earth Observation into legal strategies, there will be a need for strong advocates and effective champions for these technologies who can persuade others of the utility of Earth Observation. Under GEOSS and GMES, foundations have been built for future progress, but it is unclear whether these initiatives could themselves oversee or take direct responsibility for the coordination of legal opportunities and the implementation of high-profile pilot demonstration studies. There is now a need for a body to show dynamic leadership and play a coordination role, identifying strategies for enhanced profile building to legal audiences."[128]

In 2011, the ESA launched a series of pilot research projects under the heading "Out of Europe Timely Situation Awareness for Law Enforcement and Intelligence Applications". The results of these projects, including on the subject of the transport of hazardous wastes, should help demonstrate the role Earth Observation can play in the environmental treaty verification and law enforcement.

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[127] R. PURDY, "Treaty Verification and Law Enforcement Through Satellite Earth Observation: Emerging Legal Issues with Satellite Earth Observation" *in* Current Legal Issues for Satellite Earth Observation: Treaty Verification and Law Enforcement through Satellite Earth Observation, from the European Space Policy Institute (ESPI) conference on Current Legal Issues for Satellite Earth Observation in April 2011, ESPI, Report 25, Vienna, August 2010. See also R. PURDY, "Using Earth Observation Technologies for Better Regulatory Compliance and Enforcement of Environmental Laws", Journal of Environmental Law 22:1, Oxford University Press, 2009, published on-line with permission at http://www.envirosecurity.org/events/HELF_Meeting/RayPurdy.pdf

[128] R. PURDY, *Ibid.*

11. Migration

From the early hunter-gatherer communities to the agricultural societies, migration has always been used as a strategy for survival throughout history, especially in the face of environmental change. Today, the effects of climate change are expected to increase 'environmental migration' globally. A key distinction is to be made between population displacement resulting from rapid-onset natural disasters such as floods and storms (clearly forced movement) and migration resulting from slow processes such as drought, desertification and soil degradation linked to changing rainfall patterns, and the resulting scarcity of productive agricultural land.

Today, the vast majority of displacements due to rapid-onset hydro-meteorological disasters take place in Asia but experts predict significant population displacements on the African continent as well, most notably on the eastern coast of southern Africa which has already experienced severe displacement in recent years.[129]

Migration and displacement due to slow-onset phenomena is already becoming a major challenge in Africa, having pushed an estimated ten million people on the road over the last two decades. On 11 July 2011, the UN High Commissioner for Refugees Antonio Gutterres called Somalia "the worst humanitarian disaster in the world", while visiting the Dadaab refugee camp in eastern Kenya, where thousands of refugees continue to arrive from Somalia, following unprecedented droughts in the region. Estimates say that Chad and Niger could potentially lose their entire rain-fed agriculture by 2100 due to changing rainfall patterns and degraded land, while in Mali cereal harvests could decline by 30 percent. Desertification is likely to cause the largest share of (forced) migration in Africa over the long term, both rural-rural and rural-urban. In Asia, sea level rise and glacial melt already profile themselves as challenges for the region's stability, threatening to push dozens of millions of people on the road in the next 100 years.

Most analysts predict that the majority of environmental migration will be internal or to bordering countries. Those most vulnerable to environmental and climatic factors may actually be those who are unable to use migration as an adaptation strategy.

Large scale migration can potentially have destabilising effects but must be considered in parallel with contextual factors in the receiving area. Conflict may arise when migrants, particularly those of a different nationality or ethnicity, move quickly or in large numbers to areas already suffering from tensions over access to scarce resources and where coping mechanisms are absent. The situation on the Indian-Bangladesh border, where India is building a fence to prevent mass migratory movements of Bangladeshi across the Indian border illustrates the failure of the international community and the two parties to set up appropriate adaptation mechanisms to the threat of rising sea levels.

Concerted action is needed at all levels, on the one hand to minimise forced migration, and on the other hand to manage migration flows, including the facilitation of migration as an adaptation strategy. As world population grows and natural hazards increase in frequency and intensity, one can see that the lack of planning to deal with large-scale migration flows will cause the worsening of human suffering and may spark conflict in receiving areas.

11.1. International Action

The Cancun Agreement adopted at COP 16 for the first time address the issue in the UNFCCC context. The Cancun Agreement include a paragraph inviting all parties to undertake adaptation action, including "measures to enhance understanding, coordination and co-operation with regard to climate change induced displacements, migration and planned relocation, where appropriate, at national, regional and international levels."

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[129] A. FLAVELL, International Organization for Migration, Brussels, in "Africa, Climate Change, Environment and Security Dialogue Process, Programme Outline 2011-2014, May 2011," http://www.envirosecurity.org/acces/docs/ACCES_Programme_Outline.pdf

11.1.1. International Organization for Migration

The International Organization for Migration (IOM) was established in 1951. It is committed to the principle that humane and orderly migration benefits migrants and society. From its roots as an operational logistics agency, it has broadened its scope to become the leading international agency working with governments and civil society to advance the understanding of migration issues, encourage social and economic development through migration, and uphold the human dignity and well-being of migrants.

The broader scope of activities has been matched by rapid expansion from a relatively small agency into one with an annual operating budget of close to $1 billion and some 5,400 staff working in over 100 countries worldwide.

As "The Migration Agency" IOM has become the point of reference in the heated global debate on the social, economic and political implications of migrants in the 21st century.

11.1.2. Environmental refugees

FIrst introduced in the 1970s by Lester Brown of the Worldwatch Institute, the concept of environmental migrant is now entered into common usage. A distinction is made between forced environmental migrant and environmentally motivated migrants. The first can be described as a person that "has" to leave his/her place of normal residence because of an environmental stressor whereas the second is a person who "may" decide to move because of an environmental stressor.

Though no internationally accepted definition for persons moving for environmental reasons[130] exists and many contested figures have been put forward to estimate the flows of environmental refugees in the course of this century - up to 300 million environmental refugees in 2050 -, the question of environmental refugees is already a hot topic and requires to be properly addressed.

11.2. EU Action

Following events in Ceuta and Melilla in September 2005, Heads of State and Government met at Hampton Court to discuss the challenges of migration and concluded that there was an urgent need for more action, both among Member States and in partnership with countries of origin and transit, in particular North and Sub-Saharan Africa.

11.2.1. Global Approach to Migration

In December 2005, building on a Commission's Communication, the European Council adopted the *Global Approach to Migration: Priority Actions Focusing on Africa and the Mediterranean* to formulate coherent policies and action on migration addressing a vast array of migration issues and bringing together the various relevant policy areas including external relations, development, employment, and justice, freedom and security.

The Global Approach was kickstarted by a Ministerial Conference on Migration and Development held in Rabat on 10-11 July 2006 that brought together EU Member States with a number of African countries of origin and transit, in the aim of focusing on the West and Central African migration route and finding joint responses to migration, including through financial assistance in areas concerning or related to migration.

Through the development of the Global Approach to Migration, the external dimension of the EU's migration policy focuses on dialogue and partnerships with third countries, based on mutual interests. Significant steps have also been taken towards the creation of a European Asylum System and European agencies such as Europol, Eurojust, the Fundamental Rights Agency and Frontex have reached operational maturity in their respective fields of activity.

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[130] Terms such as "environmental refugee" or "climate change refugee" have no legal basis in international refugee law

11.2.2. *Stockholm Programme*

The Stockholm Programme[131], adopted by the European Council in December 2009 provides a framework for the continuation of EU action on the questions of citizenship, justice, security, asylum and immigration for the period 2010-2014.

One of the priorities listed in the Stockholm Programme is a dynamic and comprehensive migration policy. This objective is to be attained through a set of policies:

- Consolidating, developing and implementing the EU Global Approach to Migration
  - Improved policy coherence to promote the positive development effects of migration
  - A concerted policy in keeping with national labour-market requirements
  - Proactive policies for migrants and their rights
  - More effective integration policies in Member States
  - Effective policies to combat illegal immigration
  - Measures to protect unaccompanied minors
- The establishment of a common area of protection and solidarity based on a common asylum procedure

In April 2010, the European Commission proposed an Action Plan Implementing the Stockholm Programme.[132] The Action Plan reiterates the Commission's commitment to pursue and implement the global approach to migration with the objective of putting solidarity and responsibility at the heart of EU response. Firstly brought to attention in a 2008 Communication on the Global Approach, the issue of migration and development is now included in the Action Plan which requires the Commission to:

- Produce a communication on the effects of climate change on international migration
- Produce a communication on maximising the positive and minimising the negative aspects of immigration on Development
- Support the establishment of a migration observatory network in ACP countries
- Support third countries in defining and implementing their migration policy through cooperation in particular within sub-Saharan Africa.

The European Commission's main migration-specific financial instrument, the Thematic Programme on Migration and Asylum, similarly recognises the need to foster the links between migration and development as one of its thematic priorities in its 2011-2013 strategy paper.

With regards to the effects of illegal migration on European security, the Action Plan proposes the smart use of modern technologies in border management to complement existing tools as a part of a risk management process that should make Europe more accessible to bona fide travellers and stimulate innovation among EU industries. In this context, the coming into operation of the Schengen Information System (SIS) II and Visa Information System (VIS) are considered to be priorities.

11.3. The Role of Earth Observation

Earth observation is currently used in monitoring conditions that may lead to population displacements in several regions throughout the world. For instance, the International Organization for Migration has

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[131] Council of the European Union 17024/09, "The Stockholm Programme - An open and secure Europe serving and protecting the citizen, Brussels, 2 December 2009

[132] Communication COM(2010) 171 final from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - Delivering an area of freedom, security and justice for Europe's citizens - Action Plan Implementing the Stockholm Programme, Brussels, 20 April 2010

been using satellite imagery to create environment and livelihoods vulnerability maps in Darfur. These maps are aimed to improve the quality of information available to humanitarian actors on environment and livelihoods, and community vulnerability to environmental change, water shortages, livelihood disruptions and other effects.

In Europe, however, Earth Observation technologies are being expanded rapidly to control maritime areas. Navies, coastguards etc. are also responsible for the detection of illegal activities and identification of those involved in illegal transportation of goods and people as well as the prevention of terrorism and border control.

Sea borders are monitored through complex integrated EO systems based on Vessel Detection Systems (VDS), providing information on small vessels and on the unusual suspect behaviour of vessels. Thus EO information is provided for tactical planning and reaction using near real time applications (e.g. ATALANTA and FRONTEX joint exercises in the last years) and for strategic planning through monitoring of preferred trafficking and migration routs over open waters often between proxy shorelines at EU borders.

In the past years technical approaches were invented within the framework of GMES to monitor land and sea borders. Computerised models have been developed linking specialised geographic information like land use/cover maps derived from EO data to detect and monitor potential transfer routs of illegal migrants or human trafficking organisations trying to reach the EU territory. Landscapes providing hidden routs through e.g. bushes and non-inhabited buildings far from villages and border control posts are identified and thus can be monitored more easily. Very high and high resolution EO surveillance of these approaches provide detailed spatial information on the situation even in areas hard to access.

FRONTEX for example, is monitoring the land and sea borders through combination of different techniques. FRONTEX is working on the land and sea borders through the national authorities using the traditional means of border control and surveillance, but FRONTEX is starting to make more and more use of geo-information technologies.[133]

[133] A. SCHÄRTEL, GAF AG

12. Peace & Security

Since the end of the Cold War, two fundamental changes have shaped the way the international community understands peace and security[134]. First, the range of potential actors of conflict has expanded significantly to include a number of non-state entities. In today's world, state failure and civil war in developing countries represent some of the greatest risks to global peace. War-torn countries have become havens and recruiting grounds for international terrorist networks, organised crime, and drug traffickers, and tens of millions of refugees have spilled across borders, creating new tensions in host communities.[135]

Second, the potential causes of insecurity have also increased and diversified considerably. While political and military issues remain critical, conceptions of conflict and security have broadened: economic and social threats including poverty, infectious diseases and environmental degradation are now also seen as significant contributing factors.

UNEP also points out that the links between natural resources & conflict are significant:

- 40% of internal conflicts have a link to natural resources
- A link to natural resources doubles the risk of conflict relapse within 5 years
- Only 25% of peace agreements include natural resource provisions

This new broader understanding of the contemporary challenges to peace is reflected in several recent high-level policy debates and statements.

The 2004 report of the UN Secretary-General's High-Level Panel on Threats, Challenges and Change highlighted the fundamental relationship between the environment, security, and social and economic development in the pursuit of global peace in the 21st century.[136]

In 2007, United Nations Secretary-General Ban Ki-moon stressed that, "when resources are scarce - whether energy, water or arable land - our fragile ecosystems become strained, as do the coping mechanisms of groups and individuals. This can lead to a breakdown of established codes of conduct, and even outright conflict."[137] In June 2007, a historic debate at the UN Security Council concluded that poor management of "high-value" resources constituted a threat to peace.[138]

More recently, UN Secretary-General Ban Ki-moon confirmed that "the basic building blocks of peace and security for all peoples are economic and social security, anchored in sustainable development, [because they] allow us to address all the great issues – poverty, climate, environment and political stability – as parts of a whole."[139]

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[134] The UNEP publication "From Conflict to Peacebuilding" refers to several uses of the term "security". "State or national security" refers to the requirement to maintain the survival of the nation-state through the use of economic, military and political power and the exercise of diplomacy. "Human security" is a paradigm for understanding global vulnerabilities, which argues that the proper referent for security should be the individual rather than the state. Human security holds that a people-centred view of security is necessary for national, regional and global stability. "Environmental security" refers to the area of research and practice that addresses the linkages among the environment, natural resources, conflict and peacebuilding

[135] R. MATTHEW, O. BROWN and D. JENSEN, "From Conflict to Peacebuilding: The Role of Natural Resources and the Environment", UNEP, 2009, p. 6, see: http://www.iisd.org/publications/pub.aspx?pno=1062 (last consulted 10 November 2011)

[136] UN Secretary-General's High-Level Panel on Threats, Challenges and Change, "A more secure world: our shared responsibility: Report of the Secretary-General's High-Level Panel on Threats, Challenges and Change", United Nations General Assembly. New York, 2004

[137] UN Security Council, 5663rd Meeting, first-ever debate on the impact of climate change on security, 17 April 2007

[138] UN Security Council, "Statement 2007/22 by the President of the Security Council", United Nations Security Council, New York, 25 June 2007

[139] B. KI-MON "A green future - The right war." *Time*, 16 April 2008

In Europe, too, the impacts of environmental degradation (and of climate change in particular) have increasingly been highlighted in the context of international security. The OSCE Madrid Declaration on Environment and Security (2007) included the point that "Environmental degradation, including both natural and man-made disasters, and their possible impact on migratory pressures, could be a potential additional contributor to conflict. Climate change may magnify these environmental challenges."[140]

In 2008 a high-level paper by the European Union said that "Climate Change is a threat multiplier which exacerbates existing trends, tensions and instability in developing countries."[141] These tensions include conflict over resources such as land, water, food and energy. The expected increase in the frequency and severity of natural disasters plus the slow-onset of environmental degradation threaten the human security of local populations.

Environmental peacemaking strategies offer the chance to craft a positive, practical policy framework for co-operation that can engage a broad community of stakeholders by combining environment, development, and peace related concerns.

One can examine such efforts with respect to the following stages of the conflict cycle[142]:

- Conflict Prediction (Early Warning)
- Conflict Prevention
- Conflict Resolution
- Post Conflict Recovery and Transition

Another specific area of work relates to the impact of manmade and natural hazards and disasters on environment, development and peace. Confidence building measures can be taken for example to reduce the possibility of manmade hazards (e.g. pollution, weapons waste, etc.) contributing to tensions between communities or the possibilities for natural disasters to exacerbate a (potential) conflict situation.

This chapter covers international and EU action with regard to all four of the stages in the conflict cycle. Peace and security aspects related to manmade and natural hazards are discussed in the chapter on hazards and disasters.

12.1. Conflict Prediction (Early Warning)

Conflict prediction (early warning) can be distinguished from the broader term of conflict prevention in the sense that the former involves using indicators of economic and environmental stress and identifying signs of potential tension and conflict at the earliest possible stages where the later implies some form of intervention such as confidence building measures.[143]

The field of conflict early warning seeks to forecast the outbreak of armed conflict, or, at minimum, to detect the early escalation of violence, with the objective of preventing the outbreak or the further escalation of violence in order to save lives.

12.1.1. International Action

[140] OSCE, "Madrid Declaration on Environment and Security" MC.DOC/4/07, 30 November 2007

[141] "Climate Change and International Security: Paper from the High Representative and the European Commission to the European Council", S113/08, Brussels, 14 March 2008, p2

[142] K. CONCA, A. CARIUS, and G. D. DABELKO, "Building Peace Through Environmental Co-operation"; in R. MICHAEL, H. FRENCH and E. ASSADOURIAN, Eds. *State of the World 2005: Redefining Global Security*, W.W. Norton & Company / Worldwatch Institute, Washington, D.C., 2005, p.154, see: http://ecc.adelphi.de//PDF/SOW%2005%20chap8.pdf (last consulted 10 November 2011)

[143] R. A. KINGHAM, "Discussion Paper on Economic and Environmental Confidence- and Peace-building Measures and the Role of the OSCE", paper presented at the OSCE Chairmanship Workshop on Economic and Environmental Activities as Confidence Building Measures, Vienna, 30 May 2011, p.9

Initial conceptions of conflict early warning materialised in the 1970s and 1980s but the field really emerged on the international policy agenda after the end of the Cold War. Both qualitative and quantitative approaches have been developed for conflict forecasting and conflict monitoring. Qualitative methodologies typically draw on local area experts with extensive knowledge on one country or region. This is the approach taken by the International Crisis Group, for example. In contrast, quantitative methodologies quantify conflict trends and use mathematical techniques to forecast future trends or "events of interest" (EOIs). For example, the Integrated Conflict Early Warning Systems project at the Defense Advanced Research Projects Agency (DARPA) in the US Department of Defence takes this approach. Some approaches to conflict early warning combine both qualitative and quantitative methodologies, such as the formerly operational project of Swisspeace called FAST[144].

The Conflict Early Warning And Response Mechanism (CEWARN) operates an indicator-based early warning system in the Horn of Africa focused on cross border and interstate pastoral and related conflicts, monitoring specific factors in so far as any aspect relating to them could be a peace-promoting or conflict generating. Collection and analysis of information received from the field is done through National Research Institutes (NRIs), independent bodies contracted directly by CEWARN.

The CEWARN Protocol lays down a wide range of areas on which CEWARN can collect information. These include livestock rustling, conflicts over grazing and water points, nomadic movements, smuggling and illegal trade, refugees, land mines and banditry. CEWARN has, however, been mandated by the Member States to commence with the monitoring of cross-border pastoral and related conflicts, providing information to Member States concerning potentially violent conflicts as well as their outbreak and escalation in the IGAD region. The Horn of Africa is home to the largest pastoralist population in the world and cattle rustling is one of the violent practices among the pastoral communities.

Part of the strength of the Mechanism is the ability to link up with the formal government structures at the national and local levels as well as with the civil society. At the national level, national Early Warning and Early Response Units referred to as CEWERUs have been established in all Member States except Somalia. The composition of CEWERUs includes representatives from government, security agencies, Members of Parliament and civil society. The value of the CEWERU lies in its capacity to generate or cause a response as a result of information or alerts received from CEWARN.

In several regions of Europe, the Environment and Security Initiative (ENVSEC) and in particular the OSCE are also involved in early warning and conflict prediction. More information about their activities is included in the next section on conflict prevention.

12.1.2. EU Action

The Council of the European Union has recently reiterated its commitment in deploying early warning and early action mechanisms. It plans to better integrate existing early warning capacities and outputs from all sources, including from Member States, and drawing more extensively upon field based information from EU Delegations and civil society actors, in order to provide a more solid foundation for conflict risk analysis.[145] In addition, recent Foreign Affairs Council conclusions on EU Climate Diplomacy[146] extend the scope of early warning mechanisms to environmental deterioration and climate change.

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[144] FAST (Früherkennung und Analyse von Spannungen und Tatsachenermittlung or Early Recognition of Tensions and Factfinding) was an event data-based political early warning program covering 25 countries/regions in Africa, Asia, and Europe. Its objective was the early recognition of potential crisis situations and windows of opportunity for peacebuilding. FAST was run by Swisspeace on behalf of a number of development agencies in Europe and North America. For further information see: http://www.swisspeace.org

[145] Council of the European Union, Council conclusions on conflict prevention, 3101st Foreign Affairs Council meeting, Luxembourg, 20 June 2011

[146] Council of the European Union, Council conclusions on EU Climate Diplomacy , 3106th Foreigh Affairs Council meeting, Brussels, 18 July 2011

Policy Planning and Early Warning Unit (PPEWU)

Recognising that the coherence of the Common Foreign and Security Policy (CFSP) depended on how Member States react to international developments, the EU acquired its own Policy Planning and Early Warning unit as a result of a declaration annexed to the Treaty of Amsterdam. It was set up within the General Secretariat of the Council under the authority of the High Representative for the CFSP. Comprising specialists drawn from the General Secretariat, the Member States, the Commission and the Western European Union, its tasks included:

- monitoring and analysing developments in areas relevant to CFSP;
- providing assessments of the Union's foreign and security policy interests and identifying areas on which the CFSP could focus;
- providing timely assessments and early warning of events, potential political crises and situations that might have significant repercussions on the CFSP;
- producing, at the request of either the Council or the Presidency, or on its own initiative, reasoned policy option papers for the Council.

The Lisbon Treaty dissolved the PPEWU and transferred its portfolio under the European External Action Service.

Joint Situation Centre (SITCEN)

The Joint Situation Centre (SITCEN) aims to provide the EEAS with high quality information on matters of public security, in the form of early warnings, assessment, services in case of emergency, and by constituting a contact between the High Representative and the intelligence community of the countries of the EU.

Continental Early Warning System (CEWS)

Together with regional early warning systems, the Continental Early Warning System (CEWS) was set up to anticipate and prevent conflicts in Africa through collecting data and information. This is to help the Peace and Security Council (PSC) to take decisions and to guide the African Standby Force (ASF) in the deployment of its troops.

The CEWS is based on a multiplicity of indicators which are observed on a regular and standardised basis. Climate and the environment is one aspect of this. Information is mainly gathered through AU Regional Offices (currently 12), some of which even have a specific focus on environmental issues (Burkina Faso, Niger). Linkages between the work of the CEWS and AMESD (more) were recognised and need further exploration. Also, both institutions are supported by the Joint Research Centre (more) of the EU Commission which might serve as fruitful technical link.

12.2. Conflict Prevention

Many factors contribute to conflict - poverty, economic stagnation, uneven distribution of resources, weak social structures, lack of good governance, systematic discrimination, oppression of minorities, the destabilising effects of refugee flows, ethnic antagonism, religious and cultural intolerance, social injustice and the proliferation of weapons of mass destruction and small arms.[147]

Concerning environmental factors and conflict prevention, Conca, Carius, and Dabelko state that: "If the minimum requirement for peace is the absence of violent conflict, then environmental cooperation may have a role to play in forestalling the sort of violence that can be triggered by resource overexploitation, ecosystem degradation, or the destruction of people's resource-based livelihoods. Not surprisingly, most of the scholarship linking environmental degradation with violent outcomes has pointed to the need to relieve pressures on people's livelihood resources and to enhance the ability of

[147] Communication COM(2001) 211 final from the Commission - Conflict Prevention, Brussels, 11 April 2001

institutions to respond to environmental challenges. In other words, the most direct form of environmental peacemaking may be action to forestall environmentally induced conflict". [148]

12.2.1. International Action

United Nations Department for Economic and Social Affairs (UNDESA)

The United Nations has undertaken measures to promote a comprehensive approach on conflict prevention, peace-building and development. In these efforts there has been increasing recognition of the socio-economic causes of violent conflict and the urgent need for addressing them. In addition, the importance of long-term development in post conflict countries and their re-integration into the global economy is gaining increasing importance within and outside the United Nations.

Along with other actors, DESA has been focusing on these issues. In particular, DESA has worked to integrate conflict prevention and peace-building by: servicing the ECOSOC Ad Hoc Advisory Groups on African Countries Emerging from Conflicts, participating in mechanisms as the Framework Team; mainstreaming gender and bringing gender perspectives to the centre of peace processes, strengthening technical co-operation activities for capacity building at the country level in conflict prevention and peace-building, addressing the inter-relationship between social integration and peace-building; and analysing the impact of conflict on natural resource management and the relationship between natural resource endowments and causes of conflicts.

UN-EU Partnership on Natural Resources, Conflict and Peacebuilding

UN-EU Partnership project on Natural Resources, Conflict and Peacebuilding and the United Nations Interagency Framework Team for Preventive Action aim to strengthen the ability of national stakeholders and their UN and other international counterparts to analyse, prevent and resolve disputes over land and water, and to minimise tensions over natural resources.

The European Union and five UN partners – UNDP, DPA, UNEP, PBSO, HABITAT and DESA are working to support countries improve natural resource management for conflict prevention and peacebuilding. Through a joint programme coordinated by the UN Framework Team for Preventive Action and financed by the EU's Instrument for Stability, technical assistance will be provided to help national stakeholders, as well as UN and EU staff in conflict-affected countries, to better understand and prevent tensions over environmental issues and the management of natural resources. The partnership is also designed to enhance policy development and programme coordination between key actors at the field level.

Phase I: Guidance and training material

This project aims to equip national stakeholders, UN Country Teams and EU Delegations with the skills and tools needed to understand, anticipate, prevent, and mitigate potential conflicts over natural resources. As such, the first outcome of the project is a series of Guidance Notes, training manuals, and an online self-paced learning tool covering the following themes:

- Land and conflict
- Extractive industries and conflict
- Environmental scarcity and conflict
- Capacity development for managing land and natural resources

Phase II: Pilot-testing and field training

The second outcome of the project aims to deliver a series of training modules for UN and EU field staff, as well as local partners, in four pilot countries: Timor Leste, Liberia, Peru and Guinea-Conakry. In countries where specific natural resource management and conflict challenges are identified, the project aims to provide focused technical assistance in the development of conflict prevention

[148] K. CONCA, A. CARIUS, and G. D. DABELKO, *Op. cit.,* p.150

strategies. This could include the deployment of staff and other experts to assist the UN Country Team, including the Resident Coordinator or Peace and Development Advisor, in analysing options and designing programmes. Where needed, dedicated follow-up measures may also be undertaken on an inter-agency basis, in partnership with the EU.

