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COMMISSION

Community Research

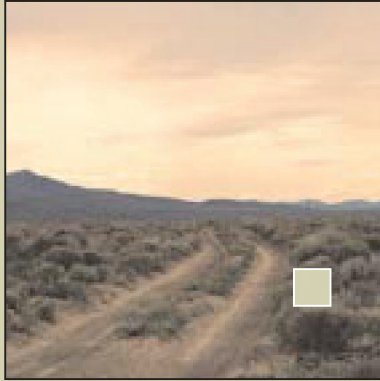


GLOBAL CHANGE AND ECOSYSTEMS: EUROPEAN RESEARCH IN ACTION



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Part 1 | The purpose of environmental research



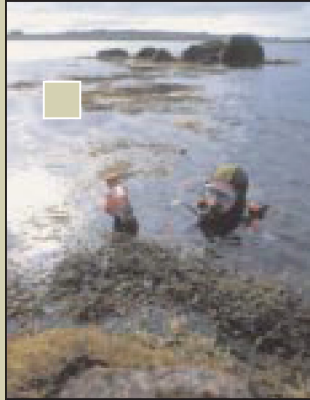
In the wake of the Rio Summit in 1992, the community of nations has become increasingly aware of the threats hanging over the planet. Environmental protection is now high on the international agenda. There has been a much closer focus on environmental research and sustainable development over the last ten years, primarily as a result of the European Union's efforts in this sphere.

Nonetheless, huge challenges still have to be met: in spite of some changes for the better, the pressure on the environment and natural resources has generally not eased to any significant extent. The future continues to look bleak as a result of various environmental threats and what these portend for human health and the planet.

The European Union framework for action is tailored to the need to coordinate European countries' contributions to the global effort. Determined to accept its responsibilities on a global scale, the EU has set its sights on a carefully orchestrated implementation of the European sustainable development strategy. One of the components of this approach is the Sixth Environmental Action Programme.

During the September 2002 Johannesburg World Summit on Sustainable Development, the European Union delivered a persuasive argument in favour of its sustainable development approach. It lent its solid support to **meaningful action** designed to achieve clear, measurable targets according to a firm timetable in the context of water supply, health and poverty. Other measures have also been taken in the light of various international conventions such as:

- the 1997 Kyoto Protocol on reducing greenhouse gas emissions;
- the 1992 United Nations Convention on biological diversity;
- the 1994 United Nations Convention on combating desertification.



■ Action underpinned by science

Initially, the main role of science was to make an inventory of the actual state of the environment, but today science is required to help in formulating specific and concrete proposals for promoting sustainable development.

This is why the European Union is giving its backing, as a matter of priority, to research initiatives designed to recommend practical solutions for the remediation and easing of environmental problems. Europe is now asserting itself as a key testing ground for the production of scientific and technological tools for promoting sustainable development.

One of today's environmental challenges is to find ways of strengthening the scientific and socio-economic resources for forging tools to help make decisions and produce sustainable development schemes. The main challenge is to ensure that these instruments may be applied in any context within the EU.

Part 2 | The environment in the Sixth Framework Programme



The ever-increasing interest in environmental concerns began to be reflected in the European Framework Programmes for Research and Technological Development in the early 1990s. In the Third and Fourth Framework Programmes, the aims primarily involved acquiring the knowledge necessary to gain a better understanding of ecosystems and the development of new environmental protection technologies. Set in motion in 1998, the Fifth Framework Programme featured a thematic programme focusing on a combination of environmental and energy issues. At the same time, other research themes began to include the environmental dimension in order to reflect the principle of sustainable development.

Covering the period 2002-2006, the Sixth Framework Programme was designed to provide major leverage to the creation of a European Research Area (ERA), where the aim is to provide the EU with a scientific and technological policy that is more effectively coordinated, better managed and more dynamic. Environmental research now forms part of a thematic priority on **"sustainable development, global change and ecosystems"**, on the same footing as energy and transport. This new research priority will enable progress to be made on promoting the further inclusion of various sustainable development-related research themes, mainly by forging closer ties with agricultural and socio-economic research.

To qualify for EU support, projects involving the sub-priority **"global change and ecosystems"⁽¹⁾** should focus on a better understanding of ecosystems and of the mechanisms of global change, including the effect these mechanisms have on land and marine resources, and the development of related forecasting capacities.

1. Appearing as theme 1.1.6.3 in the European Parliament and Council decision on the Sixth Framework Programme (2002-2006), see http://europa.eu.int/comm/research/fp6/documents_en.html#fp

Part 3 | Global change and ecosystems: research priorities

Global change encompasses the complex dynamic changes over different timescales in the physical, chemical and biological components of the Earth system (i.e. atmosphere, oceans and land), in particular those influenced by human activities.