The Environment and Security (ENVSEC) Initiative

ENVSEC works to assess and address environmental problems, which threaten or are perceived to threaten security, societal stability and peace, human health and/or sustainable livelihoods, within and across national borders in conflict prone regions. The Initiative collaborates closely with governments, particularly foreign, defence and environment ministries, national experts and NGOs. Together with the stakeholders ENVSEC has carried out assessments and published reports illustrated by maps, for understanding the linkages between environment and security in the political and socio-economic reality of Eastern Europe, South Eastern Europe, the Southern Caucasus and Central Asia. Based on the assessments, the Initiative develops and implements work programmes aimed at reducing tensions and solving the problems identified. Key partners in ENVSEC include UNDP, UNEP, OSCE, NATO, UNECE and REC.

These organisations within ENVSEC offer countries their combined pool of expertise and resources to peacefully resolve their overriding political, economic and social concerns, including mechanisms to address the links between the natural environment and human security. ENVSEC focus areas include natural resources, hazardous substances, climate change and information & participation.

Under OSCE's Chairmanship, the ENVSEC Initiative is currently working to strengthen the security component of its work in order to expand its capacity to better respond to emerging environmental challenges to security within the pan-European region for the next decade. It is expected that through a redefined security focus of the work programme and more articulated environment and security interventions, not only the effectiveness, but also the impact of the Initiative as a confidence building tool will be increased.

The Organization for Security and Co-operation in Europe (OSCE)

The Organization for Security and Co-operation in Europe (OSCE) is the world's largest regional security organisation, fostering comprehensive and co-operative security among 56 States from Vancouver to Vladivostok.

As part of its comprehensive approach to security, the OSCE is concerned with economic and environmental matters, recognising that co-operation in these areas can contribute to peace, prosperity and stability.

The OSCE, in particular through the Office of the Co-ordinator for OSCE Economic and Environmental Activities and the OSCE Conflict Prevention Centre, promotes a continuous dialogue through regular meetings of its permanent bodies in Vienna such as the Permanent Council, the Economic and Environmental SubCommittee. Economic and Environmental Officers operate on the ground in the OSCE Field Presences in South-Eastern Europe, Eastern Europe, the South Caucasus and Central Asia.

Through its work, OSCE offers a forum for political negotiations and decision-making in the fields of early warning, conflict prevention, crisis management and post-conflict rehabilitation.

The OSCE assists participating States with the sustainable use and sound management of natural resources, supporting projects aiming to improve water management, deal with soil degradation and dispose safely of toxic and radioactive waste. In addition, it works to raise environmental awareness and promote public participation in environmental decision-making.

12.2.2. EU Action

In parallel with its growing economic power, the EU has created its own foreign and security policy. Regional conflicts in Europe and elsewhere in the 1990s and the fight against terrorism persuaded EU leaders to create formal instruments for both diplomacy and intervention.

Long-term prevention: projecting stability

As a promoter of integration, the EU has for decades maintained special relations with its neighbours, which have helped to maintain a high level of stability and prosperity. This regional co-operation has not stopped at the EU's borders, and could also serve as an example to bodies such as Mercosur, the West African Economic and Monetary Union (UEMOA) and the Gulf Co-operation Council (GCC), which already receive EU support.

Trade is an important aspect of co-operation and development and contributes to conflict prevention. Through the Generalised System of Preferences (GSP), the EU facilitates access to the European market for most products from developing countries. The system is based on tariff preferences at variable rates, accompanied by trade-related capacity building. Since February 2001, the "Everything but Arms" initiative has given duty-free access to the European market, without quotas, to all products from the least developed countries (LDCs) other than arms. These preferences may be suspended if a country's political situation deteriorates. Introduced in 1974, it should be noted that the GSP is undergoing a review that aims to take into account recent commercial trends and emerging powers and will likely result in fewer countries benefitting from the scheme.

Conflict prevention must be incorporated in co-operation programmes, since violent conflict rarely springs out of nowhere, but is the result of a gradual deterioration. Development policy and co-operation programmes are therefore effective instruments for dealing with the root causes of conflict. Their emphasis is on reducing poverty.

It is, however, not enough for the EU to be a major supplier of aid to the world. It's approach must also be integrated, i.e. take account of each country's specific conditions while seeking sustainable or structural stability, as in Salvador and Guatemala.

Country strategy papers (CSP) are an essential part of this integrated approach. They include an evaluation of potential conflict using the indicators referred to above (CEWS). Conflict prevention measures are thus incorporated in the co-operation programmes of countries with obvious risk factors.

For sustainable stability and conflict prevention, a healthy macroeconomic environment is also necessary. The Commission therefore provides financial support for appropriate economic reform programmes in highly indebted poor countries (HIPC).

The EU also supports democracy, the rule of law and civil society, by conducting operations in the fields of transition, democratic elections, civil and political rights, freedom of expression and of the media, good governance, the development of civil society and gender equality. Particular emphasis is placed on support to electoral processes, parliamentary activities and the administration of justice.

Measures to support Security Sector Reform[149] (SSR) and specific measures for post-conflict situations are also necessary. The Security Sector Reform concerns reform of both the bodies which provide security to citizens (police, army,...) and the state institutions responsible for management and oversight of those bodies. The European Community is engaged in SSR-related support in over 70 countries, through both geographical and thematic programmes. Measures for post-conflict situations include demobilisation, disarmament and reintegration (DDR), demining operations, particular attention to children affected by armed conflict, and measures to promote the reconciliation process.

Another aspect of long-term prevention is more effective handling of cross-cutting issues such as drugs, small arms, the management of natural resources, environmental degradation, communicable diseases, massive population flows, human trafficking and private-sector interests in unstable areas. Private businesses in unstable areas have a responsibility in terms of a country's socio-economic development and also in terms of their possible contribution to maintaining, or even creating, structural causes of conflict. The EU is therefore developing guidelines to encourage businesses to behave more responsibly. This includes respect for the human rights of local people, and non-interference in the political process.

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[149] Communication COM(2006) 253 final from the Commission to the Council and the European Parliament - A Concept for European Community Support for Security Sector Reform, Brussels, 24 may 2006

Short-term prevention: reacting rapidly to incipient conflicts

The EU Programme for the Prevention of Violent Conflicts - the "Gothenburg Programme" - adopted by the Council 10 years ago - set out a series of actions to be undertaken by the European Union to prevent violent conflict, human suffering and social and economic dislocation. Policies and priorities for preventive action have also been set through the European Security Strategy and its implementation report of 2008, the Commission Communication on conflict prevention, and the development of policies on dialogue and mediation, security sector reform, the security and development nexus and situations of fragility. EU instruments for long and short term prevention have been strengthened, notably through the development of civilian and military CSDP, including the rapid deployment and security sector reform pools, and the establishment of Instruments for Stability.

In parallel, the Commission identifies two classic EU instruments, of which optimal use must be made, are emergency economic assistance and election observers. It also has political and diplomatic instruments at its disposal, such as political dialogue, Special Representatives and the use of sanctions. In its recommendations the Commission proposes making political dialogue more focused and flexible, giving Special Representatives the role of full mediators and using sanctions preventively as well as reactively. It also considers that the civilian and military crisis-management tools developed in the context of the Common Security and Defence Policy (CSDP) could be used in pre-crisis scenarios.

The EU also has a Rapid Reaction Mechanism with a single financial and legal framework, which facilitates Commission action in this field.

The Lisbon Treaty and the creation of the European External Action Service, with its enhanced and integrated resources provide the opportunity to give renewed impetus to preventive action by the EU. The Council is scheduled to meet again on this issue by the end of 2011.

Enhancing international co-operation on conflict prevention

The Council emphasises that mutually reinforcing, beneficial and sustainable partnerships with key partners such as the UN, OSCE, NATO, World Bank, African Union and other international actors and individual countries such as the US need to be further strengthened to enable the EU to operate successfully in the field of long term structural conflict prevention to complement shorter term crisis management and peace support operations.[150]

The Commission considers that the "Friends of" approach, bringing together a country's suppliers of aid, is a good method for coordinating action with partner countries in post-conflict situations. Prevention also occupies an important place in the EU's dialogue with industrialised countries.

In terms of international organisations, the Commission advocates enhanced co-operation with the United Nations, the Bretton Woods institutions (World Bank and International Monetary Fund), the Organisation for Security and Co-operation in Europe (OSCE), the Council of Europe, the Organisation for Co-operation and Economic Development (OECD) and the G8 (Canada, France, Germany, Italy, Japan, Russia, the United Kingdom and the United States). Such co-operation will take account of the specific characteristics of each organisation.

The Commission recognises the essential role of non-governmental organisations (NGOs), particularly on the ground, and states its intention of emphasising conflict prevention in its dealings with them.

12.3. Conflict Resolution

Conflict resolution is a range of methods for alleviating or eliminating sources of conflict. The term "conflict resolution" is sometimes used interchangeably with the term dispute resolution or alternative dispute resolution. Processes of conflict resolution generally include negotiation, mediation, and diplomacy. The processes of arbitration, litigation, and formal complaint processes such

[150] Council of the European Union, Council conclusions on conflict prevention, 3101st Foreign Affairs Council meeting, Luxembourg, 20 June 2011

as ombudsman processes, are usually described with the term dispute resolution, although some refer to them as "conflict resolution." Processes of mediation and arbitration are often referred to as alternative dispute resolution.

12.3.1. *International Action*

UN Security Council

The UN Security Council is the main organisation of the United Nations dedicated to the resolution of conflicts and peacekeeping. It is composed of fifteen members, five of whom are permanent, namely China, France, the Russian Federation, the United Kingdom and the United States, and ten of which are elected by the General Assembly every two years.

When the Security Council is confronted with a problem that can represent a threat for international peace and safety, it must first try to resolve the problem peacefully. In the past, the Security Council has acted as mediator or, in cases of armed conflict, proposed a cease-fire. The Council can also reinforce its decisions by enacting sanctions. According to the report " 'We the Peoples'...", sanctions are a way for the Council to apply its decisions, constituting a step between a simple condemnation and armed intervention. Sanctions can include an arms embargo, trade and finance restrictions, the ceasing of air and sea contact, or diplomatic isolation. Furthermore, the council can also opt for measures that call for more people and material.

Peacekeeping missions allow the Security Council to watch over the cease-fire and participate in the creation of conditions for peace. On a few rare occasions, the Security Council has authorised member States to use all the necessary means to keep the peace, including collective military action.[151]

12.3.2. *EU Action*

The EU is committed to being able to act with rapid and decisive action applying a fully coherent approach to the whole spectrum of crisis management operations covered by the Treaty on European Union. A range of instruments is at its disposal, ranging from political and diplomatic initiatives through measures such as trade, aid and humanitarian relief to the possibility of military intervention with the framework of the Petersburg Tasks set out in Article 17 of the Treaty. These are integral part of Common Foreign and Security Policy (CFSP) and the European Security and Defence Policy (ESDP), and range from humanitarian and rescue operations to crisis management including peacemaking. Joint disarmament operations, support for third countries in combating terrorism and security sector reform are also seen as potential tasks.

12.4. Post-Conflict Recovery and Transition

According to the UNDP, post-conflict economic recovery aims to establish sustainable economic growth and human development while addressing the factors that could lead to a recurrence of conflict. Post-conflict recovery is not about restoring pre-war economic or institutional arrangements. It is about transformation — requiring a mix of far-reaching economic, institutional, legal, and policy reforms that allow war-torn countries to re-establish the foundations for self-sustaining development.

Environmental confidence building measures can be particularly important in cases of post conflict recovery and transition. Matthew, Brown and Jensen reported that "Preliminary findings from a retrospective analysis of intrastate conflicts over the past sixty years indicate that conflicts associated with natural resources are twice as likely to relapse into conflict in the first five years. Nevertheless, fewer than a quarter of peace negotiations aiming to resolve conflicts linked to natural resources have addressed resource management mechanisms."[152] These findings have been confirmed by Erika

[151] See: http://www.unac.org/peacecp/factsheet/role.html (last consulted 10 November 2011)

[152] R. MATTHEW et al, *Op. cit.,* p. 5

Weinthal in her paper on "Harnessing the Environment in Post-Conflict Peace Building"[153], adding that conventional literature has overlooked the role of the environment in maintaining the peace, even where the environment is explicitly part of a negotiated peace agreement (e.g. the Israel-Jordan Peace Treaty).

Pekka Haavisto, then with the UNEP Post-Conflict Assessment Unit, wrote in 2004 "for the first time in 29 years Iraqi and Iranian water and environmental authorities together discussed the issue of the shared Mesopotamian Marshes. Old enemies are once again negotiating on environmental matters. Along with improving the state of these resources, the management of shared resources can serve as an important way to build confidence between formerly hostile countries."[154]

12.4.1. International Action

UN Peacebuilding Commission

The UN Peacebuilding Commission brings together all relevant actors to marshal resources and to advise on proposed integrated strategies for post conflict peacebuilding and recovery; helps ensure predictable financing for early recovery activities and sustained financial investment over the medium to long-term; and develops best practices on issues in collaboration with political, security, humanitarian and development actors.

The resolutions mandating the Commission also identify the need for the Commission to extend the period of international attention on post-conflict countries and where necessary, highlight any gaps which threaten to undermine peacebuilding. For example attention is paid to helping to prevent natural resources and environmental stress from undermining the peacebuilding process, while at the same time serving as a platform for dialogue, co-operation and confidence-building.

With a view to offering independent expertise and advice to the Commission and the wider peacebuilding community, the United Nations Environment Programme (UNEP) established an Expert Advisory Group on Environment, Conflict and Peacebuilding in February 2008. Consisting of leading academics, think tanks and non-governmental organisations with combined experience from over 30 conflict-affected countries, the Group provides policy inputs, develops tools, and identifies best practice in using natural resources and the environment in ways that contribute to peacebuilding and prevent relapse into conflict.

World Bank – on Conflict, Security, and Development

Following the World Development Report 2010: Development and Climate Change the Bank's 2011 report is devoted to Conflict, Security, and Development. It examines the changing nature of violence in the 21st century, and underlines the negative impact of repeated cycles of violence on a country or region's development prospects. Preventing violence and building peaceful states that respond to the aspirations of their citizens requires strong leadership and concerted national and international efforts.

The report begins with a reference to the situation in the Middle East and North Africa, saying that we are now seeing again that "violence in the 21st century differs from 20th-century patterns of interstate conflict and methods of addressing them. Stove-piped government agencies have been ill-suited to cope, even when national interests or values prompt political leaders to act. Low incomes, poverty, unemployment, income shocks such as those sparked by volatility in food prices, rapid urbanisation, and inequality between groups all increase the risks of violence. External stresses, such as trafficking and illicit financial flows, can add to these risks."

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[153] E. WEINTHAL "Harnessing the Environment in Post-Conflict Peace Building", Paper presented at the annual meeting of the International Studies Association, Town & Country Resort and Convention Center, San Diego, California, USA, 22 Mar 2006, see: http://citation.allacademic.com/meta/p_mla_apa_research_citation/0/9/9/6/2/pages99624/p99624-1.php (last consulted 10 November 2011

[154] P. HAAVISTO, "Environmental Impacts of War" in R. MICHAEL, H. FRENCH and E. ASSADOURIAN, Eds. *State of the World 2005: Redefining Global Security*, W.W. Norton & Company / Worldwatch Institute, Washington, D.C., 2005, p.154, see: http://ecc.adelphi.de//PDF/SOW%2005%20chap8.pdf (last consulted 10 November 2011)

This year's report looks across disciplines and experiences drawn from around the world to offer some ideas and practical recommendations on how to move beyond conflict and fragility and secure development. The key messages are important for all countries—low, middle, and high income—as well as for regional and global institutions.

UNEP Post Conflict and Disaster Management Branch (PCDMB)

The Post Conflict and Disaster Management Branch (PCDMB) has conducted operations in more than twenty-five countries and has published eighteen environmental assessments reports between 1995 and 2008. It has five core areas of operation:

- Conducting environmental assessments;
- Mitigating environmental risk;
- Strengthening institutions for environmental governance;
- Integrating environmental considerations in reconstruction;
- Strengthening international and regional environmental cooperation.

The main phase of post-conflict environmental assessments followed by PCDMB are as follows:

- Preparatory phase
  - Political and institutional cooperation
  - Desk studies and satellite imagery analyses
  - Recruitment and training of international and national experts
  - Initial stakeholders meetings and fact-finding missions
- Field investigation phase
  - Identification of potential environmental hotspots
  - Technical missions (site visits, sampling, interviews)
- Reporting phase
  - Technical reports from each field team
  - Synthesis of technical reports into public final report
  - Finalisation and dissemination of final report
- Analytical and stakeholder consultation phase
  - Laboratory and GIS analysis
  - Expert review panel, stakeholder consultations
- Follow-up
  - Catalyse national action and financial support
  - Integrate findings in UN frameworks

Today, the PCDMB is also coordinating UNEP's Disasters and Conflict Programme, which is delivered through several partners, including the Joint UNEP/OCHA Environment Unit, ENVSEC, and the APELL (Awareness and Preparedness from Emergencies on a Local Level) Programme.

The International Criminal Court (ICC)

The International Criminal Court (ICC), governed by the Rome Statute, is the first permanent, treaty-based, international criminal court established to help end impunity for the perpetrators of the most serious crimes of concern to the international community. It entered into force on 1 July 2002 after ratification by 60 countries.

To date, three State Parties to the Rome Statute - Uganda, the Democratic Republic of the Congo and the Central African Republic - have referred situations occurring on their territories to the Court. In addition, the Security Council has referred the situation in Darfur, Sudan - a non-State Party.

International Court of Justice (ICJ)

The International Court of Justice (ICJ) is the principal judicial organ of the United Nations. It was established in June 1945 by the Charter of the United Nations. This court was created to resolve conflicts between States, whereas the ICC deals exclusively with the responsibility of individuals. However, because there are so few States that are ready to bring their differences before this court and accept its authority, this institution has not yet had a large impact.

United Nations High Commissioner for Refugees

The UN Refugee Agency emerged in the wake of World War II to help Europeans displaced by that conflict. What was originally a three-year mandate soon became a permanent agency growing from 34 staff members in 1950 to more than 7,190 national and international staff members and a budget of more than US$ 3.32 billion in 2011. It has since become the main agency dealing with internally displaced people, refugees, returnees, stateless people and asylum seekers.

In post-conflict situations, UNHCR, the United Nations High Commissioner for Refugees, is responsible for the relocation of refugees, and supervises the work conducted in the field.

12.4.2. EU Action

A 2007 Communication[155] from the Commission stresses that fragile situations are a major obstacle to sustainable development, regional stability and international security. They are triggered by several factors, such as structural fragility of the economy, a number of democratic governance shortcomings, environmental degradation or access to natural resources.

Effective prevention and adequate response are important strategies as is the management of the post-crisis phase which is ensured by the Linking Relief, Rehabilitation and Development[156] (LRRD) strategic framework which aims at the creation of synergies between the withdrawal of humanitarian aid and the transition to development activities.

The Commission recognises that in addressing fragility, the EU must improve the use of its resources, i.e. Community instruments, the common foreign and security policy (CFSP) and the Common Security and Defence Policy (CSDP) instruments, but also Member States' bilateral aid. Specifically, it should encourage increased synergy between existing financial instruments, i.e.:

- The European Development Fund (EDF), which finances flexible mechanisms for post-emergency action and transition to the development phase.
- The Development Co-operation Instrument (DCI) and European Neighbourhood and Partnership Instrument (ENPI), which provide for a special emergency procedure allowing transition to development and specific measures to be implemented when stability and humanitarian aid measures cannot intervene.
- The Instrument for Stability, which provides for support in situations of crisis or emerging crisis, initial post-crisis political stabilisation and early recovery from natural disasters.
- The humanitarian aid instrument, used when situations of crisis have humanitarian implications, whatever the level of fragility and the causes of the crisis.

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[155] Communication COM(2007) 643 final from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions - Towards an EU response to situations of fragility - engaging in difficult environments for sustainable development, stability and peace, Brussels 25 October 2007

[156] Communication COM(2001) 153 final from the Commission to the Council and the European Parliament of 23 April 2011 entitled "Linking Relief, Rehabilitation and Development - An assessment, Brussels, 23 April 2001

- The thematic programme Non State Actors and Local Authorities in Development and the European Instrument for Democracy and Human Rights (EIDHR), which provide for procedures applicable to situations that are not favourable to participatory development or to respect for human rights. Specifically, the EIDHR can fund activities without approval from the governments of partner countries, which is fundamental in certain situations of fragility.
- Budget support, which has often been used by the Commission in post-conflict cases to address urgent financial needs, consolidate key state functions and maintain social stability.

12.5. The Role of Earth Observation

Earth Observation increasingly appears as a key tool for ensuring peace and security. Satellites have long been able to detect movements of troops, migrant flows, fires, etc. Today, this data is also increasingly accessible to the public, making it more difficult for warring factions to hide their crimes and control information. The following broad approach to the principle demands for earth observation support can be envisaged.[157]

In *Pre-crisis* situations include broadly-based routine observation in the context of the ESS, counter-terrorism and counter-proliferation policies to support the Situation Centre and other bodies as required. Other useful areas for pre-crisis or conflict prevention include the monitoring of resources in developing countries which are potential focal points for crisis (including, for example, diamonds, timber and water) as well as applications for humanitarian purposes such as the monitoring of crops for food security.

In *developing crises* principle demands include flexibility to facilitate rapid focus on emerging problems and crisis management planning. This might include on the one hand assessing the impact of natural disasters or of indicators of potential crises, such as movements of troops and refugees and on the other aspects of supporting the preparation of humanitarian or military operations.

In *conflict resolution* during a crisis situation earth observation should contribute to political management of crises including humanitarian intervention and any military or police intervention in crises management. All will require quality information in near real time.

In *post-crisis* situations earth observation should contribute to management of the post-crisis with flexibility, accuracy and precision. This will include supporting damage assessment and tracking post-crisis humanitarian aid, recovery and reconstruction programmes, the monitoring of military disengagement, including disarmament and demobilisation and possibly specific observation tasks linked to the implementation of peace building agreements, such as the monitoring of large-scale movements of displaced persons and refugees, borders or other disputed areas, critical infrastructure, etc.

Satellite Sentinel Project (SSP)

Post-crisis situations of course also involve conflict prediction and conflict prevention. An example of the role of earth observation here is the Satellite Sentinel Project (SSP) which combines satellite imagery analysis and field reports with Google's Map Maker technology to deter the resumption of war between North and South Sudan. The project provides an early warning system to deter full-scale civil war between Northern and Southern Sudan and to promote greater accountability for mass atrocities by focusing world attention and generating rapid responses on human rights and human security concerns.

EU Satellite Centre (EUSC)

The EU Satellite Centre (EUSC) is the focal point for the acquisition and analysis of satellite imagery to support the operations and missions of the EU and member states including, for example, military

[157] B. JASANI, M. PESARESI, S. SCHNEIDERBAUER and G. ZEUG, editors, "Remote Sensing from Space, Supporting International Peace and Security", Springer, 2009, p.25

operations, police missions and security monitoring tasks. Given the complex institutional framework of EU security policy, the range of potential customers for this imagery is considerable.[158]

The European Parliament resolution on Space and Security in 2008 urged that the European Union Satellite Centre (EUSC) be fully developed to make full use of its potential. Since then the EUSC remains one of the key institutions for European Union's Security and Defence policy in the field of space and it works closely with the EC's Joint Research Council (JRC) and the ESA. Since 2009 they have been working together to address the issues involved in Image Information Mining. Their Seventh Conference on Image Information Mining: Geospatial Intelligence from Earth Observation in March 2011 highlighted the problem that manual process performed by experts to mine information from images is currently too complex and expensive to be applied systematically on even a small subset of the acquired scenes. The meeting continued these organisations' interest in automation in support of applications and services for geospatial intelligence.

G-MOSAIC

The G-MOSAIC (GMES services for Management of Operations, Situation Awareness and Intelligence for regional Crises) Collaborative Project will provide the European Union with intelligence data that can be applied to early warning and crisis prevention as well as to crisis management and rapid interventions in hot spots around the world. It aims at identifying and developing products, methodologies and pilot services for the provision of geo-spatial information in support to EU external relations policies and at contributing to define and demonstrate the sustainability of GMES global security services.

The G-MOSAIC project was launched in January 2009. It is a three-year project, with a total budget of 15.3 million euros, of which the European Commission (Directorate Enterprise and Industry) will finance 9.6 million through a grant under the 7th Framework Programme for Research and Technological Development. G-MOSAIC brings together industrial operators, public sector research, and academia. It gathers the main players of GMES Security services in Europe:

- Industrial service providers : e-GEOS, EADS Astrium, GMV, Indra Espacio, Astrium Geo-Information Services, Thales Alenia Space, and Thales Communications;
- Institutional stakeholders : the European Union Satellite Centre, the German Space Agency DLR, the Joint Research Centre of the European Commission, and the Polish Space Research Centre;
- Representatives of leading European academic institutions and specialised small and medium size enterprises.

The main expected results of G-MOSAIC are:

- Organise service chains and infrastructure for the provision of pre-operational pilot services in support to security activities, in particular focusing on External Regional Crises;
- Develop pre-operational Services for Security, and identify related Downstream Services, based on what was developed in previous GMES security and emergency response projects;
- Develop a prototype portal for the management and harmonisation of the different service cases in a secure service network.

G-MOSAIC will develop services for security to:

- Support Intelligence & Early Warning, with the objective to deploy and validate those information services which contribute to the analysis of the causes leading to regional crises, such as weapons proliferation, fight for natural resources, population pressure, land degradation, and illegal activities. One important aspect will be the development of crisis indicators;
- Support Crisis Management & Operations, with the objective of deploying and validating those information services which contribute to support the planning for EU intervention during crises,

[158] B. JASANI, *Op. cit.,* p.24

the EU intervention itself and citizen repatriation during crises, the crisis consequences management, reconstruction & resilience.