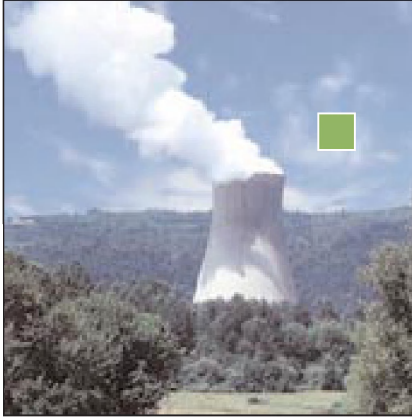
The objectives of this priority for European research are:

- 1) to strengthen the capacity to understand, detect and forecast global change and develop strategies for prevention, mitigation and adaptation, in close liaison with the relevant international research programmes and in the context of relevant conventions;
- 2) to preserve ecosystems and protect biodiversity which would also contribute to the sustainable use of land and marine resources. With regard to global change, the strategies for integrated, sustainable management of agricultural and forest ecosystems are of particular importance for the preservation of these ecosystems and will contribute substantially to the sustainable development of Europe.

These objectives will be best achieved through activities aiming at the development of common and integrated approaches necessary to implement sustainable development, taking into account its environmental, economic and social aspects, as well as the impact of global change on all countries and regions of the world. It will foster the convergence of European and national research efforts for common definitions of thresholds of sustainability and estimation methods, and encourage international co-operation in order to achieve common strategies to respond to global change issues.



Six Research priorities:



Impact and mechanisms of greenhouse gas emissions and atmospheric pollutants on climate, ozone depletion and carbon sinks (oceans and inland waters, forests and soil).

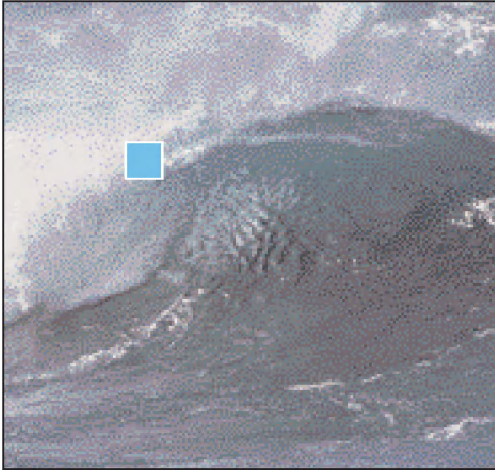
The objective is to detect and describe global change processes, associated with greenhouse gas emissions and atmospheric pollutants from all sources, including those resulting from energy supplies, transport and agriculture, to improve prediction and assessment of their global and regional impacts, evaluate mitigation options and improve the access of European researchers to facilities and platforms for global change research.

Research will focus on:

- understanding and quantification of changes in the carbon and nitrogen cycles;
- the role of all sources of greenhouse gases and atmospheric pollutants and their sinks in the biosphere;
- their effects on climate dynamics and variability, ocean and atmospheric chemistry, and their interactions;
- future stratospheric ozone levels and ultraviolet radiation;
- prediction of global climatic change and impacts;
- associated phenomena (e.g. the North Atlantic oscillation, El Niño and changes in sea level and ocean circulation);
- mitigation and adaptation strategies.



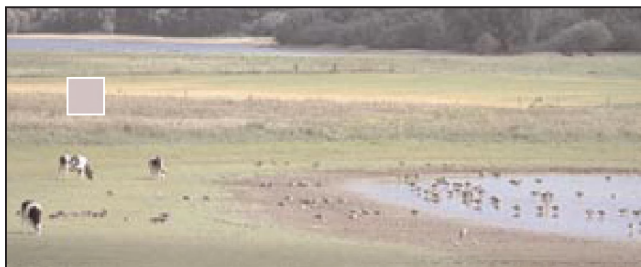
Water cycle, including soil-related aspects



The objective is to understand the mechanisms and assess the impact of global change and in particular climate change on the water cycle, water quality and availability, as well as soil functions and quality, to provide the bases for management tools for water systems to mitigate the impacts.

Research will focus on:

- ▮ impact of climate change on the components of the hydrological cycle, land/ocean/atmosphere interactions, groundwater/surface water distribution, freshwater and wetland ecosystems, soil functioning and water quality;
- ▮ assessment of vulnerability of water/soil systems to global change;
- ▮ management strategies, their impacts and mitigation technologies;
- ▮ scenarios of water demand and availability.