G-MOSAIC will develop sixteen service chains in the fields of Intelligence & Early Warning and Crises Management & Operations:

- Nuclear and Treaties Monitoring
  - Monitoring of Nuclear Decommissioning Sites
  - Continuous Surveillance of Nuclear Facilities
- Natural resources and conflicts
  - Exploitation of Natural Resources
  - Population Pressure
  - Land Degradation
  - Illegal Mining
  - Illegal Timber Logging
  - Illicit Crops
- Migration and Border Monitoring
  - Border Area Monitoring
  - Monitoring Migration Routes and Settlements
- Critical Assets
  - Critical Assets Monitoring
  - Critical Assets Event Assessment
- Crisis Management and Assessment
  - Contingency Plan Preparation
  - Rapid Geospatial Reporting
  - Damage Assessment for Post Conflict Situations
  - Support Reconstruction Missions After Conflicts

G-MOSAIC will also:

- Disseminate knowledge about the potential impact of GMES on the Security-related User Community;
- Contribute towards building a political consensus on GMES Services for Security, to promote the construction of a European inter-pillar capability for the monitoring services and related infrastructures;
- Assess a sustainable provision and funding model for GMES Security Services;
- Study architectural models and prototype suitable solutions for security services provision, addressing specific requirements related to confidentiality of sensitive data and information handling;
- Provide recommendations for future sensors for security services.

G-MOSAIC products and services will be of use to both to European and national organisations and entities: the European Commission (Development, Environment, and Humanitarian Aid), the European External Action Service and its components such as the EU Military Staff (EUMS) and the EU Situation Centre (SitCen); and, finally, national institutions such as Ministries of Foreign Affairs, Police Organisations and Intelligence Centres.

13. Africa

According to the UNDP, over the last ten years, the Africa region has seen commendable progress in the areas of democratic governance, economic growth and the provision of basic social services.

Before the economic crisis hit Africa in 2008, the region boasted impressive growth rates. Many countries were able to capitalise on this trend to allocate considerable sums toward basic social services, making progress toward achievement of the Millennium Development Goals (MDGs). Thus, while Sub-Saharan Africa remains the developing region with the highest number of people living in extreme poverty, poverty rates have dropped rapidly since 1990, hovering around an estimated 46 percent in 2008.

Africa is also much more democratic today than it used to be in the 1960s. Its corrupt elites can no longer plunder its natural resources in total impunity like they did in the second half of the XXth century. The Arab Spring and the revolutions in Tunisia, Egypt and now Libya - though imperfect they are - witness this evolution and brings hope to African populations and the emerging civil society.

However, despite these encouraging signs and its abundant natural resources, Africa remains the world's poorest and most underdeveloped continent. This is the result of a variety of causes that may include corrupt governments, failed central planning, high levels of illiteracy, lack of access to foreign capital, and frequent tribal and military conflict (ranging from guerrilla warfare to genocide). According to the United Nations' Human Development Report in 2003, the bottom 25 ranked nations (151st to 175th) were all African.

The increasing frequency and intensity of droughts and rising temperatures will have a significant negative impact on regions highly vulnerable to conflict. Due to poor harvests, several areas on the African continent may face food insecurity. The UN predicts that there will be millions of "environmental" migrants by 2020 with climate change as one of the major drivers of this phenomenon.[159] The International Panel on Climate Change (IPCC) estimates that a if temperatures rise above two degrees Celcius in Sub-Saharan Africa, more than 600 million people in the region could face hunger, new epidemics of vector-borne diseases as well as additional agricultural losses of up to US$ 26 billion by 2060.[160]

The negative impacts of climate change combined with a growing population, poverty, the current number of existing conflicts, weak state structures, and low capacities to respond represent major challenges and have potentially high consequences on security in Africa.[161]

13.1. International Action

13.1.1. World Bank

The World Bank partners with 47 countries in Sub Saharan Africa and is involved in 506 projects in the region. The Banks' portfolio includes projects and programs in multiple sectors from trade and transportation to energy, education, health care, water and sanitation. In fiscal year 2010, the Bank committed $11.5 billion in new project lending in Africa, and disbursed over $1.1 billion in grants, in addition to almost 90 analytical studies.

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[159] "Climate Change and International Security: Paper from the High Representative and the European Commission to the European Council", S113/08, 14 March 2008, p4 & p6. Note that IOM identifies the most widely cited prediction as being 200 million people moving or being permanently displaced by 2050 due to environmental factors, although estimates vary considerably, depending in large part on the climate change scenario used, source: IOM, see: http://www.envirosecurity.org/acces/docs/IOM_Migration_Climate_Change_Environment_Statistics.pdf

[160] UNDP Fact Sheet, *Op. cit*.

[161] Africa, Climate Change, Environment and Security Dialogue Process, "Climate Change and Security in Africa: Vulnerability Report" Brussels, December 2010, see http://www.envirosecurity.org/acces/docs/ACCES_2010_Vulnerability_Report.pdf

13.1.2. UNDP

With its presence in every African country and its extensive network of partners across the continent, UNDP has provided services to help African countries and regional institutions to respond to climate change by working on the following four areas:

- Strengthening Africa's voice in the global climate change negotiations
- Helping Africa to develop comprehensive strategies to tackle climate change
- Unleashing Africa's low-carbon development potential
- Helping the region to adapt to climate change

In addition, through its participation in UN-REDD (Reducing Emissions from Deforestation and Forest Degradation), UNDP will be helping to monetise the carbon stored in forest to create incentives for African countries to protect forests. The resulting financial flows will not only significantly reduce carbon emissions but can support poverty reduction and help preserve biodiversity and ecosystem serviced. The programme is currently being piloted in the DRC, Tanzania and Zambia.[162]

13.1.3. UNEP

With its main office based in Nairobi, Kenya, the United Nations Environment Programme (UNEP) has a clear advantage in understanding the environmental issues in Africa and developing countries in general.

UNEP work encompasses:

- Assessing global, regional and national environmental conditions and trends;
- Developing international and national environmental instruments;
- Strengthening institutions for the wise management of the environment;
- Facilitating the transfer of knowledge and technology for sustainable development;
- Encouraging new partnerships and mind-sets within civil society and the private sector.

UNEP has been involved in producing Post-Conflict Environmental Assessments, focusing on linkages between the environment, conflict and the ongoing humanitarian and development programmes. It's most recent such study is a Post-Conflict Environmental Assessment on Sudan.

13.1.4. Africa, Climate Change, Environment and Security (ACCES) Dialogue Process[163]

The ACCES Dialogue Process was launched at the first "Dialogue Forum on Climate Change and Security in Africa"[164] on 11 October 2010 in Addis Ababa, Ethiopia as a pre-event to the 7th African Development Forum, arranged by the UN Economic Commission for Africa, the African Union Commission and the African Development Bank. ACCES is a joint initiative involving the United Nations Environment Programme (UNEP), the United Nations Food and Agriculture Organisation (FAO), the United Nations Industrial Development Organization (UNIDO), the International Organization for Migration (IOM), the Global Water Institute (GWI), the Bonn International Center for Conversion (BICC), Swedish Defense Research Agency (FOI) and the Institute for Environmental Security (IES) with ongoing efforts to also involve

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[162] UNDP Fact Sheet, Climate Change in Africa, see: http://www.undp.org/africa/documents/FF_climate_change.pdf (last consulted 10 November 2011)

[163] For more information about ACCES and its 2011-2014 programme see: http://www.envirosecurity.org/acces/events/briefing080411.php

[164] Dialogue Forum on Climate Change and Security in Africa, see: http://www.madariaga.org/events-2010/355-dialogue-forum-on-climate-change-and-security-in-africa (last consulted on 10 November 2011)

the UN Economic Commission for Africa, the African Climate Policy Centre (ACPC), the African Union and others.

When the necessary resources are mobilised to finance the ACCES 2012-2015 Programme the multi-stakeholder process will work to address the security threats related to climate change initially in five African states / eco-regions. In each case the research and dialogue process will be led by Working Groups dealing with water security, food security, energy security, energy security, migration, natural hazards and peace & security.

The ultimate goal of the Dialogue Process is to build up local resilience capacities and establish collaborative platforms for African and international partners to jointly address the security risks of climate change in Africa from a development and human security perspective. The main purpose of the ACCES initiative is to design, jointly with regional and local communities, security sensitive climate change adaptation options, programmes and fundable project concepts which include elements of early warning, response measures, and on-going research, co-operation and dialogue.[165]

13.2. EU Action

In 2009, the EU (27 Member States and the European Commission) was once again the largest provider of development aid in the world with more than half of global Official Development Assistance - € 48.2 billion.[166]

The European Commission alone disbursed € 10 billion of which € 3.9 billion went for Africa (in comparison, this was more than double the share that went to Asia). This support was made available through various instruments and channels (projects and sector wide approach, budget support, NGOs and multilateral institutions such as the World Bank and United Nations). [167]

13.2.1. Africa-EU Strategic Partnership

The European Union (EU) and African Union (AU) work in partnership on a range of important issues referred to in the 2nd Joint Africa EU Strategy (JAES). This document was adopted at the 3rd Africa EU Summit, on 29-30 November 2010 in Tripoli, Libya.

The Action Plan 2011-2013[168] provides a framework to implement JAES priorities collectively agreed upon and adopted at the Summit under the overarching theme "Investment, economic growth and job creation". It was agreed that the Action Plan 2011-2013 would focus on eight partnerships including 1) Peace and Security, 2) Democratic Governance and Human Rights, 3) Regional Integration, Trade and Infrastructure, 4) MDGs, 5) Energy, 6) Climate Change and the Environment, 7) Migration, Mobility and Employment and, 8) Science, Information Society and Space.

A report on the most recent AU-EU meeting states that "At the heart of this co-operation remain the Millennium Development Goals (MDGs). EU support has already led to impressive results in this area: 9 million children have been enrolled in primary education; more than 31 million households have been connected to improved drinking water; and 24 million people have been helped through social transfers related to food security.

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[165] Key partners in ACCES already include the African Union Commission, the European External Action Service (EEAS) / EU Mission to the AU, United Nations Environment Programme (UNEP), United National Food and Agriculture Organisation (FAO), United Nations Industrial Development Organization (UNIDO), International Organization for Migration (IOM), Global Water Institute (GWI), Institute for Environmental Security (IES), the University for Peace Africa Programme and a number of other African, European and international organisations, research organisations and NGOs

[166] Financing the Africa-EU Partnership, see: http://www.africa-eu-partnership.org/partnerships/financing-africa-eu-partnership, (last consulted 10 November 2011)

[167] Financing the Africa-EU Partnership, *Ibid*.

[168] Joint Africa EU Strategy - 2nd Action Plan 2011-2013, see: http://www.envirosecurity.org/actionguide/view.php?r=506&m=publications (last consulted 10 November 2011)

Development Commissioner Andris Piebalgs stressed: "We remain convinced we can attain all the MDGs, provided that the proper political will, policy reforms and financial resources and investments are in place."

Indeed, Africa is moving forward on many fronts these days. With 5% growth forecast for the continent this year and rapidly expanding trade, with the emergence of a middle class of smart entrepreneurs and wealth creators, and with an ambitious regional and continental integration agenda taking shape, there are many promising channels for future joint AU-EU efforts.[169]

13.3. The Role of Earth Observation

Joint Africa EU Strategy - 2nd Action Plan 2011-2013

The Action Plan makes explicit references to the use of space applications. For example, it is stated that an emphasis needs to be placed on monitoring climate change, desertification and fires and water and food resources:

- Partnership 3 - Regional Integration, Trade and Infrastructure: "Both sides were committed to intensifying the co-operation on information and communication technologies and space applications with the objective to strengthen Africa's participation in the Information Revolution." In terms of infrastructure investments, one of the priorities of the Action Plan is a plan to support the air transport sector and satellite navigation. This includes technical assistance for the implementation of new satellite based technologies for communication, navigation and surveillance with the objective of building a core technical capacity for Satellite Based Augmentation Service (SBAS) within relevant African organisations in each region and implementation of preliminary backbone infrastructure.
- Partnership 6 - Climate Change and the Environment: The African Monitoring of the Environment for Sustainable Development project (AMESD) is "strengthening the capacities of African institutions to use satellite-based Earth Observation information for decision-making in various environmental themes that are impacted by climate change (agriculture, land degradation, water management, etc.)"
- Partnership 8 - Science, Information Society and Space: The third priority action states clearly as an objective to "enhance co-operation in the use of space application and technology to support Africa's development".

The activities include 1) the finalisation and implementation of the Action Plan on GMES and Africa, including capacity building efforts at continental, regional and national level to allow users to fully exploit available Earth observation-based information and products, 2) the reformulation and support of the implementation of the African Geodetic Reference Frame (AFREF) to establish a foundation for space applications in Africa and, 3) the development and establishment of a strong African institutional and policy framework for promoting the exploitation of space-based applications and assess the feasibility of an autonomous African Space Agency.

*African Monitoring of the Environment for Sustainable Development (AMESD) **

AMESD is an initiative managed by the African Union Commission (AUC) and funded by the EU (21 Mio Euro) in order to improve satellite earth observation and environmental monitoring and provide instruments and services to policy-makers to enhance adaptation to and prevention of environmental challenges in five regions of sub-Saharan Africa (CEMAC, ECOWAS, IGAD, IOC, SADC) and for all 47 member states covered by this initiative.

Five Regional Thematic Actions are being established to develop appropriate information services:

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[169] The Joint Africa-EU Strategy - Filling a unique partnership with life, report on the 5th College-to-College meeting of the African Union Commission and the European Commission, 31 May - 1 June 2011, see: http://www.africa-eu-partnership.org/focus/joint-africa-eu-strategy-filling-unique-partnership-life (last consulted 10 November 2011)

- Water resources management;
- Crop and rangeland management;
- Agricultural and environmental resources management;
- Mitigation of land degradation (including forest exploitation) and conservation of natural habitats, and;
- Marine and coastal management.

The observatory is based on earth observation data gathered with particular priorities in each of the regions (e.g. drought in Eastern Africa, water management in Central Africa). The AUC serves as coordination centre and political lead while one focal point institution is identified for each of the five regions. Other principal partners include the European Commission, EUMETSAT, the five participating African Regional Economic Communities and the Secretariat of the African, Caribbean and Pacific Group of States (ACP).

EUMETSAT's data, in particular Meteosat, represent a key contribution to this programme. EUMETSAT has been providing comprehensive support to Africa for more than 15 years (coverage with satellites, dissemination of data to Africa (EUMETCast system), training of users,...). However, weather forecasting capabilities across the continent have been enhanced in recent years by initiatives such as the Preparation for the Use of MSG in Africa (PUMA), the first pan-African technology project focusing on Earth observation funded by the EU. PUMA has made available data and products from EUMETSAT's latest satellites, enabling African National Meteorological and Hydrological Services to provide accurate weather forecasts, monitor extreme weather events, improve disaster management and forestall drought and starvation.

The AMESD initiative takes PUMA a stage further by extending the use of remote sensing data to environmental and climate monitoring applications. Nevertheless, African parties have expressed their interest for the development of an African GMES programme. This has been confirmed by the African Union stressing that "the GMES Africa initiative will reinforce, on an international scale, european efforts on GMES, will consolidate the objectives of PUMA and AMESD, and will contribute to the reinforcement of the 8th EU-Africa Partnership." This request has been reflected in the Joint Africa-EU Strategy Action Plan 2011-2013.

The current programme runs until 2013 and will be followed up by MESA (Monitoring of Environment and Security in Africa), programmed for five years and with a stronger focus on environmental security.

European-African Partnership in Satellite Applications

Even though there is much activity in the African continent regarding the use of satellite applications, there is a lack of a comprehensive mapping of actors and activities from African, European and international stakeholders. Under the auspices of the Belgian EU Council Presidency, the European Space Policy Institute (ESPI) undertook a comprehensive mapping of activities and actors in Africa. This project aimed at tackling three main questions regarding the use of satellite applications: 1) “who is who”; 2) “who is doing what”; and 3) “who is cooperating with whom”. The report[170] of the project provides a wide range of recommendations regarding the need for future Earth Observation applications.

[170] C. GIANNOPAPA, "European-African Partnership in Satellite Applications for Sustainable Development: A Comprehensive Mapping of European-African Actors and Activities", ESPI Report 26, September 2010

14. Arctic

Environmental changes are altering the geo-strategic dynamics of the Arctic with potential consequences for international stability and European security interests calling for the development of a EU Arctic policy. On the whole, Arctic challenges and opportunities will have significant repercussions on the life of European citizens for generations to come. It is imperative for the European Union to address them in a coordinated and systematic manner, in co-operation with Arctic states, territories and other stakeholders.

Central to the EU's concern about the Arctic is the role the region plays in Climate Change. The Arctic's sea ice is a major driver of global weather systems. The light surface of the ice reflects solar radiation away from the Earth and decreased reflectance contributes to global warming. Ice and melt water from the Arctic Ocean have profound effects on ocean circulation patterns on the North Atlantic, and from there to ocean and other climate systems over the entire planet.[171]

The results of computer modelling vary, but all show a clear trend towards warming in the Arctic and diminishing sea-ice extent. Some suggest that before the end of this century, sea ice will completely disappear during the summer months. For a variety of reasons, there is amplified warming in the Arctic, up two to three times faster than the global average. Air temperatures in large parts of the region have increased by as much as five degrees centigrade over the last 100 years. A slight shift in summer air temperature bringing averages above freezing will completely alter the character of the region. Where once ice covered the seas and permafrost stabilised the ground, open water and large tracts of marshy tundra will dominate. The consequences for Arctic wildlife and indigenous cultures will be severe.[172]

Other concerns for Europe in the Arctic are related to the exploitation of natural resources (fishing, minerals, gas and oil, etc.) as well as such issues as communications, navigation, transport and tourism.

Governance issues are also of special importance. Developing and implementing effective regulatory strategies in the Arctic remains a primary concern for the international community to guarantee both the environmental protection of the Arctic and the sustainable exploitation of its natural resources. With this in mind, promoting co-operation and preventing the outbreak of conflicts will necessarily require the establishment of the right balance between national and common interests in the Arctic.[173]

14.1. International Action

There are a large number of international legal frameworks concerned with the Arctic and forty-seven nations are each engaged in one or more of the 14 international organisations dealing with the Arctic affairs, especially regarding environmental and ecosystem issues.[174]

Of particular interest in the context of the current study are the following institutions / initiatives:

14.1.1. Arctic Council

Formally established in 1996 by the Ottawa Declaration, the Arctic Council is a high level intergovernmental forum aimed at providing a means for promoting co-operation, coordination and interaction among the Arctic States. "The Arctic Council is a particularly important 'high level forum',

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[171] National Geographic – Global Action Atlas (last consulted 10 November 2011)

[172] National Geographic, *Ibid*.

[173] A. AIROLDI, "The European Union and the Arctic. Policies and actions", Nordic Council of Ministers, Copenhagen, 2008, see: http://www.norden.org/da/publikationer/publikationer/2008-729/at_download/publicationfile (last consulted 10 November 2011)

[174] For a complete overview, see: P. A. Berkman, "Environmental Security in the Arctic Ocean: Promoting Co-operation and Preventing Conflict", RUSI, Milton Park, 2010

which established that the eight Arctic states and indigenous peoples organisations have 'common Arctic issues, in particular issues of sustainable development and environmental protection'."[175][176]

Of special importance is the Agreement on Cooperation on Aeronautical and Maritime Search and Rescue in the Arctic that was signed by the eight Arctic States at the Arctic Council ministerial in Nuuk, Greenland, in May 2011. It coordinates international search and rescue (SAR) coverage and response in the Arctic, and establishes the area of SAR responsibility of each state party. In view of the conflicting territorial claims in the Arctic, the treaty provides that "the delimitation of search and rescue regions is not related to and shall not prejudice the delimitation of any boundary between States or their sovereignty, sovereign rights or jurisdiction."

The Arctic Search and Rescue Agreement is the first binding agreement negotiated under the auspices of the Arctic Council. The Agreement also involves naval and coast guard assets under departments of defence, which largely have been outside the scope of the Arctic Council due to provision in the 1996 Ottawa Declaration that led to its establishment. The Agreement reflects the Arctic region's growing economic importance as a result of its improved accessibility due to global warming.

The first Arctic Council Search and Rescue exercise took place October 4-6, 2011 in Whitehorse, Yukon involving 80 delegates and observers from the eight Arctic Council member states.

14.1.2. UNEP/GRID Polar Programme

In collaboration with numerous partners and regional stakeholders, the Polar Programme undertakes environmental management approaches, capacity-building projects and initiatives in the Arctic and Antarctica with a global context. UNEP has designated UNEP/GRID-Arendal as "the UNEP key centre on Polar environmental assessments and early warning issues, with particular focus on the Arctic".

14.1.3. UNEP/WCMC Polar Programme

Since 1992, UNEP-WCMC has worked on an Arctic programme covering activities developed to compile information for the Arctic region. Much of this is designed to support the Arctic Environmental Protection Strategy process, in particular the Conservation of Arctic Flora and Fauna (CAFF) programme and the regional aspect of the Global Environmental Outlook (GEO-process) of UNEP.

14.2. EU Action

EU's interest in the Arctic is not new but recent years have seen the emergence of a policy on the Arctic. A March 2008 paper from the High Representative and the European Commission to the European Council [177] suggests to "develop an EU Arctic policy based on the evolving geo-strategy of the Arctic region, taking into account i.e. access to resources and the opening of new trade routes." This paper was followed the same year by a European Parliament resolution[178] on Arctic governance as well as a European Commission Communication on "The European Union and the Arctic Region"[179] accompanied by specific proposals for action around three main policy objectives:

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[175] Declaration on the Establishment of the Arctic Council, Ottawa, 19 September 1996, as quoted in Berkman

[176] In addition to the Arctic Council, there are other international institutions that involve all eight of the Arctic states, including the: North Atlantic Coast Guard Forum, 1920 Spitsberg Treaty, International Arctic Science Committee and the Standing Committee of Arctic Parliamentarians

[177] Paper from the High Representative and the European Commission S113/08 to the European Council - Climate Change and International Security, 14 March 2008

[178] Resolution 2008/2633 (RSP) of the European Parliament of 9 October 2008 on Arctic governance

[179] Communication COM(2008) 0763 final from the Commission to the European Parliament and the Council - The European Union and the Arctic region, 21 November 2008

- protecting the Arctic in unison with its population;
- promoting sustainable use of resources; and
- contributing to enhanced Arctic multilateral governance.

The Council welcomed the communication and issued the "Council Conclusions on Arctic Issues" in December 2009.

On 20 January 2011, the European Parliament adopted an own initiative report and resolution on "A sustainable EU policy for the High North."[180] The report indicates the need for a united, coordinated EU policy on the Arctic region, in which both the EU's priorities and the potential challenges and a strategy are clearly defined. According to the Parliament, the scope of the EU's Arctic policy include: environment and climate change, support to indigenous peoples and local population, research, monitoring and assessments, exploitation of hydrocarbons, fisheries, transport, tourism, multilateral governance.

In its report, the European Parliament lays down specific points which will require an improvement of space monitoring as well as the deployment of new communication technologies over the Arctic:

- Regarding transport routes the Parliament "welcomes other co-operation initiatives on secure and safe shipping in the Arctic and on better access to the various Northern sea routes"
- Regarding natural resources exploitation: the Parliament stresses "that any fishing on the high seas must be regulated by a Regional Fisheries Management Organisation that respects scientific advice and has a robust control and surveillance programme to ensure compliance with management measures, while fishing within Exclusive Economic Zones (EEZ) must meet the same standards.
- Regarding governance issues, the Commission, with the Council's blessing[181], applied for permanent observer status in the Arctic Council.[182] Pending a decision, the Commission continues to take part in Arctic Council meetings on an ad hoc observer basis. Together with the EEA, it also contributes to the work of some AC Working Groups.[183]

14.3. The Role of Earth Observation

In the conclusion of the report "A sustainable EU policy for the High North" [184] , the European Parliament stresses the need for the "Commission to put forward proposals as to how the Galileo Project or projects like Global Monitoring for Environment and Security (GMES) that could have an impact on the Arctic could be developed to enable safer and faster navigation in Arctic waters, thus investing in the safety and accessibility of the North-East Passage in particular, to contribute to better predictability of ice movements, better mapping of the Arctic seabed and an understanding of the main geodynamic processes in the area..."

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[180] Resolution 2009/2214(INI) of the European Parliament of 20 January 2011 on a Sustainable EU policy for the High North

[181] Draft Council conclusions 16826/08 of 4 December 2008 on the European Union and the Arctic region

[182] Today, three EU Member States - Denmark, Finland and Sweden - are full Members of the Arctic Council and six - France, Germany, Netherlands, Poland, Spain and the United Kingdom - are permanent observers. Italy has applied to become permanent observer

[183] It should be noted that the EU's application to gain permanent observer status with the Arctic Council was delayed at a ministerial meeting in 2009 due to the opposition of Canada. This decision was the result of EU plans to ban seal products, a policy that is strongly rejected by Canada. In May 2011, Arctic Council ministers have agreed on a new set of criteria for determining whether an external country or institution is eligible for 'permanent observer' status. However, a decision on the European Commission's long-standing application was not taken. See: http://euobserver.com/24/32331 (last consulted 10 November 2011)

[184] Resolution 2009/2214(INI) of the European Parliament of 20 January 2011 on a Sustainable EU policy for the High North

It is clear that in order to meet its Arctic objectives, the EU will need to make significant investments in space systems combining earth observation, navigation and positioning and telecommunication capabilities. If a lot has been achieved with ERS-1/2, ENVISAT, CryoSat-2 and, soon, the Sentinels, the question of data continuity must be tackled. In this regard, the European Space Agency should push for the development of long term surveillance programmes ensuring data continuity to enable efficient environmental protection and sustainable natural resources exploitation.

In addition, the European Space Agency should take the lead in promoting EU's participation to the planned Canadian-led Polar Communications and Weather (PCW) whose objectives are to provide reliable communications services above 70°N, high temporal/spatial resolution meteorological data above 50°N and space weather monitoring. Since PCW was intended to be developed through international co-operation, ESA could engage in a dialogue on how GMES and PCW might be combined to increase Arctic coverage, in order to improve the security and safety of navigation in the region.

On 8 December 2010, the IES-ESA workshop 'Europe's Arctic Course: The Future of Space Co-operation in the Arctic Region' took place at the ESA Headquarters in Paris and provided an opportunity for experts from ESA Member States to exchange information and ideas with other officials and experts on possible space systems (earth observation and remote sensing, communications and navigation) which can address the environmental security challenges in the Arctic in the future.[185]

At the Paris workshop Professor Paul Berkman, Head, Arctic Ocean Geopolitics Programme at the Scott Polar Research Institute, put forward a suggestion for an integrated remote sensing programme for real time tracking of the positions, numbers and sizes of Arctic Ocean faring vessels for operational and scientific interpretations.

Satellite sensors needed would include Surface-Vessel Reflection, Automatic Identification System, Sea-Ice Parameters, Ocean-Atmosphere Coupling, and others. This could be an international effort involving European, Russian, US, Canada, China, Japan and other space agencies. Such a programme could also include a cost recovering mechanism where users of an Arctic trade route would help pay for the services.

Dr Stephen Briggs, Head of Earth Observation, Scientific Applications and Future Technologies at ESA commented that many of the infrastructure and technology components suggested in the proposal by Prof. Berkman are already fully operational – certainly in terms of remote sensing using radar systems – or will be available in the near future when various GMES programmes become operational. Both agreed that what is still needed however is system engineering to bring the various components together so they can be used in operational decisions.

[185] For more information see: http://www.envirosecurity.org/arctic/2010Workshop.php (last consulted 10 November 2011)

Part II - Institutions

1. Introduction: Treaties & Crises - The Continuing Dance

The growth of the European Union over the last sixty years has been more pragmatic and flexible than historians of Europe normally concede. The official version of events depicts a series of noble treaties, giving concrete form to the European idea in each generation. In reality treaties are more usually documents consolidating current practice rather than exploring new territory. They are often initiated for short term tactical reasons. They can be blown off course by referenda, where a national public chooses to answer a question other than that which it was asked. The experience of the last ten years amply illustrates why the European political class now only approaches the task of treaty making as a last resort.

We may therefore establish a pattern in treaty making that can serve both for a warning about future treaties and an analytic tool for understanding inter-institutional power plays in the period between treaties. The full dynamics of this are on display as the leaders of Europe struggle with the problems of the euro and financial instability in the winter of 2011. Perhaps above all we should remember the immortal words, now attributed to Jean- Claude Junker "We know what to do. We just don't know how to do it and then get re-elected". The problem in 2011 relates to technical financial issues of fiendish complexity that are rarely understood even by the technocrats, but which are pounced on by a media and populace that has lost deference and has come to expect concealment and half-truths from its leaders.

Today, there are intriguing parallels with the situation twelve years ago which gave birth to the process that ultimately led to the ratification of the Treaty of Lisbon in December 2009. The Santer Commission had resigned en masse having failed to satisfy the European Parliament that its conduct on certain financial issues had been either clear or responsible. President Prodi came in as a new broom determined to restore the prestige and integrity of the European Commission in alliance with, rather than in opposition to, a newly assertive European Parliament. In tune with millennial optimism, he believed that the rise in Euroscepticism could be countered if everybody explained in clear and reasonable terms the nature of the European construction. A new treaty was to consolidate all the previous versions into one easy to read volume. Transparency and clarity were to be the watchwords. In a period when the leadership of the Member States lacked any great or credible figures the old model of a treaty re-drawn by the Member States acting alone in an Inter-Governmental Conference was to be supplemented by a Convention. The finest brains of Europe, chaired by the elegance of one of the most intellectual of French Presidents, was to respond to the mood of public confusion with vision and lucidity.

In fact the Convention produced a whole series of new ideas of varying quality and practicality, which were added to the usual mix of updating current practice and addressing current sensitivities. Unfortunately for both the peoples of Europe and their political elites the resulting Constitution was an impenetrable text. This text was then mangled following the rejection of the draft treaty by Dutch and French voters for reasons unconnected to the content of the treaty. The Dutch failure to ratify was related to immigration and a sense that the Dutch political elite had failed to listen to its electorate over many years. The French rejection was driven by a desire for revenge on a President who had been elected under strange circumstances when his second round opponent was from the Far Right rather than from the Left. Rejection by two founding Members of the Union caused panic in the corridors of both Brussels and the national capitals. The very word Constitution had to be discarded along with Flag and Anthem. The old model of intergovernmental negotiation and the need to meet national demands for sticking plaster headlines was back with a vengeance.

Eventually a text was agreed on that could be given life as the Treaty of Lisbon. It contained none of the coherence of the original document. The goal of clarity was abandoned on the altar of short term national expedience. As if this was not bad enough, the much revised text was then rejected by an Irish electorate high on the fantasy of the "Celtic Tiger" that it had been fed on for the previous decade. Further dissembling followed as an increasingly desperate collection of Prime Ministers fought to keep the show on the road. The final months after Irish approval at their second referendum were conducted under the malevolent gaze of eurosceptic presidents in Prague and Warsaw.

In trying to understand the content and impact of the Treaty of Lisbon an appreciation of this history is important. The process took so long and was conducted in such a variety of fora that few people understood or remembered what had survived into the final text. It is usual after the adoption of a treaty for the European Institutions to change their internal rules of procedure in order to maximise their own advantage under the new rules that have been agreed. One would normally allow a period of twelve to eighteen months in order to assess how a new treaty will work in practice. In the case of the Treaty of Lisbon and the special circumstances of its birth, this would in any case have been extended to two or more years. Two unforeseen factors are proving influential in extending this period of uncertainty substantially. Even before the arrival of a full blown crisis over the credibility of the euro in the spring of 2010, experienced voices were indicating that the real test of the new balance of power would come in the negotiations over the budget settlement for the period 2013 onwards. It is clear therefore that it would be a mistake to look purely at the text of the Treaty of Lisbon as even more than its predecessors its final impact will be dependent on the interaction of the text with the emerging political reality of a Union in crisis.

The European Parliament clearly did well from the final treaty. With the extension of Co-Decision, albeit renamed, it becomes the Co-Legislator with the Council of Ministers on almost all issues. Similarly, its budgetary powers are increased dramatically. The European Council is created as a new body for strategic oversight while the Council of Ministers loses its primacy in agenda setting via the six month National Presidencies. The future of policy making is clearly prefigured as a series of inter-institutional compromises between, Council of Ministers, Parliament and Commission under the watchful eye of the European Court and the European Council. So much for the headlines. The body copy of the Treaty tells a different story in which the European Commission seeks to re-acquire power by its ability to draft legislation and fashion compromises even before the legislation reaches Parliament or Council. This, and what we used to know as Comitology, forms the inter-institutional battle field that has continued through 2011. Perhaps the most disappointing aspect of the treaty making process in the first decade of the twenty first century is the so far dismal outcome of the attempt to give Europe a clear voice in the world via a High Representative of the Union for Foreign Affairs and Security Policy. It is truly tragic that at a time of vast global change the Union has only succeeded in presenting the disappointing bureaucracy of the European External Action Service to a waiting world.

It is, however, encouraging - as reported in the section on the EU Process on Climate Change and Security - that the EEAS is now working to revitalise the Informal Steering Group on Climate Change and International Security (ISG). The determination to elaborate an operational action plan for the ISG - together with plans to upgrade the Green Diplomacy Network - demonstrate the increased importance given to the climate change and security nexus generally and the need to move beyond discussion to practical action in particular.

The latest changes in organisation and attributions that have occurred within the institutions are reflected in the following pages. The information is presented for easy referencing in the context of this report and the focus is on those parts of the institutions which are most relevant to EU external action in the fields of climate, environment, development and security.

2. European Council

The European Council defines the general political direction and priorities of the European Union. It was created in 1974 with the intention of establishing an informal forum for discussion between Heads of State or Government. It acquired a formal status in the 1992 Treaty of Maastricht. With the entry into force of the Treaty of Lisbon on 1 December 2009, it formally became an institution of the Union. Its President is Herman Van Rompuy for a period of two years.

The European Council provides the Union with the necessary impetus for its development and defines the general political directions and priorities thereof. It does not exercise legislative functions.[186] It meets twice per presidency.

The European Council consists of the Heads of State or Government of the Member States, together with its President and the President of the Commission. The High Representative of the Union for Foreign Affairs and Security Policy takes part in its work.[187]

The President of the European Council, at his level and in that capacity, ensures the external representation of the Union on issues concerning its common foreign and security policy, without prejudice to the powers of the High Representative of the Union for Foreign Affairs and Security Policy.[188]

[186] Art. 15 §1, Consolidated versions of the Treaty on European Union and the Treaty on the Functioning of the European Union, *OJCE*, 2010/C 83/01, Vol 53, 30 March 2010

[187] Art 15 §2, *Ibid*.

[188] Art 15 §6 al.2, *Ibid*.

3. Council of the European Union

The Council is the main decision-making body of the European Union. Together with the European Parliament, it exercises legislative and budgetary functions.[189] It consists of a representative of each Member State at ministerial level, who may commit the government of the Member State in question and cast its vote.[190]

The Council is a single body, but for reasons relating to the organisation of its work, it meets - according to the subject being discussed - in different "configurations",[191] which are attended by the Ministers from the Member States and the European Commissioners responsible for the areas concerned. Since the entry into force of the Treaty of Lisbon on 1 December 2009, there are ten configurations.

The Presidency of Council configurations, other than that of Foreign Affairs, are held by Member State representatives in the Council on the basis of equal rotation.[192]

Council decisions are prepared by a structure of more than 150 working parties and committees comprising delegates from the Member States. They resolve technical issues and forward the dossier to the Permanent Representatives Committee (COREPER)[193], made up of the Member States' ambassadors to the European Union and their deputies, which ensures consistency in the work and resolves technical-political questions before submitting the dossier to the Council.

In a great majority of cases, the Council takes decisions on a proposal from the European Commission and in association with the European Parliament, either through the consultation procedure (e.g. in the areas of agriculture, judicial and police co-operation, and taxation) or through co-decision (e.g. the internal market).

3.1. Agriculture and Fisheries

The Agriculture and Fisheries Council brings together once a month the Ministers for Agriculture and Fisheries and the European Commissioners responsible for agriculture and rural development, fisheries and maritime affairs, as well as consumer health and protection.

The content of the agricultural and fisheries policies essentially involves regulation of the markets, organising production and establishing the resources available, improving horizontal agricultural structures and rural development.

Agriculture and fisheries are two of the European Union's integrated Community policies, with decisions taken at European level by the Council and a "communitarised" budget for each policy, i.e. decisions on the financing of measures are taken in the Council on the basis of a European budget (about EUR 45 billion) that is separate from the national budgets.

3.2. Competitiveness

The creation of the Competitiveness Council in June 2002, through the merging of three previous configurations (Internal Market, Industry and Research) was a response to the perceived need for a more coherent and better coordinated handling of these matters related to the European Union's

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[189] Art. 16 §1, Consolidated versions of the Treaty on European Union and the Treaty on the Functioning of the European Union, *OJCE*, 2010/C 83/01, Vol 53, 30 March 2010

[190] Art 16 §2, *Ibid*.

[191] Art 16 §6 al. 1, *Ibid*.

[192] Art 16 §9, *Ibid*.

[193] Art 16 §7, *Ibid*.

competitiveness. Depending on the items on the agenda, this Council is composed of European Affairs Ministers, Industry Ministers, Research Ministers, etc. It meets about five or six times a year.

Since then, this Council assumes a horizontal role in ensuring an integrated approach to the enhancement of competitiveness and growth in Europe. In that spirit, it reviews on a regular basis both horizontal and sectorial competitiveness issues on the basis of analyses provided by the Commission and give its views on how competitiveness issues can be properly taken into account in all policy initiatives which have an impact on enterprises. It also deals with legislative proposals in its different fields of activity, where it decides by qualified majority, mostly in co-decision with the European Parliament.

Space Council

The Space Council, which brings together the EU Competitiveness Council and the ESA Council at ministerial level, was established in order to coordinate and facilitate cooperative activities between the European Community and ESA through their Framework Agreement[194], adopted in October 2003 by the ESA Council and endorsed by the EU Council.

The Framework Agreement recognises that both parties have specific complementarity and mutually reinforcing strengths, and commits them to work together to avoid duplication of efforts. The framework has two main aims:

- To establish a common basis and appropriate practical arrangements for efficient and mutually beneficial cooperation between ESA and the EU;
- To progressively develop a European space policy to link the demand for services and applications in support of EU policies with the supply, through ESA, of the space systems and infrastructure needed to meet that demand.

The Space Council adopts the resolutions that set the general guidelines and the objectives of the space policy, while evaluating the development of the operating projects. However, the Council does not enjoy real powers regarding space projects: firstly the EU has no budget line exclusively dedicated to space, and secondly, decisions regarding ESA's space programme and its budget are an exclusive competence of the ESA ministerial Council. Everything relies thus upon the coherence of the decisions adopted by the states delegations in both Councils.[195]

3.3. Economic and Financial Affairs (ECOFIN)

The Economic and Financial Affairs Council, commonly known as the Ecofin Council, is composed of the Economics and Finance Ministers of the Member States, as well as Budget Ministers when budgetary issues are discussed. It meets once a month.

The Ecofin Council covers EU policy in a number of areas including: economic policy coordination, economic surveillance, monitoring of Member States' budgetary policy and public finances, the euro (legal, practical and international aspects), financial markets and capital movements and economic relations with third countries. It decides mainly by qualified majority, in consultation or codecision with the European Parliament, with the exception of fiscal matters which are decided by unanimity.

The Ecofin Council also prepares and adopts every year, together with the European Parliament, the annual budget of the European Union.

The Eurogroup, composed of the Member States whose currency is the euro, meets normally the day before the Ecofin meeting and deals with issues relating to the Economic and Monetary Union (EMU). It is an informal body which is not a configuration of the Council.

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[194] Council Decision 12858/03 of 7 October 2003 on the signing of the Framework Agreement between the European Community and the European Space Agency

[195] A. GAUBERT, A. LEBEAU, "Reforming European Space Governance", *Space Policy*, 25, 2009, p.43

When the Ecofin Council examines dossiers related to the euro and EMU, the representatives of the Member States whose currency is not the euro do not take part in the vote of the Council.

3.4. Environment

The Environment Council is composed of environment ministers who meet about four times a year. It decides by qualified majority in co-decision with the European Parliament.

In this sector, the European Community has the task of fostering the harmonious, balanced and sustainable development of economic activities which respects the need, in particular, to ensure a high level of environmental quality.

To achieve this, it aims to preserve the quality of the environment, human health, the prudent and rational utilisation of natural resources and to promote measures at international level to deal with regional or worldwide environmental problems.

While taking into account the diversity of situations in the various regions of the Community, Community policy on the environment is based on the precautionary principle and on the principles that preventive action should be taken, that environmental damage should as a priority be rectified at source and that the polluter should pay.

3.5. Employment, Social Policy, Health and Consumer Affairs (EPSCO)

The Employment, Social Policy, Health and Consumer Affairs Council (EPSCO) is composed of employment, social protection, consumer protection, health and equal opportunities ministers, who meet around four times a year.

The Council usually decides by qualified majority, acting together with the European Parliament under the co-decision procedure (social security is an exception: here the Council acts unanimously). It adopts European rules to harmonise or coordinate national laws, in particular on working conditions (workers' health and safety, social security, employee participation in the running of companies), strengthening of national policies to prevent illness and combat the major health scourges and protection of consumers' rights.

Since employment and social protection policies remain the responsibility of the Member States, the Community's contribution is confined to setting common objectives for all the Member States, analysing measures taken at national level and adopting recommendations to the Member States.

Within the Council, and in particular in the framework of the Employment Committee and the Social Protection Committee, Member States can exchange ideas and information or share the results of their own experiences.

3.6. Education, Youth, Culture and Sport (EYC)

The Education, Youth and Culture (EYC) Council brings together education, culture, youth and communication Ministers around three or four times a year. It usually adopts its decisions by a qualified majority (apart from on cultural affairs, where it acts unanimously) and in co-decision with the European Parliament.

The European Union’s aim is to contribute to the development of quality education, the implementation of a vocational training policy and the flowering of Member States’ cultures, bringing the common cultural heritage to the fore, while fully respecting the responsibility of the Member States for defining the content of teaching and vocational training and organising education and vocational training systems, as well as their national and regional cultural diversity.

3.7. Foreign Affairs (FAC)

The Foreign Affairs Council is the successor to the External Relations Council. It was created in 2009 by the Treaty of Lisbon to "elaborate the Union's external action on the basis of strategic guidelines laid down by the European Council and ensure that the Union's action is consistent".[196] It brings together the Foreign Ministers of the Member States. Ministers responsible for European Affairs, Defence, Development or Trade also participate depending on the items on agenda. The configuration is unique as it is chaired by the High Representative of the Union for Foreign Affairs and Security Policy.

At its sessions on Foreign Affairs, the Council deals with the whole of the EU's external action, including the Common Foreign and Security Policy (CFSP), the Common Security and Defence Policy (CSDP), foreign trade and development co-operation.

3.8. General Affairs

The General Affairs Council ensures consistency in the work of the different Council configurations on dossiers that affect more than one of the Union's policies, such as negotiations on EU enlargement, preparation of the Union's multi-annual budgetary perspective or institutional and administrative issues.

Additionally, it prepares and ensures the follow-up to meetings of the European Council, in liaison with the President of the European Council and the Commission.[197]

3.9. Justice and Home Affairs (JHA)

The Justice and Home Affairs (JHA) Council brings together the justice and home affairs ministers approximately every other month, to discuss the development and implementation of co-operation and common policies in this sector. The Council acts as co-legislator of the EU by henceforth adopting directives and regulations over the whole field of justice and home affairs.

The JHA Council has gone through a number of changes following the Treaty of Lisbon. Practically, the whole field of JHA is now subject to co-decision, with the exception of family law, operational police co-operation and a few other areas. In addition, matters which were previously dealt with under the third pillar, such as judicial co-operation in criminal matters and police co-operation, are to be treated under the same kind of rules as those of the single market. Consequently, EU and national measures in these areas are subject to the judicial review of the Court of Justice in Luxembourg.

It should be noted that Denmark, the United Kingdom and Ireland do not participate fully in a number of JHA matters or participate under certain conditions. In particular, the United Kingdom and Ireland do not take part in the Schengen Agreement on the free movement of persons, external border controls and visa policy. The representatives of these States therefore do not vote on these issues in the Council.

3.10. Transport, Telecommunication and Energy (TTE)

Since June 2002 these three policies have been placed under the sole responsibility of a single Council configuration which meets approximately every two months. The composition of the Council varies according to the items on the agenda (Ministers for Transport, Telecommunications or Energy).

The EU's objective in the field of transport, telecommunications and energy is to establish modern and efficient systems that are viable in economic, social and environmental terms. The harmonious and sustainable development of infrastructures is crucial to the smooth functioning of the internal market and to the Union's economic and social cohesion.

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[196] Art 16 §6 al. 3, *Ibid*.

[197] Art 16 §6 al. 2, *Ibid*.

To achieve this, the Council has contributed to the introduction of trans-European transport, energy and telecommunications networks. These networks respond to the overall objective of economic and social cohesion, which is of particular importance for the coming years in view of enlargement and the need to connect the large trans-European networks to the projects under way in the new countries of the Union.

The Council has also adopted the European satellite navigation system known as Galileo which is designed for civilian purposes, is open to international co-operation and will be exploited commercially.

3.11. Other Relevant Bodies

3.11.1. *European Co-operation in Science and Technology (COST)*

COST - European Co-operation in Science and Technology - is an intergovernmental European framework for international co-operation between nationally funded research activities. It is the oldest European networking system in research, established in 1971. It currently counts 35 Member Countries and one co-operating state.

Rather than funding research itself, COST brings together research teams in different countries working on specific topics, supporting networking, conference, short-term scientific exchanges and publications. The coordination activities are supported from the EU RTD Framework Programme.

One of the main characteristics of COST is its flexibility: there are no set areas for co-operation, but scientists themselves put forward proposals for COST actions. Only five member countries need to participate for it to operate.

COST continues to play a substantial role in the development of scientific and technical co-operation in Europe as an important pillar in the European Research Area.

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3.11.2. *European Research Area Committee (ERAC)*

The European Research Area Committee (ERAC) is the new name of the former Scientific and Technical Research Committee (CREST) as adopted by the Competitiveness Council on 26 May 2010 "in order to better align its role with the new emphasis given to the ERA by the Treaty on the Functioning of the European Union."[198]

[198] Council Resolution 10255/10 of 28 May 2010 on the Developments in the Governance of the European Research Area (ERA)

CREST was set up in the early seventies by a Resolution of the Council of the European Communities (in French). In the mid-nineties, the legal basis for the Committee's work was replaced by a new Resolution (of 28 September 1995) from the Council of the European Union.

ERAC is a strategic policy advisory body whose main mission is to provide timely strategic input to the Council, the Commission and the Member States on any research and innovation issue relevant to the development of the European Research Area, on its own initiative or on the request of the Council or the Commission.

ERAC	General Secretariat of the Council
Email	erac@consilium.europa.eu

4. European External Action Service

One of the innovations brought by the Treaty of Lisbon is the creation of the position of High Representative of the Union for Foreign Affairs and Security Policy to ensure consistency and coordination of EU external action.

The High Representative is assisted by the European External Action Service (EEAS), comprising staff from the European Commission, the General Secretariat of the Council and the Diplomatic Services of EU Member States.

4.1. High Representative of the Union for Foreign Affairs and Security Policy

The High Representative of the Union for Foreign Affairs and Security Policy is appointed by the European Council, acting by a qualified majority, with the agreement of the President of the Commission.[199] Catherine Ashton was appointed High Representative in November 2009 for five years.

In that capacity, she chairs the Foreign Affairs Council and conducts the Common Foreign and Security Policy and Common Security and Defence Policy. Drawing on her role as Vice-President of the European Commission, she ensures the consistency and coordination of the European Union's external action.

According to Arts 18 and 27 TEU, the High Representative:

- conducts the Union's common foreign and security policy;
- contributes by her proposals to the development of that policy, which she will carry out as mandated by the Council, and ensures implementation of the decisions adopted in this field;
- presides over the Foreign Affairs Council;
- is one of the Vice-Presidents of the Commission. she ensures the consistency of the Union's external action. She is responsible within the Commission for responsibilities incumbent on it in external relations and for co-ordinating other aspects of the Union's external action;
- represents the Union for matters relating to the common foreign and security policy, conducts political dialogue with third parties on the Union's behalf and expresses the Union's position in international organisations and at international conferences;
- exercises authority over the European External Action Service and over the Union delegations in third countries and at international organisations.

4.2. Corporate & Policy Board

Council Decision 2010/427/EU of 26 July 2010[200] outlines in general terms the structure of the EEAS. The EEAS shall be directed by a Corporate Board headed by the High Representative of the Union for Foreign Affairs and Security Policy, a Chief Operating Officer (David O'Sullivan) and an Executive Secretary-General (Pierre Vimont), assisted by a Deputy Secretary General for Inter-institutional Affairs (Maciej Popowski) and a Deputy Secretary General for Political Affairs (Helga Schmid).

4.3. Directorates General of EEAS

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[199] Art. 18 §1, Consolidated versions of the Treaty on European Union and the Treaty on the Functioning of the European Union, *OJCE*, 2010/C 83/01, Vol 53, 30 March 2010

[200] Council Decision 2010/427/EU of 26 July 2010 establishing the organisation and functioning of the European External Action Service

The Corporate Board is assisted in its work by seven Directorates General headed by the following Managing Directors (organisational chart):

- Managing Director for Crisis Response & Operational Coordination (Agostino Miozzo)
- Managing Director for Asia and the Pacific (Viorel Isticioaia Budura)
- Managing Director for Africa (Nicholas Westcott)
- Managing Director for Russia, Eastern Neighbourhood & the Western Balkan (Miroslav Lajcak)
- Managing Director for the Middle East & Southern Neighbourhood (Hugues Mingarelli)
- Managing Director for the Americas (Christian Leffler)
- Managing Director for Global and Multilateral Issues (Maria Marinaki)

4.4. Common Security and Defence Policy (CSDP) Structure and Instruments

4.4.1. *Political and Security Committee (PSC)*

The Political and Security Committee[201] is comprised of representatives of ambassadorial rank of the Member States.

The Committee's main functions are keeping track of the international situation, and helping to define policies within the Common Foreign and Security Policy (CFSP) including the Common Security and Defence Policy (CSDP). It prepares a coherent EU response to a crisis and exercises its political control and strategic direction.

The Committee reports to the EEAS Corporate Board and has a direct link to Working Group Chairs.

The Political and Security Committee is chaired by Olof Skoog.

4.4.2. *EU Military Committee (EUMC)*

Chaired by Gen. Hakan Syrén, the EU Military Committee (EUMC) is the highest military body, originally set up within the Council[202]. It is composed of the Chiefs of Defence (CHOD) of the Member States, who are regularly represented by their permanent Military Representatives (MilReps).

The EUMC directs all EU military activities and provides the Political and Security Committee (PSC) with advice and recommendations on military matters. Integrated within the External Action Service, the EUMC now advises directly the High Representative.

4.4.3. *EU Military Staff (EUMS)*

The European Union Military Staff[203] (EUMS) provides in-house military expertise for the High Representative (HR) and performs early warning; strategic planning; and situation assessment.

As the EU is conducting its seventh military Operations, the EUMS has become a key player in the development of the EU Common Security and Defence Policy (CSDP)

The EUMS was transferred from the Council General Secretariat to the European External Action Service on 1 January 2011. It is the only permanent integrated military structure of the European Union. Established on 11 June 2001, the EU Military Staff receives taskings from the EU Military Committee. It's Director General is Lt. Gen. Ton Van Osch.

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[201] Council Decision 2001/78/CFSP of 22 January 2001 setting up the Political and Security Committee

[202] Council Decision 2001/79/CFSP of 22 January 2001 setting up the Military Committee of the European Union

[203] Council Decision 2005/395/CFSP of 10 May 2005 amending Decision 2001/80/CFSP on the establishment of the Military Staff of the European Union

EUMS	Public Relations/Public Information
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Email	eums.info@consilium.europa.eu

4.4.4. *Civilian Planning and Conduct Capability (CPCC)*

The Civilian Planning and Conduct Capability (CPCC) has the mandate:

- to plan and conduct civilian Common Security and Defence Policy (CSDP) operations under the political control and strategic direction of the Political and Security Committee;
- to provide assistance and advice to the High Representative, the Presidency and the Relevant EU Council bodies;
- and to direct, coordinate, advise, support, supervise and review civilian CSDP operations.

CPCC works in close co-operation with the other crisis management structures within the European External Action Service and the European Commission.

The CPCC Director is Mr Hansjörg Haber. As EU Civilian Operations Commander, he exercises command and control at strategic level for the planning and conduct of all civilian crisis management operations, under the political control and strategic direction of the Political and Security Committee (PSC) and the overall authority of the High Representative.