Biodiversity and ecosystems

The objectives are to develop a better understanding of marine and terrestrial biodiversity and of ecosystem functioning, understand and minimise the negative impacts of human activities on them, and ensure sustainable management of natural resources and terrestrial and marine ecosystems (including fresh water systems) as well as the protection of genetic resources.

Research will focus on:

- assessing and forecasting changes in biodiversity, structure, function and dynamics of ecosystems and their services, with emphasis on marine ecosystems' functioning;
- relationships between society, economy, biodiversity and habitats;
- integrated assessment of drivers affecting ecosystems' functioning and biodiversity, and mitigation options;
- risk assessment, management, conservation and rehabilitation options in relation to terrestrial and marine ecosystems.



Mechanisms of desertification and natural disasters

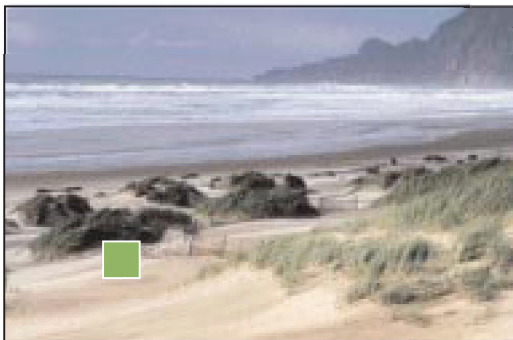


The objective is to understand the mechanisms of desertification and natural disasters (such as those caused by seismic and volcanic activity), including their links with climatic change so as to improve risk and impact assessment and forecasting, and decision support methodologies.

Research will focus on:

- ▮ large-scale integrated assessment of land/soil degradation and desertification in Europe and related prevention and mitigation strategies;
- ▮ long-term forecasting of hydro-geological hazards;
- ▮ natural hazard monitoring, mapping and management strategies;
- ▮ improved disaster preparedness and mitigation.

Strategies for sustainable land management, including coastal zones, agricultural land and forests

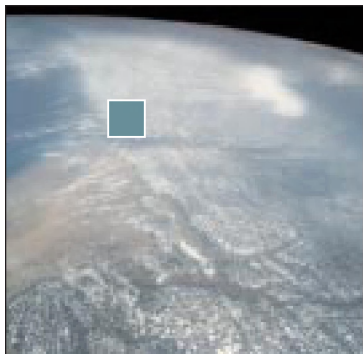


The objective is to contribute to the development of strategies and tools for sustainable use of land, with emphasis on the coastal zones, agricultural lands and forests, including integrated concepts for the multipurpose utilisation of agricultural and forest resources, and the integrated forestry/wood chain in order to ensure sustainable development at economic, social, and at environmental levels; qualitative and quantitative aspects of multifunctionality of agriculture and forestry will be addressed.

Research will focus on:

- ▮ development of the necessary tools for integrated management of coastal zones (ICZM);
- ▮ evaluation of positive and negative externalities under different production systems for agriculture and forestry;
- ▮ development of strategies for sustainable forest management considering regional specificity;
- ▮ strategies/concepts for sustainable management and multipurpose utilisation of forest and agriculture resources;
- ▮ cost-efficiency of new environmental-friendly processes and recycling technologies within the integrated forestry/wood chain.

Operational forecasting and modelling, including global climate change observation systems



The objective is to make systematic observations of atmospheric, terrestrial and oceanic parameters including those of climate so as to improve forecasting of the marine, terrestrial and atmospheric environment, consolidate long-term observations for the modelling and in particular prediction, establish common European databases, and contribute to international programmes.

Research will focus on:

- ▮ observations of basic marine, terrestrial and atmospheric parameters necessary for global change research and management strategies, and of extreme events;
- ▮ large observing/monitoring/ surveying/operational forecasting/modelling networks (taking into account the developments of GMES and providing the European dimension to G3OS⁽²⁾).

2. Three Global Observing Systems: Global Climate Observing System (GCOS), Global Ocean Observing System (GOOS), Global Terrestrial Observing System (GTOS).

Complementary research will focus on: development of advanced methodologies for risk assessment of processes, technologies, measures and policies, appraisal of environmental quality, including reliable indicators of population health and environmental conditions and risk evaluation in relation to outdoor and indoor exposure. Relevant prenormative research on measurements and testing for these purposes will also be necessary.

Cross-cutting issues: sustainable development concepts and tools. The objective is to develop concepts and tools for facing the complex challenges expressed in the EU Strategy on Sustainable Development and the Johannesburg Summit. The tools to be developed will be aimed at measuring environmental, economic and social impacts and integrating the sustainability dimension into the relevant policies. The precautionary principle and the regional aspect of sustainable development will be key elements to be taken into account.