4.4.5. *EU Operations Centre*

The EU Operations Centre is operational since 1 January 2007 and is used to conduct missions and operations of limited size. Using some EUMS core staff, as well as some extra "double hatted" EUMS officers and so-called "augmentees" from the Member States, the EU Operations Centre aims to give the EU with an increased capacity to respond to crisis management situations.

4.5. EU Agencies on CSDP

4.5.1. *European Defence Agency (EDA)*

The European Defence Agency was established under a Joint Action of the Council of Ministers on 12 July, 2004[204], "to support the Member States and the Council in their effort to improve European defence capabilities in the field of crisis management and to sustain the European Security and Defence Policy as it stands now and develops in the future".

The Agency's tasks include:

- working for a more comprehensive and systematic approach to defining and meeting the capability needs of the Common Security and Defence Policy (CSDP);
- promoting European defence-relevant Research and Technology (R&T). This involves pursuing collaborative use of national defence R&T funds, in the context of a European Defence R&T Strategy which identifies priorities;
- promoting European co-operation on defence equipment, both to contribute to defence capabilities and as a catalyst for further restructuring the European defence industry;
- working, in close co-operation with the Commission, on steps towards an internationally competitive market for defence equipment in Europe.

[204] Council Joint Action 2004/551/CFSP of 12 July 2004 on the establishment of the European Defence Agency

The High Representative of the Union for Foreign Affairs and Security Policy, Catherine Ashton, is Head of the Agency and Chairwoman of the Steering Board, its decision-making body composed of Defence Ministers of the 26 participating Member States (all EU Member States, except Denmark) and the European Commission. In addition, the Steering Board meets regularly at sub-ministerial levels, such as National Armaments Directors, Capability Directors or R&T Directors. The Steering Board acts under the Council's Authority and within the framework of guidelines issued by the Council.

The EDA is composed of (chart):

- Capabilities Directorate
- R & T Directorate
- Armaments Directorate
- Industry and Market Directorate
- Corporate Services Directorate

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4.5.2. *European Union Institute for Security Studies (ISS)*

The European Union Institute for Security Studies (EUISS) is a Paris-based agency of the European Union, operating under the Common Foreign and Security Policy (CFSP). Its goals are to find a common security culture for the EU, to help develop and project the CFSP, and to enrich Europe's strategic debate.

The board of the EUISS is chaired by Catherine Ashton, High Representative of the Union for Foreign Affairs and Security Policy. Álvaro de Vasconcelos of Portugal has been the Institute's Director since 1 May 2007.

The EUISS is an autonomous agency with full intellectual freedom. As a think tank it researches security issues of relevance for the EU and provides a forum for debate. In its capacity as an EU agency, it also offers analyses and forecasting to the Council of the European Union.

Activities of the Institute include:

- Research: The EUISS covers all areas related to the Common Foreign and Security Policy (CFSP), including the Common Security and Defence Policy (CSDP), and it approaches its research from both geographic and thematic perspectives. Its nine research fellows are complemented by an extensive network of external researchers who contribute to the Institute's research activities on an ad hoc basis;
- Publications: The Institute's flagship publication is its monograph series of Chaillot Papers. The Institute also publishes occasional papers, books, reports, and shorter policy briefs and analyses, as well as a quarterly newsletter;
- Seminars and Conferences: The Institute organises regular seminars and conferences. They bring together academics, EU officials, national experts, decision-makers and NGO representatives from the 27 Member States but also from the rest of the world. At the Institute's Annual Conference the EU High Representative delivers his address on the state of the CFSP;
- Co-operation: The Institute co-operates with numerous counterpart institutions in Europe the United States and beyond, playing an essential role in the development of CFSP concepts. It is also a partner of the European Security and Defence College.

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4.5.3. *European Union Satellite Centre (EUSC)*

The European Union Satellite Centre (EUSC) mission is to support the decision-making of the European Union by providing analysis of satellite imagery and collateral data. It is one of the key institutions for European Union's Security and Defence policy in the field of space. Operational activities of the Centre with the Council mainly take place in the form of direct cooperation with Council DG E VIII, EU Military Staff and Joint Situation Centre (SITCEN). The Centre also collaborates with ESA in several areas, the most important being the Heterogeneous Mission Accessibility (HMA) project in the frame of GMES Data Infrastructure.

The staff of the Centre, headed by the Director Mr. Tomaž Lovrenčič, consists of experienced image analysts, geospatial specialists and supporting personnel from EU member countries.

The Satellite Centre's areas of priority reflect the key security concerns as defined by the European Security Strategy, such as monitoring regional conflicts, state failure, organised crime, terrorism and proliferation of weapons of mass destruction. The EUSC gives, for example, support to EU deployed operations (such as the EUFOR in Bosnia and Herzegovina and EUFOR R.D. Congo) and humanitarian aid missions and peacekeeping missions. The Centre is also an important early warning tool, facilitating information for early detection and possible prevention of armed conflicts and humanitarian crises.

The EUSC's structure is organised as follows (chart):

- The Operations Division which is further divided into
  - the data preparation team
  - the rapid response team
  - the remote sensing/geographic information systems team
  - the counter-proliferation team
- The Operations Support Division which is further divided into
  - the data office
  - the training unit
  - earth observation projects
  - production section
- The Technical Division
- The Admin and Personnel Division

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4.6. Crisis Management Structure

4.6.1. *Joint Situation Centre (SITCEN)*

The Joint Situation Centre aims to provide the EEAS with high quality information on matters of public security, in the form of early warnings, assessment, services in case of emergency, and by constituting a contact between the High Representative and the intelligence community of the countries of the EU.

Under the new EEAS structure, SITCEN will report to the Directorate General for Crisis Response & Operational Coordination and the Corporate Board with a direct link to the Crisis management structures (EUMS, CMPD, CPCC). On 17 December 2010, EU High Representative appointed Mr Ilkka Salmi as the new Director of the Situation Centre.

The Situation Centre has its roots in the European Security and Defence Policy of 1999. In 2002, the Situation Centre started to be a forum for exchange of sensitive information between the services of France, Germany, Italy, the Netherlands, Spain, Sweden and the United Kingdom. While its initial mission focused on assessment of situations abroad, in June 2004, Javier Solana expanded its domain of interest to terrorist threats within the EU.

The Situation Centre is divided into three units:

- The Civilian Intelligence Cell (CIC), comprising civilian intelligence analysts working on political and counter-terrorism assessment;
- The General Operations Unit (GOU), providing 24-hour operational support, research and non-intelligence analysis;
- The Communications Unit, handling communications security issues and running the council's communication centre (ComCen).

4.6.2. *Crisis Management and Planning Directorate (CMPD)*

Until recently, distinct defence and civilian planning directorates existed within the Council structure. The decision by Member States to integrate the two was taken in 2008 by creating the Crisis Management and Planning Directorate (CMPD). It is responsible for strategic planning of civilian and military CSDP missions.

Voices have risen to denounce what they call a "military take over" on civilian crisis management due to the unbalanced representation of military staff and civilian strategic planners within the CMPD, with the risk to crowd out the civilian character of operations, and despite the central role of civilian activities in crisis management and peacebuilding.[205]

The CMPD is headed by Walter Stevens.

4.7. Other Relevant Services

4.7.1. *Foreign Policy Instruments Service*

The Foreign Policy Instruments Service (FPIS) is a department of the European Commission set up in response to the establishment of the EEAS. It is meant to manage foreign policy issues within the Commission's mandate, but it reports directly to the High representative and is hosted within the same building as the EEAS.

It manages programmes such as the crisis response *Instrument for Stability*, which is shared between the Commission and the EEAS.

Observers in Brussels have shed light on a struggle between the Commission, the Parliament and the Council around the Commission resisting the transfer of its Instruments for Stability personal to the External Action Service.

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[205] F. BRANTNER, "A Military Takeover in the EU Council?", E!Sharp, 25 February 2010, see: http://www.esharp.eu/Web-specials/A-military-takeover-in-the-EU-Council (last consulted 10 November 2011)

The European Peacebuilding Liaison Office (EPLO), an NGO's platform that works, among other things, on facilitating dialogue on peacebuilding issues between civil society and the EU institutions wrote to the Commission to request the transfer of two staff members from the Instrument for Stability team to the EAS. The response from Commission Secretary-General Catherine Day restates the EU's commitment to conflict prevention and peacebuilding and emphasises that there will be more than just the two staffers working on peacebuilding - only not in the External Action Service. Instead, responsibility for this area will be shared jointly by the Commission and the EEAS.[206]

4.7.2. *EU Green Diplomacy Network*

Launched in June 2003 by the European Council, the Green Diplomacy Network (GDN) is aimed at promoting the integration of environment into external relations. The Network consists of officials dealing with international environment and sustainable development issues in the EU's Ministries of Foreign Affairs and their diplomatic missions. It focuses on environmental topics that have significant relevance to the EU's external relations, such as climate effectiveness of European actions in the environment domain.

As the external dimension of the European Union's environment policy is increasingly prominent in international affairs, the Network has an important role in increasing the coherence, consistency and effectiveness of European actions in the environment domain.

The main tasks of the Network are:

- To promote the use of the EU's extensive diplomatic resources (diplomatic missions, development co-operation offices) in support of environmental objectives, orchestrating campaigns and demarches.
- To exchange views and share experiences on how Member States (in particular Foreign Ministries) and the Commission are integrating environmental concerns into their diplomatic efforts.
- Local informal GDN in third countries: the Network is now increasingly focusing on the added value it can bring by supporting the development of local informal green diplomacy networks in third countries between EU Embassies and Commission Delegations.

Since the Lisbon Treaty came into force, the operation of the GDN is common responsibility of the rotating Presidency and the European External Action Service, working in close cooperation with DG CLIMA and DG ENVI.

The last GDN meeting in Budapest on 11 February 2011 was an opportunity for experts of Hungary and the Commission to clarify their positions on climate change, bio-diversity, the international mercury negotiations, green economy and sustainable development; and to renew the proposals on the GDN's operation.

Despite the non-binding agreements of the UNFCCC negotiations on climate change in Copenhagen and Cancún, József Feiler, Head of the Climate Policy Department of the Hungarian Ministry of National Development, declared that the "Cancún conference was successful for giving the Copenhagen results an official form". Setting aside the fact that the "commitments" obtained in Cancún will not prevent the climate from reaching a threshold dangerous for human life, what most specialists saw in the run up to Copenhagen and beyond was Europe's internal divisions regarding its own climate objectives and its loss of leadership in what remained one of Europe's last strength on the international scene.

More recently, there were discussions on the need to revitalise the GDN. Apart from its important function as an information stream to foreign ministries, is is increasingly seen as a tool for implementing the recent Council conclusions on EU Climate Diplomacy.[207]

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[206] D. SMITH, "EAS: Officially launched but the tussle continues", Dan Smith's blog, 3 December 2010, see: http://dansmithsblog.com/2010/12/03/eas-officially-launched-but-the-tussle-continues/ (last consulted 10 November 2011)

[207] Council conclusions on EU Climate Diplomacy, 3106th Foreign Affairs Council Meeting, Brussels, 18 July 2011

5. European Parliament

The European Parliament is the Community institution that represents the peoples of the Member States of the European Union. It has 736 directly elected members. Its members may sit in political groups following political affiliation. Its president directs its activities and acts as its representative.

The European Parliament, jointly with the Council, exercises legislative and budgetary functions. It exercises functions of political control and consultation as laid down in the Treaties and elects the President of the Commission.[208]

The European Parliament has 20 policy committees, which meet, mainly in Brussels, throughout the year.

The plenary sittings are the high point of parliament's work. This is where all the work done by the committees and political groups culminates. It is also where MEPs get to debate with other movers and shakers in the EU. The plenary sittings take place mainly in Strasbourg, the headquarters of the parliament, but some meetings also take place in Brussels.

Below are brief descriptions of the most relevant committees for this study.

5.1. Committee on Foreign Affairs (AFET)

Chaired by Gabriele Albertini (EPP), the Committee on Foreign Affairs (AFET) is the largest committee in the Parliament with 76 MEPs. It is assisted in its responsibility by the Subcommittee on Security and Defence and the Subcommittee on Human Rights.

The Committee on Foreign Affairs helps to formulate a foreign policy that addresses the interests of the Union, the security expectations of its citizens and the stability of its neighbours, and ensures that it is coherent and effective.

It monitors, among other things, the neighbourhood policy for all countries that cooperate with the EU and it opens, monitors and concludes negotiations concerning the accession of European States to the Union.

Furthermore, it is responsible for providing the European Parliament's views on the Common Foreign and Security Policy (CFSP) and the Common Security and Defence Policy (CSDP).

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5.2. Committee on Agriculture and Rural Development (AGRI)

[208] Art 14 §1, *Ibid*.

The Committee on Agriculture and Rural Development (AGRI) is chaired by Paolo de Castro (S&D). It has recently seen its responsibilities increased by the entry into force of the Treaty of Lisbon as the European Parliament now has the power of co-decision, with the Council of Agriculture Ministers, on the Common Agricultural Policy (CAP).

Another important responsibility of the AGRI Committee is forestry.

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5.3. Committee on Development (DEVE)

The Development Committee (DEVE) is chaired by Eva Joly (Greens/EFA). The Committee is responsible for:

- the promotion, implementation and monitoring of the development and co-operation policy of the Union, notably:
  i. political dialogue with developing countries, bilaterally and in the relevant international organisations and interparliamentary fora;
  ii. aid to, and co-operation agreement with, developing countries;
  iii. promotion of democratic values, good governance and human rights in developing countries.
- matters relating to the ASP-EU Partnership Agreement and relations with the relevant bodies
- Parliament's involvement in election observation missions, when appropriate in co-operation with other relevant committees and delegations

The Committee coordinates the work of the interparliamentary delegations and ad hoc delegations falling within its remit.

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5.4. Sub-Committee on Human Rights (DROI)

The Subcommittee on Human Rights (DROI) is chaired by Heidi Hautala (Greens/EFA).

The Subcommittee's main responsibilities include issues concerning human rights, the protection of minorities and the promotion of democratic values in third countries.

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5.5. Committee on Environment, Public Health and Food Safety (ENVI)

The Committee on Environment, Public Health and Food Safety (ENVI) is chaired by Jo Leinen (S&D), and is responsible for environmental policy and environmental protection measures, in particular concerning:

- air, soil and water pollution, waste management and recycling, dangerous substances and preparations, noise levels, climate change, protection of biodiversity;
- sustainable development;
- international and regional measures and agreements aimed at protecting the environment;
- restoration of environmental damage;
- civil protection;
- the European Environment Agency.

As indicated above, the Committee is also responsible for public health and food safety issues.

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5.6. Committee on International Trade (INTA)

The Committee on International Trade (INTA) is chaired by Vital Moreira (S&D). It is responsible for matters relating to the establishment and implementation of the Union's common commercial policy and its external economic relations, in particular:

- financial, economic and trade relations with third countries and regional organisations;
- measures of technical harmonisation or standardisation in fields covered by instruments of international law;
- relations with the relevant international organisations and with organisations promoting regional economic and commercial integration outside the Union;
- relations with the WTO, including its parliamentary dimension.

The committee liaises with the relevant inter-parliamentary and ad hoc delegations for the economic and trade aspects of relations with third countries.

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5.7. Committee on Industry, Research and Energy (ITRE)

The Committee on Industry, Research and Energy (ITRE) is chaired by Herbert Reul (EPP). It is responsible for:

- the Union's industrial policy and the application of new technologies, including measures relating to SME's;
- the Union's research policy, including the dissemination and exploitation of research findings;
- space policy;
- the activities of the Joint Research Centre and the Central Office for Nuclear Measurements, as well as JET, ITER and other projects in the same area;
- Community measures relating to energy policy in general, the security of energy supply and energy efficiency including the establishment and development of trans-European networks in the energy infrastructure sector;
- the Euratom Treaty and Euratom Supply Agency; nuclear safety, decommissioning and waste disposal in the nuclear sector;
- the information society and information technology, including the establishment and development of trans-European networks in the telecommunication infrastructure sector.

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ITRE	Secretariat
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5.8. Committee on Fisheries (PECH)

The Committee on Fisheries (PECH) is chaired by Carmen Fraga Estévez (EPP). It is responsible for:

- the operation and development of the Common Fisheries Policy and its management;
- the conservation of fishery resources;
- the common organisation of the market in fishery products:
- structural policy in the fisheries and aquaculture sectors, including the financial instruments for fisheries guidance;
- international fisheries agreements.

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5.9. Sub-Committee on Security and Defence (SEDE)

The Subcommittee on Security and Defence (SEDE) is a subcommittee of the Committee on Foreign Affairs (AFET). Chaired by Arnaud Danjean (EPP) its responsibilities are to assist AFET on the Common Foreign and Security Policy (CFSP) and the Common Security and Defence Policy (CSDP).

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5.10. Policy Challenges Committee (SURE)

The Policy Challenges Committee (SURE) was established in July 2010 and given a one year mandate to define the European Parliament's political priorities for the new post-2013 multiannual financial framework, both in legislative and budgetary terms and to submit guidelines regarding the resources necessary for the Union to implement these priorities. It completed its work in June 2011 and produced two extensive documents.

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5.11. Committee on Transport and Tourism (TRAN)

The Committee on Transport and Tourism (TRAN) is chaired by Brian Simpson (S&D). It is responsible for:

- matters relating to the development of a common policy for rail, road, inland waterway, maritime and air transport, in particular:
  i. common rules applicable to transport within the European Union,
  ii. the establishment and development of trans-European networks in the area of transport infrastructure,
  iii. the provision of transport services and relations in the field of transport in third countries,
  iv. transport safety,
  v. relations with international transport bodies and organisations;
- postal services
- tourism.

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6. European Commission

The Treaty of the European Union confers a central role to the European Commission in the legislative process and provides that, except where the Treaties provide otherwise, Union legislative acts may only be adopted on the basis of a Commission proposal[209].

The Commission's proposals must be grounded in the European interest and respect the principles of subsidiarity and proportionality. It consults widely so that all parties affected by a legislative act can contribute to its preparation. In general, an assessment of the economic, social and environmental impact of a given legislative act is published at the same time as the proposal itself.

In addition, the Commission is also responsible for putting the EU's common policies into practice and for managing the EU's budget and programmes. The Commission oversees the application of Union law under the control of the Court of Justice of the European Union.[210]

6.1. Commission Work Programme 2011

The Commission Work Programme 2011[211] gives a multiannual overview which helps stakeholders and other EU institutions plan their work with the Commission. It is built on the five main political priorities for the EU set out by President Barroso in the first State of the Union Address, delivered before the European Parliament in September 2010:

- Dealing with the economic crisis and building the momentum for recovery;
- Restoring growth for jobs by accelerating the Europe 2020 reform agenda;
- Building an area of freedom, justice and security;
- Launching negotiations for a modern EU budget;
- Pulling the EU's weight on the global stage.

More specifically, the Commission will set out its vision for "Resource efficiency" as a flagship initiative in 2011. The aim is to build progressively a framework based on resource efficiency to include the shift to a low-carbon society and which sets sectoral policies including energy, transport, and the management of natural resources such as agriculture and fisheries within a long-term sustainable framework.

These interconnected initiatives will define medium and long-term scenarios, thus providing a solid basis for decision-making and more predictable conditions for large-scale investment.

On budget, the work programme argues that the post-2013 budget must be targeted to policies and areas where it can make a real difference, supporting medium and long term investment, and bringing added value in support of the Union's policy objectives. The Commission's proposal for the next Multiannual Financial Framework (MFF) was published on mid-2011. Additionally, the Commission is issuing a number of Communications and reports on key policy areas, in particular the reform of the common agricultural policy, of the common fisheries and the future of cohesion policy, as well as space matters (GMES).

6.2. Directorates General

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[209] Art. 17 §2, *Ibid*.

[210] Art. 17 §1, Consolidated versions of the Treaty on European Union and the Treaty on the Functioning of the European Union, *OJCE*, 2010/C 83/01, Vol 53, 30 March 2010

[211] Communication COM(2010) 623 final from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - Commission Work Programme 2011, Brussels, 27 October 2010

6.2.1. Directorate General for Agriculture and Rural Development (AGRI)

The European Commission's Directorate General for Agriculture and Rural Development is based in Brussels under the authority of Commissioner Dacian Ciolos.

With a staff of about 1000, it is responsible for the implementation of agriculture and rural development policy, the latter being managed in conjunction with the other DGs which deal with structural policies.

The mission of DG AGRI is to promote the sustainable development of Europe's agriculture and to ensure the well-being of its rural areas through:

- promoting a robust and competitive agricultural sector which respects high environmental and production standards, ensuring at the same time a fair standard of living for the agricultural community;
- Contributing to sustainable development of rural areas, in particular through helping the agricultural sector to adapt to new challenges, protecting the environment and the countryside, especially in view of climate change, and improving the quality of life in rural areas, whilst ensuring growth and jobs in the countryside;
- Promoting the European agricultural sector in world trade.

DG AGRI is made up of 13 Directorates dealing with all aspects of the Common Agricultural Policy[212]:

- Directorate A: International Affairs I, in particular multilateral negotiations
- Directorate B: International Affairs II, in particular enlargement
- Directorate C: Economics of agricultural market and single CMO
- Directorate D: Direct support, management of market measures, promotion
- Directorate E: Rural development programmes I
- Directorate F: Rural development programmes II
- Directorate G: Horizontal aspects of rural development
- Directorate H: Sustainability and quality of agriculture and rural development
- Directorate I: Management of resources
- Directorate J: Audit of agricultural expenditure
- Directorate K: Relations with other Institution; Communication and Documentation
- Directorate L: Economic analysis, perspectives and evaluations
- Directorate M: Agricultural legislation

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6.2.2. Directorate General for Climate Action (CLIMA)

The Directorate General for Climate Action was established in February 2010 under Commissioner Connie Hedegaard. Climate change was previously included in the remit of DG Environment of the European Commission. DG CLIMA leads international negotiations on climate, helps the EU deal with the consequences of climate change and meet its targets for 2020, as well as develops and implements the EU Emissions Trading Scheme (ETS).

[212] http://ec.europa.eu/dgs/agriculture/who-is-who/org_en.pdf

DG CLIMA develops and implements cost effective international and domestic climate change policies and strategies in order for the EU to meet its targets for 2020 and beyond, especially with regard to reducing its greenhouse gas emissions. Its policies also aim at protecting the ozone layer and at ensuring that the climate dimension is appropriately present in all Community policies and that adaptation measures will reduce the European Union's vulnerability to the impacts of climate change. DG CLIMA leads the respective Commission task forces on the international negotiations in the areas of climate change and ozone depleting substances and coordinates bi-lateral and multi-lateral partnerships on climate change and energy with third countries.

In addition, DG CLIMA develops and implements the EU Emissions Trading System and promotes its links with other carbon trading systems with the ultimate aim of building an international carbon trading market. Furthermore, it monitors the implementation of Member States' emission reduction targets in the sectors outside the EU ETS. It also promotes the development and demonstration of low carbon and adaptation technologies, especially through the development and implementation of cost effective regulatory frameworks for their deployment as well as through the development of appropriate financial support schemes.

DG CLIMA currently employs around 160 EC officials and external staff.

DG CLIMA is organised into three main directorates:

- Directorate A: International & Climate Strategy
- Directorate B: European & International Carbon Markets
- Directorate C: Mainstreaming Adaptation & Low Carbon Technology

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6.2.3. *EuropeAid Development and Co-operation (DEVCO)*

EuropeAid Development and Co-operation (DEVCO) is a new Directorate General that falls under the political guidance of Commissioner Andris Pielbags. It is responsible for designing EU development policies and delivering aid through programmes and projects across the world. It incorporates the former Development and EuropeAid DGs and formally began its work on 3 January 2011.

EuropeAid Development and Co-operation is responsible for putting into motion the European Commission's development policies, by bringing together policy design and policy implementation covering all development countries.

It acts as the single contact point for stakeholders both inside and outside the EU, but also for the European External Action Service (EEAS), and for all sectoral DGs of the European Commission. DEVCO aims to play a leading role in the international debate for development involving donors, international institutions, developing and emerging countries and non State actors.

In addition, DG DEVCO is expected to play a central role, albeit with the assistance of DG CLIMA, in the promotion and implementation of climate mitigation and adaptation policies in external cooperation.

The final organisation of the Directorate-General is still to be decided. However, the work has started from the first of January 2011 under a transitory organigramme:

- Directorate A: EU Development Policy
- Directorate B: Quality and Impact
- Directorate C: Sustainable Growth and Development
- Directorate D: Human and Society Development

- Directorate E: Sub-Saharan Africa and Horizontal ACP Matters
- Directorate F: Neighbourhood
- Directorate G: Latin America and Caribbean
- Directorate H: Asia, Central Asia and Pacific
- Directorate R: Resources in Headquarters and in Delegations

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6.2.4. *Humanitarian Aid and Civil Protection Office (ECHO)*

The European Union's mandate to ECHO is to provide emergency assistance and relief to the victims of natural disasters or armed conflict outside the European Union. ECHO was established in 1992.

ECHO's task is to ensure goods and services get to crisis zones fast. Goods may include essential supplies, specific foodstuffs, medical equipment, medicines and fuel. Services may include medical teams, water purification teams and logistical support. Goods and services reach disaster areas via ECHO partners.

ECHO operates under Commissioner Kristalina Georgieva, who is responsible for International Co-operation, Humanitarian Aid & Crisis Response. It is divided into three directorates:

- Directorate A: Strategy, Policy and Internal Co-operation
- Directorate B: Humanitarian and Civil Protection Operations
- Directorate C: Resources, Partnerships and Operational Support

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6.2.5. *Directorate General for Energy (ENER)*

Under the political guidance of Commissioner Günther H. Oettinger, the Directorate General for Energy is responsible for developing and implementing a European energy policy. In doing so, the Directorate General aims to support the Europe 2020 programme which, for energy, is captured in the Energy 2020 strategy.

The Directorate General carries out its tasks in many different ways. For example, it develops strategic analyses and policies for the energy sector; promotes the completion of the internal energy market encompassing electricity, gas, oil and oil products, solid fuels and nuclear energy; ensures that indigenous energy sources are exploited in safe and competitive conditions; ensures that markets can deliver agreed objectives, notably in efficiency and renewable energies; promotes and conducts an EU external energy policy; facilitates energy technology innovation; develops the most advanced legal framework for nuclear energy, covering safety, security and non-proliferation safeguards; support the reinforcement of energy infrastructure, monitors the implementation of existing EU lax and makes new legislative proposals; encourages the exchange of best practices and provides information to stakeholders.