Part 4 | How to qualify for Community support

A wide range of well-differentiated financial instruments is available for research schemes that are in keeping with the thematic priorities of the Sixth Framework Programme. Each and every instrument has its own specific features tailored to the various forms that research initiatives may take. According to the time-honoured procedure for European Framework Programmes, the aim is to underpin cross-border co-operation between public and/or private establishments, that is, universities and higher education establishments, research bodies and companies, including SMEs. Incentives are also given to the involvement of non-research sector organisations that are nonetheless keen on exploiting, disseminating or providing a framework for research findings.

Against the background of the European Research Area, the Sixth Framework Programme offers three new instruments for making the most of European research assets and creating enough critical mass to match the scale of the acknowledged aims.

The first two instruments are designed to fund large-scale projects, whilst allowing European research consortiums maximum independence and flexibility. The key European research players are urged to:

- create **networks of excellence** seeking to cover top-level research expertise in one area, thereby paving the way for the dissemination of the expert knowledge required to play a leading role in this context on the world stage. These networks have to be based on joint programmes of activities, form part of a long-term co-operation and take a variety of forms.
- propose **integrated projects** mobilising a critical mass (in terms of the number of teams participating, the countries involved, the scale of the investments and the time frames) to achieve the clearly defined scientific and technological targets (particularly in the case of products, processes and services).

The third new instrument has been around for some time now but has never been put into action: the European Union's participation in research programmes undertaken by several Member States. This option is specifically provided for by Article 169 of the Amsterdam Treaty.



The instruments of earlier Framework Programmes may still be used for the items that are best suited for small-scale activities. These take the form of:

▮ **Specific targeted projects**, that is “classical” research and/or demonstration projects similar to the instruments used in the Fifth Framework Programme.

They cater for the dual purpose of:

- ▮ gaining new knowledge either to improve considerably existing products, processes and services (or develop new ones);
- ▮ meeting the aims of demonstration projects designed to prove the viability of new technologies that offer potential economic advantages but cannot be commercialised directly.

▮ **Coordination actions** conducted between several European research operators and covering such as activities as the planning of conferences and meetings, carrying out surveys, exchanges of staff, exchanging and disseminating best practices, creating information systems and setting up expert groups.

Lastly, accompanying measures, now referred to as **support actions**, are also proposed to help bring sponsored initiatives to a successful conclusion, and to help pave the way for forthcoming research schemes. These actions may

apply to such items as the development of research facilities linked in particular to cross-border access, preparatory technical work (including feasibility studies), along with assistance to SMEs, small research teams, new research centres and procedures for the involvement of the candidate countries.

General principles for awarding funds:

- ▮ the European Commission is tasked with awarding Framework Programme funding (there are no “national quotas” for Framework Programme funds);
- ▮ the funding is generally awarded on the basis of the competitive call for proposals published by the Commission on a regular basis in the EU's Official Journal and on the CORDIS website (<http://www.cordis.lu/fp6>);
- ▮ to qualify for funding, projects must have a scope and relevance reflecting the priorities highlighted in the call for proposals;
- ▮ the quality and technological value of projects for which Community funding is sought are assessed by outside independent experts;
- ▮ the funding may be used solely for clearly defined research work or activities, as it is not supposed to be regarded as aid for research bodies or companies.

Part 5 | Contacts and further sources of information

Contacts

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Internet

What is the European Research Area?

| http://europa.eu.int/comm/research/era/index_en.html

Documents relating to the Sixth Framework Programme (2002-2006)

| http://europa.eu.int/comm/research/fp6/documents_en.html

Documents relating to the sustainable development activities in the Sixth Framework Programme (2002-2006)

| http://www.cordis.lu/rtd2002/fp-activities/sustainable_development.htm

Instruments for implementing the Thematic Priorities of the Sixth Framework Programme (2002-2006)

| <http://europa.eu.int/comm/research/fp6/networks-ip.html>

Articles on European research in the environment

| <http://europa.eu.int/comm/research/news-centre/en/environment-menu.html>

Focus on the results of European research into environmental issues of wide public interest

| <http://europa.eu.int/comm/research/leaflets/index.html>

Energy, Environment and Sustainable development under the Fifth Framework Programme (1999-2002)

| <http://europa.eu.int/comm/research/eesd.html>

| <http://www.cordis.lu/eesd/>

The Sixth Environment Action Programme of the European Community 2001-2010

| <http://europa.eu.int/comm/environment/newprg/index.htm>

Presentation of the Johannesburg Summit on the Europa site

| http://europa.eu.int/comm/environment/wssd/index_en.html

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