All this work is aided by expert input from the Executive Agency for Competitiveness and Innovation (EACI) and the Agency for the Co-operation of Energy Regulators (ACER, operational from March 2011), both of which under the supervision of the Directorate General.

DG ENER is organised into five main directorates:

- Directorate A: General Policy
- Directorate B: Security of Supply, Energy markets and Networks
- Directorate C: New and renewable sources of energy, Energy efficiency & Innovation
- Directorate D: Nuclear energy
- Directorate E: Nuclear safeguards

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6.2.6. *Directorate General for Enterprise and Industry (ENTR)*

In line with Europe 2020, the EU's strategy for smart, sustainable and inclusive growth, the Directorate General Enterprise and Industry is working towards five general objectives: to strengthen Europe's industrial base and promote the transition to a low carbon economy; to promote innovation as a means to generate new sources of growth and meet societal needs; to encourage the creation and growth of SMEs and promote an entrepreneurial culture; to ensure an open internal market for goods; and to support the European presence in space. DG ENTR works under the guidance of Commissioner Antonio Tajani.

DG ENTR is responsible for two of the seven flagship initiatives of Europe 2020:

- "An industrial policy for the globalisation era" to improve the business environment, notably for SMEs, and to support the development of a strong and sustainable industrial base able to compete globally, and;
- "Innovation Union" to improve framework conditions and access to finance for research and innovation so as to ensure that innovative ideas can be turned into products and services that create growth and jobs.

DG ENTR employs around 1,000 people in its departments and units and is responsible for a budget of some € 1.5 billion. It is organised into 9 Directorates. DG ENTR is responsible for space, security and GMES:

- ENTR R: Resources and Communication
- ENTR A: Coordination, planning and international affairs
- ENTR B: Industrial Policy and Economic Analysis
- ENTR C: Regulatory Policy
- ENTR D: Industrial Innovation and Mobility Industries
- ENTR E: SMEs and Entrepreneurship
- ENTR F: Tourism, CSR, Consumer Goods and International Regulatory Agreements
- ENTR G: Chemicals, metals, mechanical, electrical and construction industries: Raw materials
- ENTR H: Space, security and GMES

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Global Monitoring for Environment and Security (GMES)

The Global Monitoring for Environment and Security Programme is the European Programme for the establishment of a European capacity for Earth Observation. Policy-Makers and public authorities, the major users of GMES, will use the information to prepare environmental legislation and policies with a particular focus on climate change, monitor their implementation and assess their effects. GMES is also designed to support the critical decisions that need to be made quickly during emergencies, such as when natural or man-made catastrophes and humanitarian crises occur.

The European Earth Observation Programme provides data useful in a range of issues including climate change and citizen's security. Land, sea and atmosphere - each Earth component is observed through GMES, helping improve citizen's safety.

The purpose of GMES is to deliver information which corresponds to user needs. The processing and dissemination of this information is carried out within the "GMES service component". The thematic areas within the GMES service component comprise:

- land, marine and atmosphere information - ensuring systematic monitoring and forecasting the state of the Earth's subsystems at regional and global levels;
- climate change information - helping to monitor the effects of climate change, assessing mitigation measures and contributing to the knowledge base for adaptation policies and investments;
- emergency and security information - providing support in the event of emergencies and humanitarian aid needs, in particular to civil protection authorities, also to produce accurate information on security related aspects (e.g. maritime surveillance, border control, global stability, etc.)

The GMES service component depends on Earth observation data, collected from space (satellites), air (airborne instruments, balloons to record stratosphere data, etc.), water (floats, shipboard instruments, etc.) or land (measuring stations, seismographs, etc.). These facilities are called the GMES infrastructure component; non-space based installations in the GMES infrastructure component are generally referred to as "in situ component".

The Forum GMES 2008 held in Lille, France, in September 2008 marked the launch of the first GMES services in pre-operational mode. These services are:

- geoland2 (land monitoring)
- MyOcean (marine environment monitoring)
- MACC (atmosphere monitoring)
- SAFER (emergency management)
- G-MOSAIC (security)

By securing the sustainability of an information infrastructure necessary to produce output information in the form of maps, data-sets, reports, targeted alerts, etc..., GMES aims to help people and organisations to take action, make appropriate policy decisions and decide on necessary investments. GMES also represents a great potential for businesses in the services market, which will be able to make use of the data and information it provides according a full and open access principle.

Earth observation-based services already exist in Europe, but they are dispersed at national or regional level and cannot rely on a sustainable observation capacity. With the exception of meteorological

services, long-term availability and reliability of information is not guaranteed. This is why, in order to contribute to improve its response to ever growing challenges of global safety and climate change, Europe needs a sustained and reliable Earth observation system of its own.

In December 2009, a study published by the Directorate-General for Internal Policies of the European Parliament entitled 'The EU Programme for Global Monitoring for Environment and Security (GMES): Governance and Financing' produced the following policy recommendations:

- A division of responsibilities between the political leadership (EC) and the provider of technical knowledge and capability (ESA) is foreseen in the governance structure. In order to ensure an efficient approach, EC and ESA need to start a discussion about political requirements and technical feasibility at an early stage.
- The roles of ESA and EEA are crucial for the whole governance of GMES. In order to ensure the main aim of GMES, to unite all the national initiatives under one roof, it is recommended that EEA be given an outstanding role, and is fully engaged in the development and coordination of user-driven services.
- There seems to be a problem harmonising the roles of the EC, ESA and the space industry. Although some steps have been taken, the industry, particularly its SMEs, is not sufficiently involved in the political process. The space industry, with its direct links to the end users, could foster their involvement and express and specify their needs.
- The financial relationship between the EU and ESA still remains unclear. There should be further consideration of the principle of juste retour within the EU and the ESA frameworks. On the one hand, repeated negotiations on financial contributions should be avoided because they result in higher administrative costs. On the other hand, uncertainties regarding the process and the outcome of the negotiations are likely to discourage MS from investing in GMES. Therefore, there is a need for an approach that creates an attractive GMES funding framework, and gets the MS more tightly involve in GMES financing.
- In a conclusion, the creation of a single budget line for GMES, with clearly defined coordination between ESA, EC and MS and the involvement of the private sector, could be the best starting position for an operational GMES.

More recently, the Council adopted its regulation on the European Earth observation programme (GMES) and its initial operations (2011-2013)[213], following an agreement reached within the European Parliament at first reading. It is aimed to contribute to the establishment of GMES as an operational programme, and will provide additional funds for its initial operations allowing a gradual build-up of capabilities until 2013, as well as putting into place the necessary structures for the governance of the programme.

It is mentioned that GMES initial operations (2011-2013) may comprise operational actions in the following fields: (i) specific service areas; (ii) measures to support take-up of services by users, (iii) data access; (iv) support for in-situ data collection; (v) the GMES space component. Regarding this latter point, it is specifically mentioned that the technical coordination and implementation of the GMES space component shall be delegated to ESA, relying on the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT) where necessary.

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[213] Regulation (EU) N°911/2010 of the European Parliament and of the Council of 22 September 2010 on the European Earth Monitoring Programme (GMES) and its initial operations 2011-2013

Security Research and Development Programme

The Security Research and Development (SR) programme is administered by DG-ENTR's policy unit H-3 in collaboration with the EU's Research Executive Agency (REA). It is part of the Seventh Framework Programme (FP7) and has a budget of EUR 1.4 billion.

It's origins began after the terrorist events of September 2001 and the "Group of Personalities" report "Research for a Secure Europe". This prompted the European Parliament in 2003 to request a preparatory plan from the Commission to test the idea of using EU funding for security-oriented R&D. That, in turn, led to the launch of the 2003-2006 Preparatory Action in Security Research (PASR) with a budget of EUR 45 million. PASR laid the ground for today's much larger EU Security Research Programme.

SR's primary goal is to protect Europe's citizens and society from harm, while enabling its economy to recover from man-made or natural disasters. It also has an economic dimension as the programme's research projects are complemented by industrial policy measures, ranging from the support of technical standards to efforts to overcome fragmentation in Europe's competitive position in the global marketplace for security products and services.

SR is based on the EU's four broad security missions (security of citizens - security of infrastructure and utilities - intelligent surveillance & border security - restoring security & safety in case of crisis). Each of these is supported by cross-cutting research projects (security & society - systems integration, interconnectivity, interoperability - security research coordination & structuring) which are either multi-disciplinary in nature or promote cross-border R&D coordination and networking activities. The resulting technologies apply to both "hard security" functions (critical infrastructure protection, border management, etc.) and to service-oriented ones such as first-responder capabilities, public transport security, civil disaster planning, crisis management and emergency communications.

These activities are based on regular stakeholders' consultations with government, civil society and industry via workshops, conferences and advisory groups.

Independent organisations have expressed a number of concerns about the SR, including the threat posed to civil liberties and fundamental rights and the corporate influence on the programme as early as 2006.[214] A more recent report by TNI/Statewatch goes further by saying that "aligned to the EU's policy objectives, the corporate-led research under the SR favours the public procurement of new security technologies and EU security policies that mandate their implementation. This largely hidden influence is now exerting a tremendous influence on the EU policy agenda in an expanding cycle of largely unaccountable and highly technocratic decision-making.[215]

Such fears have been relayed by the European Parliament[216] which found that:

- With regard to the "public-private dialogue", EU security research and development activities have mainly been driven by ministries of Defence and Interior, together with representatives of major security companies. In the process, civil society organisations, parliamentarians and organisations in charge of civil liberties and fundamental freedoms have been largely sidestepped.
- An overview of current security research projects sponsored through FP7 shows an unequal distribution of funding, which is concentrated on a small number of participating countries and a small number of organisations, and focusing mainly on the development of technologies of surveillance.

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[214] B. HAYES, "Arming Big Brother: The EU's Security Research Programme", TNI/Statewatch, Amsterdam, 2006, see: http://www.statewatch.org/analyses/bigbrother.pdf (last consulted 10 November 2011)

[215] B. HAYES, "NeoConOpticon: The EU Security-Industrial Complex", TNI/Statewatch, Amsterdam, 2009, see: http://neoconopticon.wordpress.com/read-the-report/ (last consulted 10 November 2011)

[216] Directorate-General for Internal Policies (Study), "Review of Security Measures in the Research Framework", Policy Department C: Citizen's rights and constitutional affairs, 2010, see: http://www.statewatch.org/news/2010/nov/ep-review-security-research-programme.pdf (last consulted 10 November 2011)

In short, critics to the SR programme point a closed dialogue mainly driven by the economic considerations of major security companies in Europe. This is particularly illegitimate as these technologic developments threaten to affect civil liberties and fundamental rights and, therefore, require a full, transparent and public debate on their threats and opportunities.

6.2.7. *Directorate General for the Environment (ENV)*

The objective of the European Commission's Directorate General for the Environment is to protect, preserve and improve the environment for present and future generations. To this end, DG ENV initiates and defines new environmental legislation. The Commissioner for DG ENV is Janez Potocnik.

DG ENV makes sure that Member States correctly apply EU environmental law through investigations following complaints made by citizens and non-governmental organisations (NGOs). Additionally, it can take legal action if it deems that the EU law has been infringed. In certain cases DG Environment represents the European Union in environmental matters at international meetings such as the United Nations Convention on Biodiversity.

Activities within DG ENV are distributed around six main directorates:

- Directorate A: Legal Affairs & Cohesion
- Directorate B: Nature
  B1) Agriculture, Forests & Soils; B2) Bio-diversity, and; B3) Natura 2000.

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- Directorate C: Industry
  C1) Environment & Industry; C2) Sustainable Production & Consumption, and; C3) Industrial Emissions.

Directorate C: Industry	**Soledad Blanco (Director)**
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- Directorate D: Water, Chemicals & Biotechnology
  D1) Water; D2) Marine, and; D3) Chemicals & Nanomaterials.

Directorate D: Water, Chemicals & Biotechnology	**Gustaaf Borchardt (Director)**
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- Directorate E: International Affairs
  E1) International Relations and enlargement; E2) Multilateral Environmental agreements, processes and trade issues; E3) LIFE - Nature, and; E4) LIFE - Environment & Eco-innovation.

Directorate E: International Affairs	Timo Makela (Director)
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- Directorate F: Strategy
  F1) Chief Economist, Instruments & Impact assessment; F2) Institutional affairs and programming; F3) Communication, and; F4) Chief Scientist, Research & Innovation.

Directorate F: Strategy	Robin Miege (Director)
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INSPIRE Directive

The INSPIRE Directive[217] came into force in May 2007, establishing an infrastructure for spatial information in Europe to support Community environmental policies, and policies or activities which may have an impact on the environment.

The Directive addresses 34 spatial data themes needed for environmental applications, with key components specified through technical implementing rules.

The INSPIRE team consists of staff of the European Commission from the three DGs:

- DG Environment acts as an overall legislative and policy co-ordinator for INSPIRE. Given the primary focus of INSPIRE on environmental policy, and based on liaison with the EEA, DG Environment specifies environmental thematic policy requirements for INSPIRE as a framework for the implementation programme;
- Eurostat acts as the overall implementation co-ordinator for INSPIRE. It is also running the secretariat for the INSPIRE Regulatory Committee as part of its operational responsibilities;
- JRC: acts as the overall technical co-ordinator through its Spatial Data Infrastructure Unit (SDI). It ensures the viability and evolution of the technical infrastructure for INSPIRE and guarantees the liaison with the European and international research community.

The last INSPIRE Conference entitled "INSPIREd by 2020 - Contributing to smart, sustainable and inclusive growth" took place from 27 June to 1 July 2011 in Edinburgh, Scotland to envision how INSPIRE could contribute best to the Europe 2020 Strategy.

In addition to reporting on the progress being made in the development and implementation of INSPIRE Directive and Implementing Rules, three exploratory chapters were discussed:

- INSPIRE for Sustainable Growth called for ideas and demonstrations of INSPIRE's contribution to resource efficiency and greenhouse gas reductions; for protecting the environment and preventing biodiversity loss; for strengthening the resilience to climate risks, disaster prevention and response capacities.
- INSPIRE for Smart Growth explored INSPIRE's contribution to Europe's Digital Agenda and more in particular it's role in eGovernment and the development of eEnvironment services.
- INSPIRE for Inclusive Growth - opened new avenues for INSPIRE in the context of New Skills for New Jobs. It called for an exploration on the kind of jobs and the potential for job creation related to INSPIRE. What skills and competences are needed? What kind of education and

[217] Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 establishing an infrastructure for Spatial Information in the European Community

training is needed? What kind of INSPIRE applications can help people integrate in the communities where they live?

6.2.8. Directorate General for Home Affairs (HOME)

Directorate-General for Home Affairs (HOME) was created on July 1, 2010 from the division of DG Justice, Freedom and Security into two Directorates-General, a move brought about due to the growing importance related to this area in the work of the Union. The new Directorate-General has approximately 300 staff members lead by Mr Stefano Manservisi under the political guidance of Commissioner Cecilia Malmström.

The Directorate-General focuses on two main priorities. On one side, it is ensuring European security and on the other, putting solidarity at the heart of the European migration policy. The Stockholm Action Plan constitutes the roadmap to implement these priorities.

In order to ensure the security of Europe, DG HOME aims to intensify the efforts to fight terrorism and organised crime. Proposals critical to this area include stricter rules against illicit trafficking of firearms, as well as the revision of the present legislation on fighting against trafficking in human beings and on combating child sexual abuse, sexual exploitation and child pornography.

In the domain of migration, the focus is on ensuring a balanced migration policy that addresses the irregular migration problems and, as it is foreseen in EU 2020, clears the way for legal migration to the EU, an asset for a sustainable economic recovery. A priority is therefore the consolidation of a genuine common immigration and asylum policy that includes actions such as developing new and flexible admission systems for economic immigration; initiatives to support smooth integration of immigrants into our societies; and the proposal of a common European Migration and Asylum system based on solidarity and respect of human rights.

All Home affairs policies have two dimensions, an internal and an external one. Therefore, DG HOME will continue and enhance dialogue and co-operation with third countries.

DG HOME Is currently subdivided into 3 main Directorates:

- Directorate A: Internal Security
- Directorate B: Immigration and Asylum
- Directorate C: Migration and Borders

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6.2.9. Joint Research Centre (JRC)

The Joint Research Centre was originally established under the Euratom treaty. Euratom's role is to promote nuclear safety and security in Europe and the JRC has been contributing to this aim with its research activities ever since.

The JRC has, however, at the request of its customers, expanded to also embrace other fields important to policy making, such as life sciences, energy, security and consumer protection. It has transformed itself from a purely research-driven organisation focussing on nuclear energy to a customer-driven, research-based policy support organisation. Today, the JRC is deeply embedded in the European Research Area and the EU legislative process.

The JRC is a Directorate General under the responsibility of Maire Geoghegan-Quinn, European Commissioner for Research, Innovation and Science.

The JRC is organised in three directorates (chart):

- JRC A: Programmes and Stakeholder Relations
- JRC B: Resource Management
- JRC C: Ispra Site Management
- In addition, the JRC structure includes seven institutes:
- JRC D: Institute for Reference Materials and Measurements (IRMM)
- JRC E: Institute for Transuranium Elements (ITU)
- JRC F: Institute for Energy (IE)
- JRC G: Institute for the Protection and Security of the Citizen (IPSC)
- JRC H: Institute for Environment and Sustainability (IES)
- JRC I: Institute for Health and Consumer Protection (IHCP)
- JRC J: Institute for Prospective Technological Studies (IPTS)

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Environmental Information Systems Implementation and Evolution (ENABLE)

The study of the complex relationship between our changing environment and society calls for an integrated approach across disciplines, as well as integrated environmental information systems. To address this issue, the European Commission is working with the Member States of the European Union, the European Environment Agency and other stakeholders on three main policies:

- Development and implementation of an Infrastructure for Spatial Information in Europe (more)
- Development of new information services to support Global Monitoring for Environment and Security (more)
- Development of a Shared Environmental Information System (SEIS) to coordinate environmental policies and policies that affect the environment.

An important international initiative in which Europe participates is the implementation of a Global Earth Observation System of Systems (GEOSS), which aims to improve the monitoring of environmental change driven from physical, chemical and biological processes.

Together with JRC-Institute for Environment and Sustainability's Action SHAPE on policy development, ENABLE aims to reaffirm the role of the JRC as recognised centre for spatial data infrastructure and research in environmental information management.

6.2.10. Directorate General for Maritime Affairs and Fisheries (MARE)

The Directorate General for Maritime Affairs and Fisheries is the Commission department responsible for the implementation of the Common Fisheries policy and of the Integrated Maritime Policy. With a staff of about 400, led by Director-General Lowri Evans and based in Brussels, DG MARE is made up of 6 Directorates dealing with all aspects of both policies, including among others conservation, control, market measures, structural actions and international relations relating to fisheries. DG MARE reports to Maria Damanaki, Commissioner for Maritime Affairs and Fisheries.

DG MARE mission statement is "to steer, in close relationship with stakeholders at regional and European level, the development and implementation of the Integrated Maritime Policy and to manage the Common Fisheries Policy with a view to promote the sustainable development of maritime activities as well as the sustainable exploitation of fisheries resources within and beyond Community waters".

DG MARE is organised into six directorates:

- Directorate A: Policy development and coordination
- Directorate B: International affairs and markets
- Directorate C: Atlantic, Outermost Regions and Arctic
- Directorate D: Mediterranean and Black Sea
- Directorate E: Baltic Sea, North Sea and Landlocked Member States
- Directorate F: Resources

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6.2.11. *Directorate General for Mobility and Transport (MOVE)*

Under the political guidance of Commission Vice-President Siim Kallas, the Directorate General for Mobility and Transport is in charge of developing transport policies for the European Union. Its remit is to ensure mobility in a single European transport area, integrating citizens' needs, environmental policy, and competitiveness.

DG Mobility and Transport aims to ensure that its policy is designed and implemented for the benefit of all sectors of society, including industry and citizens. For this reason, it works in close dialogue with EU citizens and stakeholders.

The DG carries out its tasks in many different ways: it develops strategic policies for the transport sector; it monitors the implementation of existing EU law and makes new legislative proposals; it encourages voluntary agreements and the exchange of best practices; and it co-finances infrastructure in the Trans-European Transport Network. Its work is accompanied by a range of support activities: financial support programmes (e.g. Marco Polo); research projects (such as intelligent transport systems); the promotion of policies internationally; and the provision of information to the public and to stakeholders.

DG MOVE has a total of about 400 staff in Brussels and shares administrative support services with DG Energy. It manages a yearly budget of about €1,5 billion, mostly for co-financing European transport network infrastructure and transport research.

DG MOVE is subdivided into five directorates:

- Directorate A: General policy
- Directorate B: Trans-European transport networks & Smart transport
- Directorate C: Maritime transport
- Directorate D: Inland transport
- Directorate E: Air transport

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6.2.12. Directorate General for Research & Innovation (RTD)

The Directorate-General for Research and Innovation, formerly DG Research, was set up on 1 January 2011 after an internal reorganisation in order to cope with its new mandate. It gets its political directions from Commissioner Maire Geoghegan-Quinn.

Its mission is to develop and implement the European research and innovation policy with a view to achieving the goals of Europe 2020 and the Innovation Union.

As such, DG RTD aims to contribute to making Europe a better place to live and work, improving Europe's competitiveness, growth and job creation while tackling the main current and future societal challenges. To do so, DG RTD supports research and innovation through European Framework Programmes, coordinates and supports national and regional research and innovation programmes, contributes to the creation of the European Research Area (ERA) by developing the conditions for researchers and knowledge to circulate freely, and supports European organisations and researchers in their co-operation at international level.

DG RTD is organised as follows (chart):

- Directorate A - Framework programme - Interinstitutional relations
- Directorate B - European Research Area
- Directorate C - Research and innovation
- Directorate D - International co-operation
- Directorate E - Biotechnologies, Agriculture, Food
- Directorate F - Health
- Directorate G - Industrial technologies
- Directorate H - Transport
- Directorate I - Environment
- Directorate K - Energy
- Directorate M: Management Operational Support - FP
- Directorate R - Resources

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6.2.13. Directorate General for Trade (TRADE)

DG TRADE's objective is to help through the EU's trade policy to secure prosperity, solidarity and security in Europe and around the globe, under the guidance of EU's Trade Commissioner Karel De Gucht.

DG TRADE's agenda includes: negotiating bilateral and multilateral trade agreements, ensuring that the rules agreed upon are applied, working closely with the World Trade Organization (WTO) and other

multilateral institutions. Its aim is to meet the challenges posed by globalisation and to ensure that as many people as possible can seize the opportunities it offers.

Recognising that success in Europe is inextricably bound up with the success of its trading partners, both in the developed and developing world, sustainable development and development policy in general are central to DG Trade's overall approach.

DG TRADE is organised into eight directorates (chart):

- Directorate A: Resources and economic analysis
- Directorate B: Services and investment, bilateral trade relations
- Directorate C: Sustainable development, bilateral trade relations
- Directorate D: Development and EPAs
- Directorate E: Public procurement and intellectual property, bilateral trade relations
- Directorate F: WTO Affairs, OECD and Dual Use
- Directorate G: Market access and Industry
- Directorate H: Trade defence

DG TRADE	Jean-Luc Demarty (Director General)
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6.3. Executive agencies

Executive agencies are organisations established in accordance with Council Regulation (EC) N°58/2003 (OJ L 11, 16.1.2003) with a view to being entrusted with certain tasks relating to the management of one or more community programmes. These agencies are set up for a fixed period that runs for the lifetime of the programme only, their mandate can be renewed if the programme is renewed. Their location has to be at the seat of the European Commission (Brussels or Luxembourg).

6.3.1. Executive Agency for Competitiveness and Innovation (EACI)

The Executive Agency for Competitiveness and Innovation (EACI) was set up to deliver efficiently high-quality European funding schemes and initiatives in the areas of energy, transport, environment, competitiveness and innovation. It currently manages the following programmes:

- Intelligent Energy - Europe
- The Power to Innovate
- Marco Polo
- New Ways to a Green Horizon
- Enterprise Europe Network
- Business Support on Your Doorstep
- Eco-innovation
- When Business Meets the Environment
- IPeuropAware Project
- Putting Ideas to Work

In its work, the EACI reports back to the following four Directorates General of the European Commission: Energy (ENER), Mobility and Transport (MOVE), Enterprise and Industry (ENTR) and Environment (ENV).

EACI	
Address	European Commission EACI Agency B-1049 Brussels

6.3.2. *European Research Council Executive Agency (ERC Executive Agency)*

The European Research Council is part of the EU's Seventh Research Framework Programme (FP7). It is set up by the European Commission to support investigator-driven frontier research and was established in February 2007 on the basis of the FP7 IDEAS specific programme, with a total budget of 7.5 billion Euro (2007-2013).[218]

Its main aim is to stimulate scientific excellence in Europe by supporting and encouraging the very best, truly creative scientists, scholars and engineers, who are invited to submit their individual proposals in any field of research.

The ERC consists of an independent Scientific Council and an Executive Agency acting on behalf of the European Commission. The ERC Scientific Council defines the scientific strategy and methodologies, whereas the ERC Executive Agency implements and applies these strategies and methodologies in the management and operations of the ERC funding activities in the legal context of FP7.

The ERC Executive Agency was formally established in December 2007 and gained administrative autonomy on 15 July 2009.

The ERC Executive Agency manages the following tasks:

- Execute the annual work programme, as defined by the ERC Scientific Council and adopted by the Commission
- Implement calls for proposals, in accordance with the work programme
- Provide information and support to applicants
- Organise peer review evaluation
- Establish and manage grant agreements, in accordance with the EU's financial regulation.
- Provide assistance to the ERC Scientific Council

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6.3.3. *Research Executive Agency (REA)*

[218] Commission Decision (EC)2008/37 of 14 December 2007 setting up the 'European Research Council Executive Agency' for the management of the specific Community programme 'Ideas' in the field of frontier research in application of Council Regulation (EC) N° 58/2003

The Research Executive Agency (REA), located in Brussels, was created in December 2007.[219] Managing over €6.5 billion, it started its work in 2008, and became fully autonomous on 15 June 2009. The REA reports to the Directorates General for Research, Enterprise, Information Society & Media, Energy, Mobility and Transport.

The Agency aims at delivering efficient and effective services to the research community and supporting diverse European Commission services dealing with research and innovation. By establishing close contact with final beneficiaries and providing a high visibility of the European Union, the REA acts as a promoter of the European Research Area.

The evaluation of proposals and the management of projects are at the heart of research support. The REA is carrying out these evaluations and management processes for a large part of the current research framework programme - FP7.

The REA is managing the following tasks:

- the Marie-Curie fellowships and related awards;
- specific research grant agreements for the benefit of small and medium sized enterprises;
- multi-partner projects in the field of space research;
- multi-partner projects in the field of security research
- the proposal reception and evaluation facility in the Covent Garden building in central Brussels;
- "one-stop shop" help desk for enquiries about FP7;
- the unique registration facility for project partners to reduce the amount of paperwork involved in project management.

The REA Space Research Unit is in charge of organising the evaluation of proposals, negotiating retained proposals and the technical and financial management of projects (except specific topics identified by DG ENTR in the work programme (e.g. development of the space component of GMES). As with the other Executive Agencies, the policy work remains within the Commission (including the definition of the space work programme).

REA	
Address	COVE B-1049 Brussels
Email	Information desk

6.4. Policy agencies

Policy agencies are bodies governed by European public law; they are distinct from the EU Institutions (Council, Parliament, Commission, etc.) and have their own legal personality. They are set up by an act of secondary legislation in order to accomplish a very specific technical, scientific or managerial task. For an exhaustive list of policy agencies, click here.

6.4.1. European Aviation Safety Agency (EASA)

[219] Commission Decision (EC)2008/46 of 14 December 2007 setting up the 'Research Executive Agency' for the management of certain areas of the specific Community programmes People, Capacities and Cooperation in the field of research in application of Council Regulation (EC) n°58/2003

The European Aviation Safety Agency (EASA) was established by Council Regulation (EC) 1592/2002 of the European Parliament and of the Council of 15 July 2002 and modified in 2008[220].

The Agency promotes the highest common standards of safety and environmental protection in civil aviation in Europe and worldwide. It is the centrepiece of a new regulatory system which provides for a single European market in the aviation industry.

Based in Cologne, the Agency already employs some 500 professionals from across Europe. Its responsibilities include:

- Expert advice to the EU for drafting new legislation;
- Implementing and monitoring safety rules, including inspections in the Member States;
- Type-certification of aircraft and components, as well as the approval of organisations involved in the design, manufacture and maintenance of aeronautical products;
- Authorisation of third-country (non EU) operators;
- Safety analysis and research.

The Agency's responsibilities are growing to meet the challenges of the fast-developing aviation sector. In a few years, the Agency will also be responsible for safety regulations regarding airports and air traffic management systems.

6.4.2. *European Environment Agency (EEA)*

Set up in 1992, the European Environment Agency (EEA) is an EU agency whose task is to provide sound, independent information on the environment. It is a major information source for those involved in developing, adopting, implementing and evaluating environmental policy, and also the general public. Currently, the EEA has 32 member countries.

The aim of the EEA is to ensure that decision-makers and the general public are kept informed about the state and outlook of the environment. Its vision is to become recognised as the world's leading body for the provision of timely, relevant and accessible European environmental data, information, knowledge and assessments.

The core objective of the EEA is to produce European, pan-European and regional integrated environmental data and indicator sets, assessments and thematic analyses in order to provide a sound decision basis for environmental policies in the EU and Member countries and for co-operation with candidate and potential candidate countries and those covered by the European Neighbourhood Policy.

The EEA's mandate is:

- To help the Union and Member Countries make informed decisions about improving the environment, integrating environmental considerations into economic policies and moving towards sustainability
- To coordinate the European environment information and observation network (EIONET).

Depending entities of the EEA are (chart):

- Executive Director's Office
- Air and climate change
- Administrative services
- Communications
- Governance and networks

[220] Regulation (EC) No 1592/2002 of the European Parliament and of the Council of 15 July 2002 on common rules in the field of civil aviation and establishing a European Aviation Safety Agency

- Integrated environmental assessments
- Natural systems and vulnerability
- Operational Services
- SEIS support

EEA	Jacqueline McGlade (Executive Director)
Telephone	+45 3336 7100
Email	jacqueline.mcglade@eea.europa.eu

6.4.3. *European Maritime Safety Agency (EMSA)*

The European Maritime Safety Agency (EMSA) was established by Regulation (EC) 1406/2002[221] as a major source of support to the Commission and the Member States in the field of maritime safety and prevention of pollution from ships. Subsequent amendments have refined and enlarged its mandate.

The objectives of the Agency are addressed through a matrix of mainly preventive, but also reactive, tasks in a number of key areas. Firstly, the Agency has been tasked with assisting the Commission in monitoring the implementation of EU legislation relating, among others, to ship construction and planned maintenance, ship inspection and the reception of ship waste in EU ports, certification of marine equipment, ship security, the training of seafarers in non-EU countries and Port State Control. Secondly, the Agency operates, maintains and develops maritime information capabilities at EU level. Significant examples are the SafeSeaNet vessel tracking system, to enable the EU-wide tracking of vessels and their cargoes; and the EU LRIT Data Centre, to ensure the identification and tracking of EU flagged ships worldwide.

In parallel, a marine pollution preparedness, detection and response capability has been established, including a European network of stand-by oil spill response vessels as well as a European satellite oil spill monitoring service. Oil spill preparedness and response activities represent over a third of EMSA's budget, including the setting up of a network of stand-by oil response vessels and state-of-the-art equipment, which are available on demand to assist Member States.

Finally, the Agency provides technical and scientific advice to the Commission in the field of maritime safety and prevention of pollution by ships in the continuous process of evaluating the effectiveness of the measures in place, and in the updating and development of new legislation.

An agreement between EMSA and ESA was signed at ESA Headquarters in Paris on 2 July 2010 to ensure that satellite data are available to enhance maritime safety and help combat pollution from shipping. This agreement, which covers cooperation between the two agencies for the use of space-based systems and data in support of maritime activities, followed an earlier agreement that had expired in March 2010.

The agreement confers ESA the responsibility to take account of EMSA's needs and requirements in terms of satellite data, both in establishing mission requirements for future operational satellite missions and instruments such as those being developed for GMES, and in establishing exploitation plans for data of current and future missions.

The availability of satellite data in near-real time, particularly from radar such as the Advance Synthetic Aperture Radar on Envisat and in the future from the GMES Sentinel-1, is an essential way of monitoring oil spills as they provide wide area coverage and have the capability to detect oil slicks on the sea surface both in daylight and darkness, and through clouds.

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[221] Regulation (EC) No 1406/2002 of the European Parliament and of the Council of 27 June 2002, as amended by Regulation (EC) No 1644/2003 of the European Parliament and of the Council of 22 July 2003, Regulation (EC) No 724/2004 of the European Parliament and of the Council of 31 March 2004 and Regulation (EC) No 2038/2006 of the European Parliament and of the Council of 18 December 2006

On 21 October 2010, the European Commission set out concrete steps to enhance the effectiveness and cost efficiency of surveilling European seas. With its Roadmap towards establishing the Common Information Sharing Environment ('CISE') for the surveillance of the EU maritime domain, the Commission defines how to bring together relevant Member States' authorities across all maritime sectors to allow for the exchange of maritime surveillance data, held by authorities such as coast guards, traffic monitoring, environmental monitoring, pollution prevention, fisheries, border control, tax and general law enforcement authorities, as well as navies. This increased cooperation will also help to cope more efficiently with real time events at sea.[222]

In January 2011, an information meeting on the Joint EMSA/ESA Programme on Satellite based Automatic Identification System (SAT-AIS) was held in Lisbon. During the meeting, the status and functions of the common EMSA/ESA Data Processing Centre (DPC) was discussed. The DPC, an equivalent to the regional server of the terrestrial AIS, will form the space segment or "space node" of EMSA's SafeSeaNet.

Further information meetings have been held since to demonstrate the importance of space-based AIS service provision to complement and back up EMSA's work on the ground (including on EMSA's Blue Belt pilot project).

EMSA	Satellite Based Monitoring Services
Address	European Maritime Safety Agency Cais do Sodré 1249-206 Lisboa Portugal
Telephone	+351 21 1209 208

6.4.4. *European Agency for the Management of Operational Cooperation at the External Borders (FRONTEX)*

The European Agency for the Management of Operational Cooperation at the External Borders of the Member States of the European Union was established by Council Regulation (EC) 2007/2004 of 26 October 2004[223].

FRONTEX coordinates operational cooperation between Member States in the field of management of external borders; assists Member States in the training of national border guards, including the establishment of common training standards; carries out risk analyses; follows up the development of research relevant for the control and surveillance of external borders; assists Member States in circumstances requiring increased technical and operational assistance at external borders; and provides Member States with the necessary support in organising joint return operations.

FRONTEX liaises closely with other Community and EU partners responsible for the security of the external borders, such as EUROPOL, CEPOL, OLAF, the customs cooperation and the cooperation on phyto-sanitary and veterinary controls, in order to promote overall coherency.

FRONTEX aims to strengthen border security by ensuring the coordination of Member States' actions in the implementation of Community measures relating to the management of the external borders.

The relative importance of FRONTEX has grown over the last few years by what some commentators call a convergence in the EU's industrial competitiveness strategy, which has identified the global "homeland security" market as one in which Europe should prosper. "In this upgrade, the defence sector, the surveillance industry and quasi-autonomous bodies such as FRONTEX and the European

[222] A. SCHÄRTEL, GAF AG

[223] Council Regulation (EC) 2007/2004 of 26 October 2004 establishing a European Agency for the Management of Operational Cooperation at the External Borders of the Member States of the European Union

Defence Agency are joining forces."[224] With the Council's endorsement of the European Commission's Eurosur proposals for a hi-tech European border surveillance system, FRONTEX is now investing in fixed surveillance and border-drone technology.

FRONTEX	Ilkka Laitinen (Executive Director)
Telephone	+48 22 544 95 00
Email	frontex@frontex.europa.eu

6.4.5. European Global Navigation Satellite Systems Agency (GSA)

The GSA was established as a Community Agency on 12 July 2004, by Council Regulation (EC) 1321/2004[225], status amended in 2006 by Council Regulation (EC) 1942/2006[226].

GSA strategic objectives include the achievement of a fully operational Galileo system. This includes the laying of foundations for a fully sustainable and economically viable system and its security. It also aims to make Galileo the world's leading satellite navigation system for civilian applications.

GSA essentially works with two partners, the European Commission DG ENTR and the European Space Agency which are both involved in developing Galileo.

European Geostationary Navigation Overlay Service (EGNOS)

EGNOS is essentially Europe's 'pre-Galileo' system, its first concrete venture into satellite navigation. It delivers services based on GPS and GLONASS signals, providing augmentation signals re-transmitted by geostationary satellites and a network of ground stations.

EGNOS augments the two satellite navigation systems now operating, the US GPS and Russian GLONASS systems, and makes them suitable for safety critical applications such as flying aircraft or navigating ships through narrow channels.

EGNOS increases the accuracy of existing satellite positioning services to below five meters, compared with about 20 metres with GPS and GLONASS. It also transmits an extremely accurate universal time signal.

Egnos services include:

- Open service: The service is provided free of charge without any guarantee or resulting liability. It is open for use to anyone with an EGNOS-enable satellite navigation receiver.
- Safety-of-life service: Once certified, ENGOS will provide a valuable integrity message warning the user of any malfunction of the GPS signal within six seconds.
- Commercial service: EGNOS provides a terrestrial commercial data service called the EGNOS Data Access Service (EDAS). EDAS disseminates EGNOS data in real time and is the single point of access for the data collected and generated by the EGNOS infrastructure.

GALILEO

Europe's interest in a European-controlled global satellite navigation system dates back to the early 1990s. European independence is the chief reason for taking this major step. But by being interoperable with GPS and GLONASS, Galileo is also expected to be the new cornerstone of the global navigation

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[224] B. HAYES, "The robot armies at our borders", *European Voice*, 2 December 2010, see: http://neoconopticon.wordpress.com/tag/frontex/ (last consulted 10 November 2011)

[225] Council Regulation (EC) N°1321/2004 of 12 July 2004 on the establishment of structures for the management of the European satellite radio-navigation programmes

[226] Council Regulation (EC) N°1942/2006 of 12 December 2006 amending Regulation (EC) N°1321/2004 on the establishement of structures for the management of the European satellite radio-navigation programmes

satellite system (GNSS). This worldwide system will henceforth be under civilian control. And with its full complement of satellites, Galileo will allow positions to be determined accurately even in high-rise cities, where buildings obscure signals from today's satellites

Galileo will also offer several signal enhancements making the signal more easy to track and acquire and more resistant against interference and reflections. European GNSS will deliver much more precise and much more reliable services than the American and Russian systems. This means GALILEO and EGNOS will make possible a whole new and virtually limitless range of 'reliability-critical' services, applications and business opportunities.

By placing satellites in orbits at a greater inclination to the equatorial plane, GALILEO will also achieve better coverage at high latitudes, making it particularly suitable for operation over northern Europe, an area not well covered by GPS.

Despite a difficult start, numerous delays in the deployment of satellites and the failure of the public-private-partnership, Galileo was on track in 2007 thanks to the cooperation between the ESA and the Commission.

On 18 April 2011, the Committee on Industry, Research and Energy in the European Parliament adopted the own-initiative report[227] by Vladimir Remek (GUE/NGL) welcoming the Commission report on the mid-term review of the European satellite navigation programmes.

The report calls on the Commission to update GSA's Strategic Framework in the light of the current situation, including the main actions, estimated budget and timetable necessary to meet the objectives. With a view to preventing future cost overruns, the Commission is also asked to put in place stringent cost containment policies and to implement recommended risk mitigation measures, such as dual sourcing.

It stresses that Galileo's full operation capacity should be reached by 2018 at the latest, which is estimated to require additional financing of EUR 1.9 billion and annual funding to cover operating costs of approximately EUR 800 million from 2014 onwards. This information is to be balanced with Commissioner Antonio Tajani's recent assertion that Galileo is likely to cost less than expected.[228]

On the governance and management structure of GNSS, the committee proposes addressing the division of tasks and responsibilities between the Commission, the GSA and the European Space Agency, as well as other relevant issues.[229] Experts from the Commission and the Industry ask for the extension of GSA's mandate to also cover the operation of Galileo while the European Space Agency would remain responsible for deploying the Galileo constellation.

GSA	Carlo des Dorides (Executive Director)
Email	news@gsa.europa.eu

[227] Decision 2009/2226(INI) of the European Parliament of 12 April 2011 on the Mid-term review of the European satellite navigation programmes: implementation assessment, future challenges and financing perspectives

[228] A. TAJANI, "4th Conference on EU Space Policy. Benefits for citizens and society", European Parliament Hemicycle, Brussels, 8-9 Novemebr 2011

[229] See also Regulation (EU) N°912/2010 of the European Parliament and of the Council setting up the European GNSS Agency, repealing Council Regulation (EC) N°1321/2004 on the establishment of structures for the management of the European satellite radio navigation programmes and amending Regulation (EC) N°683/2008 of the European Parliament and of the Council

7. European Economic and Social Committee

The European Economic and Social Committee (EESC) is a consultative body of the European Union. Committed to European integration, the EESC contributes to strengthening the democratic legitimacy and effectiveness of the European Union by enabling civil society organisations from the Member States to express their views at European level. This Committee fulfils three key missions:

- Helping to ensure that European policies and legislation tie in better with economic, social and civic circumstances on the ground, by assisting the European Parliament, Council and European Commission, making use of EESC members' experience and representativeness, dialogue and efforts to secure consensus serving the general interest;
- Promoting the development of a more participatory European Union which is more in touch with popular opinion, by acting as an institutional forum representing, informing, expressing the views of and securing dialogue with organised civil society;
- Promoting the values on which European integration is founded and advancing, in Europe and across the world, the cause of democracy and participatory democracy, as well as the role of civil society organisations.

The 344 members of the EESC are drawn from economic and social interest groups in Europe.

Members are nominated by national governments and appointed by the Council of the European Union for a renewable 5-year term of office. The latest renewal was in October 2010 for the mandate 2010-2015.

The Committee has six sections (chart):

- Agriculture, Rural Development and the Environment (NAT)
- Economic and Monetary Union and Economic and Social Cohesion (ECO)
- Employment, Social Affairs and Citizenship (SOC)
- External Relations (REX)
- The Single Market, Production and Consumption (INT)
- Transport, Energy, Infrastructure and the Information Society (TEN)

EESC	Rolf Eriksson (Head of the President's Private Office)
Telephone	+32 2 546 8657
Email	rolf.eriksson@eesc.europa.eu

8. Committee of the Regions

The Committee of the Regions (CoR) is the political assembly that provides the regional and local levels with a voice in EU policy development and EU legislation. The Treaties oblige the Commission, Parliament and Council to consult the Committee of the Regions whenever new proposals are made in areas that affect the regional or local level. The CoR has 344 members from the 27 EU countries, and its work is organised in 6 different commissions. They examine proposals, debate and discuss in order to write official opinions on key issues.

The mission of the Committee of the Regions (CoR) is to involve regional and local authorities in the European decision-making process at the earliest stage through:

- mandatory consultation by the European Commission, the European Parliament and the Council of Ministers on key policy areas of regional concern;
- own-initiative opinions enabling the CoR to put issues on the EU agenda.

The 344 members of the CoR carry out this work through six thematic commissions and five plenary sessions, consultations with national and European associations as well as networks and platforms of regions and cities set up to exchange information on EU priority issues.

Six distinctive Commissions are responsible to support the preparation of opinions based on the proposals of the European Commission. The draft version of opinions and resolutions are submitted to the Plenary Assembly for adoption:

- Commission for Territorial Cohesion Policy (COTER)
- Commission for Economic and Social Policy (ECOS)
- Commission for Education, Youth and Research (EDUC)
- Commission for Environment, Climate change and Energy (ENVE)
- Commission for Citizenship, Governance, Institutional and External Affairs (CIVEX)
- Commission for Natural Resources (NAT)

The composition of each Commission reflects the political and national composition of the Committee of the Regions.

CoR	Gerhard Stahl (Secretary General)
Telephone	+32 2 282 2005
Email	gerhard.stahl@cor.europa.eu

9. Other Relevant Bodies

9.1. European Environment Information and Observation Network (EIONET)

A regulation from the Council and the European Parliament[230] regulates both the European Environment Agency (EEA) and the European Environment Information and Observation Network (EIONET). It consists of the EEA itself, six European Topic Centres (ETCs) and a network of around 1000 experts from 39 countries in over 350 national environment agencies and other bodies dealing with environmental information. These are the National Focal Points (NFPs) and the National Reference Centres (NRCs).

EIONET aims to provide timely and quality-assured data, information and expertise for assessing the state of the environment in Europe and the pressures acting upon it.

The EIONET partnership is crucial to the EEA in supporting the collection and organisation of data and the development and dissemination of information. The organisations and individuals in the network are supported by an extensive information technology infrastructure (e-EIONET).

Through EIONET, the EEA coordinates the delivery of timely, nationally validated, high-quality environmental data from individual countries. This forms the basis of integrated environmental assessments and knowledge that is disseminated and made accessible through the EEA website. This information serves to support environmental management processes, environmental policy making and assessment, and participation at national, European and global levels.

EIONET	
Email	helpdesk@eionet.europa.eu

9.2. European Operational Satellite Agency for Monitoring Weather, Climate and the Environment (EUMETSAT)

EUMETSAT is the European operational satellite agency for monitoring weather, climate and the environment. It is an intergovernmental organisation formed in 1986 to service a current total of 26 Member States.

It operates a system of meteorological satellites monitoring the atmosphere, ocean and land surfaces which deliver weather and climate-related satellite data, images and products on a 24/7 basis. This information is then supplied to the National Meteorological Services of the organisation's Member and Cooperating States in Europe, as well as other users worldwide.

EUMETSAT has an extended ground system to control its satellites and handle the data they collect. Images produced by the EUMETSAT system help to enhance and safeguard the daily lives of European citizens. They aid meteorologists in identifying and monitoring the development of potentially dangerous weather situations and in issuing timely forecasts and warnings to emergency services and local authorities, helping to mitigate the effects of severe weather and protecting human life and property.

This information is also critical to the safety of air travel, shipping and road traffic, and to the daily business of farming, construction, and many other industries.

One of EUMETSAT's priorities include the "development of new environmental monitoring satellite capabilities to meet the needs of EUMETSAT users, to the extent that they intereact with or are driven by weather and climate. In particular, EUMETSAT shall continue to promote the proportionate use of its

[230] Regulation (EC) N° 401/2009 of the European Parliament and of the Council of 23 April 2009 on the European Environment Agency and the European Environment Information and Observation Network

skills and operational capabilities in the implementation of GMES missions of interest to its Member States. EUMETSAT shall also build proper relationships with European institutions in charge of Environment monitoring."

Whether EU Institutions will validate the Commission's proposal not to include GMES into the Multi-annual Financial Framework remains to be seen, also with regard to the money already invested. However, EUMETSAT is recognised as a successful intergovernmental agency and has a demonstrated ability to deliver its services to end users. This quality and EUMETSAT's interest in GMES make it a strong candidate for taking over the development of GMES, in the absence of an EU budget.

9.3. Network of European Regions Using Space Technologies (NEREUS)

NEREUS, the Network of European Regions Using Space Technologies, is an initiative by regions from all over Europe, which share as Full Members its governance. Emphasis is placed on the use of space technologies. The network aims to explore the benefits of space technologies for Regions and their citizens and to spread their applications. NEREUS is a strong voice for the regional dimension of European Space Policy and programs as well as end-user needs.

As Space is a European "lead market initiative" the overall mission of NEREUS is to fully exploit the potential of the space technology market for the benefit of its Regions and their actors.

NEREUS aims to play an active role in the construction and development of space technology markets in order to ensure that optimal framework conditions are met for the further development of space applications.

As a strong voice for the regional dimension of European Space Policy, NEREUS wants to increase and enhance the participation of citizens and companies in European Space Policy and Programmes. Ultimately, it strives for an adequate representation of end user needs in terms of space applications and services.

To perform its mission NEREUS established a platform for:

- voicing the regional dimension of space policies at a political level;
- enhancing the growing role of citizens in the development of European space policy and markets;
- exchanging information and knowledge;
- networking and building of strong partnerships;
- mobilising convincing projects and initiatives.

NEREUS	Roya Ayazi (Secretary General)
Telephone	+32 2 743 7033
Email	nereus.bruxelles@euroinbox.com

ANNEX – SURVEY RESULTS

Introduction

This section of the report aims to further address the need to identify trends or new opportunities for the contribution of remote sensing (RS) / Earth observation (EO) programmes for the development and implementation of key EU external policies. This part of the study also involved efforts to identify possible partnership for the ESA with EU institutions, (beyond traditional ESA partners) such as with European professional organisations or NGOs working in the field of Climate, Environment and Development.

Methodology

To facilitate this process, questionnaires were sent to a wide range of organisations asking them to briefly indicate the policy areas in which they work, their current (or desired interest in establishing) relations with the ESA and information regarding the three following points:

- On-going / up coming space related work of the organisation;
- Examples of why the organisation is interested in how space systems can support the development and/or implementation of EU policies in the fields of climate, environment, development and/or security; and
- Ideas for possible new space systems that might be needed to help support EU policies and actions.

Replies were received from the following 20 organisations:

1. UN Economic Commission for Europe
2. UN Environment Programme - DEWA/GRID-Europe
3. UN Environment Programme - Post-Conflict and Disaster Management Branch
4. European Commission - DG Environment
5. European Commission - DG Humanitarian Aid and Civil protection (ECHO)
6. European Commission - Joint Research Centre (JRC)
7. Network of European Regions Using Space Technologies (NEREUS)
8. NATO
9. Swedish Defence Research Agency (FOI)
10. Minerva Chair of Energy and Environmental Security, US Air Force
11. Embassy of Costa Rica in Brussels
12. Adelphi research
13. Bonn International Center for Conversion (BICC)
14. Ecologic Institute
15. Foundation for Environmental Security and Sustainability (FESS)
16. Madariaga - College of Europe Foundation
17. Institute for Security Studies (ISS)
18. Institut Congolais pour la conservation de la Nature (ICCN)
19. Scott Polar Research Institute
20. Le Monde diplomatique

The number of organisations reporting that they work in the four mentioned policy areas were:
Climate (14); Environment (19); Development & Security (18); European Space Policy (6)

"ESA Relations" refers to the part of the questionnaire were respondents were asked to indicate:
❑ We already have **direct** relations with the ESA.
❑ We already have **indirect** relations with the ESA through our national space agency.
❑ We would be interested in learning more about the ESA and developing contacts in the **future**.

The number "1" in the charts indicates a positive "tick" regarding the policy area choices and status of relations with the ESA.

UNS

Organisation:	**UN Economic Commission for Europe**	**Policy Areas:**								**ESA Relations**	
		1	1	1		**Other:**				1	
Name:	Brinda Wachs					GIS, Remote Sensing and Satellite Communications					
Title:	UNECE Focal Point for Outerspace Activities	**Climate**	**Environment**	**Development & Security**	**European Space Policy**					**Direct**	**Indirect**	**Future**
Telephone:	+41 22 917 2452										
Email:	brindawachs@unece.org										
URL:	http://www. unece.org										

On-going / up-coming space related work:	As UNECE focal point for Outerspace Activities since 2005 and the focal point for Geographic Information Systems and representative to the United Nations Geographic Information Working Group (UNGIWG) since 2000, I report annually to the United Nations Inter-Agency Meeting on Outer Space Activities, which reports to the UN's Committee on the Peaceful Uses of Outerspace and to UNGIWG. In the upcoming joint meeting of the Inter-agency Meeting on Outer Space Activities and UNGIWG (16-18 March 2011), to be held at the headquarters of the UN High Commission for Refugees (UNHCR) In Geneva, I will report on the UNECE's space-related activities in the following areas: • Climate change adaptation and mitigation through UNECE Environment Conventions and other activities (e.g. World Forum on Harmonization of Vehicle Regulations and Energy Efficiency for Climate Change Mitigation) • Air pollution monitoring using remote sensing and satellite communications under the Convention on Long-range Transboundary Air Pollution and the Gothenburg Protocol (the revision of which will include Black Carbon) • GIS applications of the European Road and Rail (E-Road and E-Rail) Censuses • Remote sensing used in inland waterway transport • Other space-related or satellite communications activities at UNECE
Interest in how space systems can support EU policies:	ECE, through the above activities, supports the development of EU policies in the field of climate, environment, development and security. Through its technical, scientific and capacity-building work, development of norms and standards and the implementation of multilateral environment agreements, the ECE is one of the main partners of the Environment and Security (ENVSEC) Initiative and promotes peace and security as part of its core mandate.
Ideas for possible new space systems:	/

1

	Can provide more info	**Wishes to be kept informed**
More Information:	0	0

UNS

Organisation:	**UN Environment Programme - DEWA/GRID-Europe**	**Policy Areas:**								**ESA Relations**	
Name:	Ronald G. Witt	1	1	1		**Other:**				1	
Title:	UNEP/DEWA Regional Coordinator - Europe	**Climate**	**Environment**	**Development & Security**	**European Space Policy**	Environmental assessment and reporting, and Early Warning of emerging problems and threats at all geographic scales.				**Direct**	**Indirect**	**Future**
Telephone:	+41 22 917-8294/5										
Email:	Ron.Witt@unep.org										
URL:	http://www.grid.unep.ch/										

On-going / up-coming space related work:	Atlases of environmental change in different regions of the world, based (mostly) on high-resolution, multi-temporal satellite imagery.
Interest in how space systems can support EU policies:	Better scientific understanding of earth systems and environmental change, to help keep citizenry and policy-makers better informed, leading to better decision-making on environmental problems/issues.
Ideas for possible new space systems:	Keep existing high-resolution satellite platforms/sensors flying and make sure temporal series of imagery are continued for the long-term. Thus, not necessarily new systems, but maintaining what is already there…

2

	Can provide more info	**Wishes to be kept informed**
More Information:	0	0

UNS

Organisation:	**UN Environment Programme - Post-Conflict and Disaster Management Branch**	**Policy Areas:**								**ESA Relations**	
Name:	David Jensen	1	1	1		**Other:**					1
Title:	Policy and Planning Coordinator	**Climate**	**Environment**	**Development & Security**	**European Space Policy**	environmental drivers and impacts of conflicts and disasters				**Direct**	**Indirect** **Future**
Telephone:	+41 22 9178 8167										
Email:	David.jensen@unep.org										
URL:	http://www.unep.org/conflictsanddisasters/										

On-going / up-coming space related work:	Monitoring the impacts of climate change on the distribution and availability of natural resources and correlating these changes to potential conflicts and migration. Monitoring the environmental footprint around peacekeeping and/or refugee camps. Monitoring the illegal extraction and trade of natural resources in fragile states and conflict-affected countries. Monitoring the environmental impacts of conflicts and disasters from the destruction of industrial sites and infrastructure. Identification of transboundary environmental hotspots and potential sources of tension between countries or at the regional level. Conducting long term trend analysis of remotely sensed areas and projecting future scenarios based on the extension of the trends.
Interest in how space systems can support EU policies:	As post-conflict countries often have restrictive security conditions, remote sensing can be an effective way to collect environmental impact data. In addition, remote sensing can be an effective way to conduct pre-screening of potentially damaged infrastructure that can be visited by field teams. Regular remote sensing in vulnerable countries could also help to establish an environmental baseline that could be used to measure impacts when a conflict or disaster event occurs.
Ideas for possible new space systems:	/

3

	Can provide more info	**Wishes to be kept informed**
More Information:	0	Yes

EUR

Organisation:	**European Commission - DG Environment**	**Policy Areas:**							**ESA Relations**		
		1	1	1	1	**Other:**			1		1
Name:	Banfield Nicholas					/					
Title:	Head of Unit 'Chief Scientists, Research and Innovation'	**Climate**	**Environment**	**Development & Security**	**European Space Policy**				**Direct**	**Indirect**	**Future**
Telephone:	+32 2 296 8761										
Email:	nicholas.banfield@ec.europa.eu										
URL:	http://ec.europa.eu/dgs/environment/										

On-going / up-coming space related work:	All aspects of Earth Observation, and its associated activities, in pursuit of the development and implementation of EU environment policy (in particular, GMES).
Interest in how space systems can support EU policies:	Land-use change, de- / re-forestation, forest cover, natural habitat change, coastal zone change, sea-temperature change, all aspects of air quality (notably PM concentration, N2O concentration etc etc), flood control / prediction…..
Ideas for possible new space systems:	/

4

	Can provide more info	**Wishes to be kept informed**
More Information:	0	Yes

EUR

Organisation:	**European Commission - DG Humanitarian Aid and Civil protection (ECHO)**	**Policy Areas:**										**ESA Relations**
Name:	Soleil Beaulieu		1	1	1	**Other:**						1
Title:	Policy officer	**Climate**	**Environment**	**Development & Security**	**European Space Policy**	Civil protection and humanitarian aid responding to all types of disasters thus also to the effects of climate change. In addition we work on prevention and preparedness and disaster risk reduction.						**Direct** **Indirect** **Future**
Telephone:	+32 229 63942											
Email:	Soleil.beaulieu@ec.europa.eu											
URL:	http://ec.europa.eu/echo/index_en.htm											

On-going / up-coming space related work:	We cooperate closely with DG Enterprise and Industry on the future GMES services, on the GNSS and on satellite communication
Interest in how space systems can support EU policies:	DG ECHO operates an Emergency Response Unit (Monitoring and Information Centre - MIC); cooperates closely with humanitarian aid partners on a global basis and with 31 Participating States to the Civil Protection Mechanism. Increased quality tools for communication and navigation are of utmost importance to all working in the field. So are rapid maps, reference maps and supporting maps in particular to our decision makers from the political level to the on site commanders for strategic, tactical and operational purposes

Ideas for possible new space systems:	Any new systems that would speed up the delivery of maps during emergencies are welcomed. Tracking devices for personnel in the field should become a must for all. This is very important for security reasons, should become mandatory for all team members (small size, incorporated in a pin, watch, etc., something that you'll always wear when you are out in the field). If it would become possible to, on the basis of detailed topography information, to calculate depth and volume of floodwaters and thus make the preparedness and operational work more precise, one would have a great advantage. In Europe we have developed the EFAS (European Flood Alert System) giving forecasts based on hydrological and meteorological data. If such systems could be further developed to give flood alerts on a global basis, responders would gain a lot. (JRC is working on these issues. We do not know how much new features linked to satellites could facilitate this). In Europe we have also developed a European Forest Fire Information Service (EFFIS). If it could be further developed to also become an Early Warning System on a global basis a lot would be gained for responders. (JRC is also working on this). Recent examples to be mentioned may be forest fires in Russia and in Israel. Information we got was slow and there were discrepancies. Part of the EFFIS features like detection of active fires, so called hot spots, is based on the data received from MODIS sensors, on board of the TERRA and AQUA American satellites, which identifies areas on the ground that are distinctly hotter than their surroundings. The difference in temperature between the areas that are actively burning with respect to neighbour areas allows the identification and mapping of active fires. The Moderate Resolution Imaging Spectroradiometer (MODIS) flies onboard NASA's Aqua and Terra satellites as part of the NASA-centered international Earth Observing System. Both satellites orbit the Earth from pole to pole, seeing most of the globe every day. Onboard Terra, MODIS sees the Earth during the morning, while Aqua MODIS orbits the Earth in the afternoon. If Europe could have its own capacities we presume this would improve our EWS as well as the response and preparedness.

5

	Can provide more info	**Wishes to be kept informed**
More Information:	Yes	Yes

EUR

Organisation:	**European Commission - Joint Research Centre**	**Policy Areas:**							**ESA Relations**	
			1	1	1	**Other:**			1	
Name:	Jan Kucera					/				
Title:	Research Administrator - Geoinformation	**Climate**	**Environment**	**Development & Security**	**European Space Policy**				**Direct**	**Indirect**	**Future**
Telephone:	/									
Email:	jan.kucera@jrc.ec.europa.eu									
URL:	http://ec.europa.eu/dgs/jrc/index.cfm									

On-going / up-coming space related work:	JRC - Broad range of activities
Interest in how space systems can support EU policies:	JRC is already doing it
Ideas for possible new space systems:	Free data access for sentinels

6

	Can provide more info	**Wishes to be kept informed**
More Information:	0	Yes

RST

Organisation:	**Network of European Regions Using Space Technologies – NEREUS aisbl**	**Policy Areas:**							**ESA Relations**	
		1	1	1	1	**Other:**			1	
Name:	Roya Ayazi					Use of space technologies for regional applications, for the benefits of regions and their citizens				
Title:	Secretary General	**Climate**	**Environment**	**Development & Security**	**European Space Policy**				**Direct**	**Indirect**	**Future**
Telephone:	+32 2 743 7033									
Email:	Nereus.bruxelles@euroinbox.com									
URL:	http://nereus-regions.eu/									

On-going / up-coming space related work:	All activities of the association are related to space, Core areas EO/GMES, GNSS, Telecom, Regional Policy, Training and Education, Spreading the use of space technologies, raising the understanding of space
Interest in how space systems can support EU policies:	**Regions need space applications to manage their territory (transport, garbage management, costal management) and to respond to environmental challenges and legislation (INSPIRE etc.)**
Ideas for possible new space systems:	/

7

	Can provide more info	**Wishes to be kept informed**
More Information:	YES	Yes

RGO

Organisation:	**NATO**	**Policy Areas:**							**ESA Relations**	
		1	1	1		**Other:**			1	0	1
Name:	Sarah Tarry	**Climate**	**Environment**	**Development & Security**	**European Space Policy**	/			**Direct**	**Indirect**	**Future**
Title:	DPP / Defence Policy and Capability Directorate										
Telephone:	+32 2 707 4701										
Email:	Tarry.sarah@hq.nato.int										
URL:	http://www.nato.int										

On-going / up-coming space related work:	NATO's Allied Command Transformation is presently working on a study of the Global Commons (maritime, air, space, and cyber space), which includes identifying the challenges and vulnerabilities of ensuring assured access to these commons. NATO no longer has any space assets of its own, but commonly funds satellite communications to support its operations. NATO bodies also discuss a range of technical, space-related issues, such as spectrum management.
Interest in how space systems can support EU policies:	NATO staffs are interested in capabilities that can identify and monitor potential zones of man-made and natural disasters as well as conflicts. NATO recognises the EU's strong role in the environmental and climate change domains. On this basis, and to the extent possible, NATO would aim to support and not duplicate the EU's and ESA's activities in these areas.
Ideas for possible new space systems:	/

8

	Can provide more info	**Wishes to be kept informed**
More Information:	Yes	Yes

RST

Organisation:	**Swedish Defence Research Agency**	**Policy Areas:**								**ESA Relations**	
		1	1	1		**Other:**				1	
Name:	Christina Edlund					/					
Title:	Senior Analyst	**Climate**	**Environment**	**Development & Security**	**European Space Policy**					**Direct**	**Indirect**	**Future**
Telephone:	+46 90 106643										
Email:	Christina.edlund@foi.se										
URL:	http://www.foi.se										

On-going / up-coming space related work:	Not really related to space issues, but an increased work regarding environmental intelligence in areas where crises response operations or peace operations are to be performed. Need for e.g. satellite images and other information (maybe something for the EUSC…?)
Interest in how space systems can support EU policies:	/
Ideas for possible new space systems:	/

9

	Can provide more info	**Wishes to be kept informed**
More Information:	0	Yes

GVT

Organisation:	**US Air Force**	**Policy Areas:**								**ESA Relations**	
		1	1	1		**Other:**				1	1
Name:	Chad Briggs					/					
Title:	Minerva Chair of Energy and Environmental Security	**Climate**	**Environment**	**Development & Security**	**European Space Policy**					**Direct**	**Indirect**	**Future**
Telephone:	+1 256-748-2475										
Email:	chad@globalint.org										
URL:	http://www.globalint.org										

On-going / up-coming space related work:	We are leading a new program funded by the Secretary of Defense (OSD) too coordinate and develop new risk assessment methods for USAF. This includes cooperation with NASA on remote sensing technologies, integrating climate change data and earth systems (such as volcanic activity) and translating such data into future risk scenarios. We will introduce energy and environmental scenarios and scenario layers into planning and war-game activities for both the US Dept of Defense and NATO.
Interest in how space systems can support EU policies:	We realize that these activities cannot be solely limited to NASA, and are interested in reaching out to ESA and related agencies, particularly where remote sensing and data integration can assist environmental security assessments. We have worked with the EU in the past on development and security programmes, and would be happy to assist ESA and IES in future projects.
Ideas for possible new space systems:	/

10

	Can provide more info	**Wishes to be kept informed**
More Information:	Yes	Yes

GVT

Organisation:	**Embassy of Costa Rica in Brussels**	**Policy Areas:**							**ESA Relations**	
			1		1	**Other:**				1
Name:	Roberto Cespedes									
Title:	Counsellor	**Climate**	**Environment**	**Development & Security**	**European Space Policy**	/				
Telephone:	+32 2 640 5541								**Direct**	**Indirect**	**Future**
Email:	roberto.cespedes@costaricaembassy.be									
URL:	http://costa-rica.visahq.com/embassy/Belgium/									

On-going / up-coming space related work:	The VASMIR plasma motor for space travel (to Mars)
Interest in how space systems can support EU policies:	Illegal logging and deforestation, drug trafficking and related criminal activities in Costa Rica and Central America
Ideas for possible new space systems:	/

11

	Can provide more info	**Wishes to be kept informed**
More Information:	0	0

NGO

Organisation:	**Adelphi research**	**Policy Areas:**					**Other:**	**ESA Relations**		
		1	1	1				0	0	0
Name:	Clementine Burnley						/			
Title:	Senior Project Manager	**Climate**	**Environment**	**Development & Security**	**European Space Policy**			**Direct**	**Indirect**	**Future**
Telephone:	+49-(0)30-89 000 68-33									
Email:	burnley@adelphi.de									
URL:	http://www.adelphi.de/en/start/aktuell/43496.php									

On-going / up-coming space related work:	The G-MOSAIC (GMES services for Management of Operations, Situation Awareness and Intelligence for regional Crises) Collaborative Project will provide the European Union with intelligence data that can be applied to early warning and crisis prevention as well as to crisis management and rapid interventions in hot spots around the world. It aims at identifying and developing products, methodologies and pilot services for the provision of geo-spatial information in support to EU external relations policies and at contributing to define and demonstrate the sustainability of GMES global security services. The G-MOSAIC project was launched in January 2009, it is a three-year project, with a total budget of 15.3 million euros, of which the European Commission (Directorate Enterprise and Industry) will finance 9.6 million through a grant under the 7th Framework Programme for Research and Technological Development. Adelphi's role is to help develop crisis indicators which Support Intelligence & Early Warning, and to contribute to the analysis of the causes leading to regional crises, such as fight for natural resources, population pressure, land degradation, and illegal activities.
Interest in how space systems can support EU policies:	• Potential to deliver information on hard to reach or insecure areas • Global coverage
Ideas for possible new space systems:	/

12

	Can provide more info	**Wishes to be kept informed**
More Information:	0	Yes

NGO

Organisation:	**Bonn International Center for Conversion (BICC)**	**Policy Areas:**								**ESA Relations**	
Name:	Lars Wirkus			1	1		**Other:**				1	1
Title:	Senior researcher (Data management and GIS & Environmental Security)	**Climate**	**Environment**		**Development & Security**	**European Space Policy**	Peace and Conflict research: Natural Resources and Conflicts; Migration; Disarmament, Demobilization and Reintegration DD&R; Small Arms and Light Weapons; Security Practices;			**Direct**	**Indirect**	**Future**
Telephone:	+49 228 91196 63											
Email:	wirkus@bicc.de											
URL:	http://www.bicc.de/											

On-going / up-coming space related work:	a) partner / user in an EC FP6 funded Network of Excellence GMOSS (Global Monitoring for Security and Stability), input from a peace and conflict research perspective; b) user of EO data in an ongoing EC FP7 funded research project G-MOSAIC (GMES services for Management of Operations, Situation Awareness and Intelligence for regional Crises), involved in developing and evaluating a to be developed GMES service on illegal activities (mining / logging); c) member of the user advisory board of G-MOSAIC; d) making use of land use change detection in the context of natural resource extraction and related violent conflicts in African countries (planned)
Interest in how space systems can support EU policies:	a) BICC is working on the nexus of security and development, focusing on conflict and crisis prevention; b) to further elaborate on the links between environment and security (land and water question); c) EO data could help us in supporting UN initiatives and governments in monitoring disarmament and demobilisation processes; d) EO data could support and enrich existing and to be developed tools for countering illegal trafficking of weapons / monitoring existing control regimes; interested in the potential and the limits of EO data in supporting the Non-proliferation of Small Arms and Light Weapons; e) measuring and monitoring militarization; f) adding an additional layer of information, by doing so enhancing the quality of our research and our supporting consultancy work; g) interested to find out to what extend EO data is able to enhance social science based research for decision support in the above mentioned working areas; h) feed EO derived data into environmental security assessments and combine this with the evaluation of e.g. natural resources governance structures in hot spot areas as part of early warning systems
Ideas for possible new space systems:	Services derived from satellites: a) countering illegal trafficking of weapons / monitoring existing control regimes; b) monitoring disarmament and demobilisation processes monitoring of natural resource related control regimes (EITI, FLEGT, Kimberley)

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	Can provide more info	**Wishes to be kept informed**
More Information:	Yes	Yes

NGO

Organisation:	**Ecologic Institute**	**Policy Areas:**							**ESA Relations**		
		1	1	1		**Other:**				1	1
Name:	Sandra Cavalieri					/					
Title:	Fellow										
Telephone:	0	**Climate**	**Environment**	**Development & Security**	**European Space Policy**				**Direct**	**Indirect**	**Future**
Email:	Sandra.cavalieri@ecologic.eu										
URL:	http://ecologic.eu/										

On-going / up-coming space related work:	To my knowledge, we do not have any planned space-related work at Ecologic Institute.
Interest in how space systems can support EU policies:	- Maps to clearly show policy makers environmental changes (land use, ice cover, etc) - Data on transboundary emissions (especially source locations) - Possibly ship traffic information for the Arctic - Would be great to have a primer written by ESA on what services/information they have that is relevant to policy makers
Ideas for possible new space systems:	I think it would be helpful to have more information targeted at policy analysts that explains what data is available – and to make this data somewhat accessible so that it can be incorporated in policy documents (and not only used for its core purpose of scientific research).

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	Can provide more info	**Wishes to be kept informed**
More Information:	Yes	Yes

NGO

Organisation:	**Foundation for Environmental Security and Sustainability (FESS)**	**Policy Areas:**								**ESA Relations**	
		1	1	1		**Other:**					1
Name:	Jeffrey Stark					/					
Title:	Director of Research and Studies	**Climate**	**Environment**	**Development & Security**	**European Space Policy**					**Direct**	**Indirect**	**Future**
Telephone:	+1 703 560 8290										
Email:	jstark@fess-global.org										
URL:	http://www.fess-global.org/										

On-going / up-coming space related work:	Anticipated studies in 2011 on climate change and conflict in Ethiopia and Peru (or other Andean country); Work on food security in Eastern Africa with the UN Economic Commission for Africa
Interest in how space systems can support EU policies:	Severe lack of reliable weather data in most countries of Sub-saharan Africa makes contributions from satellite monitoring extremely important. The lack of understanding of how climate change will affect specific populations and communities makes satellite trend data especially needed and valuable
Ideas for possible new space systems:	/

15

	Can provide more info	**Wishes to be kept informed**
More Information:	0	Yes

NGO

Organisation:	**Madariaga - College of Europe Foundation**	**Policy Areas:**							**Other:**	**ESA Relations**	
						1					1
Name:	Daniel Fiott								/		
Title:	Research Fellow	**Climate**	**Environment**	**Development & Security**	**European Space Policy**					**Direct**	**Indirect**	**Future**
Telephone:	+32 498 391 230										
Email:	dfiott@madariaga.org										
URL:	http://www.madariaga.org/										

On-going / up-coming space related work:	Research Paper: D. Fiott, "Blind in a Dark Room: The EU's Capacities for Satellites and Natural Resources Governance"
Interest in how space systems can support EU policies:	Interested in how the EU can bring together all of its space capacities - located under its various institutions - for the purposes of early-warning, crisis management and enforcement of international initiatives such as the Kimberley Process
Ideas for possible new space systems:	Ensure the EU is using the latest technologies. Ensure space systems are under central commnad at EU-level, or, at minimum, that they are all being used in a coherent manner

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	Can provide more info	**Wishes to be kept informed**
More Information:	0	Yes

NGO

Organisation:	**Institute for Security Studies**	**Policy Areas:**								**ESA Relations**	
		1	1			**Other:**					1
Name:	Wilson Kipkore					Illegal poaching, logging and e-waste management					
Title:	Programme Head, Environmental Security	**Climate**	**Environment**	**Development & Security**	**European Space Policy**					**Direct**	**Indirect**	**Future**
Telephone:	+254 2 3861 625										
Email:	wkipkore@issafrica.org										
URL:	www.issafrica.org										

On-going / up-coming space related work:	/
Interest in how space systems can support EU policies:	Assessing environmental degradation, catchments, forests conversion & deforestation
Ideas for possible new space systems:	Use of geo-information to combat environmental crimes and assess impacts of climate change

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	Can provide more info	**Wishes to be kept informed**
More Information:	Yes	Yes

LOA

Organisation:	**Institut Congolais pour la conservation de la Nature**	**Policy Areas:**							**ESA Relations**	
Name:	Shalukoma Chantal						**Other:**			
Title:	Research and Monitoring Officer Kahuzi-Biéga National Park (PNKB)	**Climate**	**Environment**	**Development & Security**	**European Space Policy**	1	/		**Direct**	1
Telephone:	+243 992047155								**Indirect**	
Email:	Shalukchantal@yahoo.fr								**Future**	
URL:	http://iccn.gorillacd.org/									

On-going / up-coming space related work:	ICCN had planned to come up a space related project through the UNESCO since 2000. The project is on the way.
Interest in how space systems can support EU policies:	- The impact of the war in the 5 world heritage sites: fauna and flora destroyed; mining activities, the rebel and military camps, farms - The impact of the wild fies
Ideas for possible new space systems:	/

18

	Can provide more info	**Wishes to be kept informed**
More Information:	0	Yes

RST

Organisation:	**Scott Polar Research Institute**	**Policy Areas:**							**ESA Relations**	
		1	1	1		**Other:**				
Name:	Paul Arthur Berkman					/				
Title:	Head, Arctic Ocean Geopolitics Programme, University of Cambridge	**Climate**	**Environment**	**Development & Security**	**European Space Policy**				**Direct**	**Indirect**	**Future**
Telephone:	+44-1223-336-551									
Email:	pb426@cam.ac.uk									
URL:	http://www.spri.cam.ac.uk/									

On-going / up-coming space related work:	Only peripheral in terms of conceptualising space-based systems for necessary infrastructure to help manage increasing commercial activities and provide sufficient information for operational decisions on a real-time basis across the entire Arctic Ocean in conjunction with its environmental state-change.
Interest in how space systems can support EU policies:	See the presentation at the ESA - IES Workshop on Europe's Arctic Course, 08-12-10 http://www.envirosecurity.org/arctic/Presentations/EAC_Berkman.pdf
Ideas for possible new space systems:	See the presentation at the ESA - IES Workshop on Europe's Arctic Course, 08-12-10 http://www.envirosecurity.org/arctic/Presentations/EAC_Berkman.pdf

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	Can provide more info	**Wishes to be kept informed**
More Information:	Yes	Yes

PRS

Organisation:	**Le Monde diplomatique**	**Policy Areas:**							**ESA Relations**		
						1		**Other:**			1
Name:	Philippe Rekacewicz							Geopolitics, migrations, demography, post-soviet studies			
Title:	Journalist – Geographer cartographer	**Climate**	**Environment**	**Development & Security**	**European Space Policy**				**Direct**	**Indirect**	**Future**
Telephone:	+33 6 60 40 11 60										
Email:	reka@monde-diplomatique.fr										
URL:	http://www.monde-diplomatique.fr/										

On-going / up-coming space related work:	Aral sea environmental and geopolitical study Urban evolution study in France Ferghana Valley environmental and geopolitical study Lake Chad environmental and geopolitical study North/South Korea border dispute study Nagorny Karabakh border dispute study Tchernobyl impact Wall separation between palestine and Israël
Interest in how space systems can support EU policies:	(all of the above)
Ideas for possible new space systems:	/

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	Can provide more info	**Wishes to be kept informed**
More Information:	Yes	Yes

European Space Agency
Agence spatiale européenne

Institute for Environmental Security

Space for Europe – The International Dimensions

Report on the Evolution of EU External Action
in the Fields of Climate, Environment, Development and Security
and the role of Space

The European Space Agency has commissioned the IES to carry out a study on the evolution of EU external action in the fields of climate, environment, development and security. The report will include suggestions on new opportunities for the contribution of earth observation and satellite remote sensing in support of European external policies and programmes.

If you have information and ideas you wish to share regarding these issues and the role of space please complete this form and return it to the IES: Tel: +32 2 511 5850, Fax: +32 2 688 2685, E-mail: info@envirosecurity.org

1. My Contact Information:

Name:			
Position:			
Organisation:			
Telephone:		E-mail:	

2. Policy areas in which my organisation works:

❑	Climate (e.g. the Arctic, CO2 Emissions, Glacial Melt, Sea Level Rise, Black Carbon, etc.)
❑	Environment (e.g. Biodiversity, Deforestation, Desertification, Hazardous wastes, Natural Disasters, Oceans and Seas, etc.)
❑	Development and Security (e.g. Food Security, Water Security, Crisis Prevention (early warning), Crisis Response, etc.
❑	European Space Policy
❑	Other:

3. My organisation's relations with the European Space Agency:

❑ We already have direct relations with the ESA.
❑ We already have indirect relations with the ESA through our national space agency.
❑ We would be interested in learning more about the ESA and developing contacts in the future.

CONITINUED …

4. On-going / up coming space related work of my organisation:

5. Examples of why my organisation is interested in how space systems can support the development and/or implementation of EU policies in the fields of climate, environment, development and/or security:

6. Ideas for possible new space systems that might be needed to help support EU policies and actions:

7. More Information:

❑ Please contact me so that I might provide more information / ideas for the study.

❑ Please keep me informed about the progress of the study and the final report.

Institute for Environmental Security

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