



**Research programme
“Science for a Sustainable Development”
(SSD)**

Call for proposals 5

May 2009

Closing dates

Expression of interest (obligatory): Tuesday 7 July 2009

Research proposals: Monday 17 August 2009 at 12:00 a.m.

INFORMATION FILE FOR USE BY PROPOSAL SUBMITTERS



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FOREWORD

- This document contains all information useful to the teams wishing to participate in the call for research proposals in the framework of the **“Science for a Sustainable Development” research programme**.
- The Public Planning Service Science Policy (“PPS Science Policy”) supervises and coordinates the Programme at both the scientific and administrative levels.
- The call is for proposals for **2-year** research projects, prepared by **interdisciplinary networks of 2 to 5 teams** belonging to at least two separate Belgian scientific institutions, including at least one university institution.
- The call is intended for **Belgian university institutions, public scientific institutes, non-profit research centres, and specialised consulting offices**. These last-mentioned can be financed up to maximum 25% of the total budget requested by the network.
- The project may require punctual expertise which can be delivered in **subcontracting** form. Such subcontracting may under no circumstances amount to more than 10% of the total budget requested by the network.
- If it brings in an added value to the project and to the development of Belgian expertise, submitters may propose a cooperation with a **non-Belgian universities or public research institutes** (except for international institutions such as the Joint Research Centre). This participation will take place on a **co-funding** basis. The funding of non-Belgian partners by PPS Science Policy will under no circumstances amount to more than 20% of the total budget requested by the network. The non-Belgian partner is responsible for the co-funding, from other sources, for at least the same amount as the amount asked from PPS Science Policy¹.
- The research network must be able to tackle the problem addressed on the national scale. Hence, cooperation between partners from **different Communities or Regions** is encouraged.
- The personnel funded in the project **must be recruited under an employment contract**. Thus, no scholarship student can be taken on in the framework of the project.
- This call offers the possibility of using earth observation data via cooperation with the Space Research and Applications Service and for additional research in the framework of international commitments of the federal government via cooperation with the Service for International, Interfederal, and Interdepartmental Coordination of PPS Science Policy.
- Expressions of interest and proposals must be submitted in **English**. Proposals must be accompanied by a summary in the coordinator’s language. If the submitters deem it useful, a version of the proposal may also be submitted in the coordinator’s language.
- The submitters are obliged **to comply with the modalities** laid out in this document. Otherwise

¹ For the participation by the “Université du Luxembourg” or by a public research institute from the Grand Duchy of Luxembourg, the “Fonds National de la Recherche Luxembourg” disposes of a budget of 270.000 euro for co-funding the research activities of Luxembourgian partners. In order to know more about the conditions of co-funding by the “Fonds National de la Recherche Luxembourg”, Luxembourgian candidates should contact Mr Carlo Duprel (carlo.duprel@fnr.lu, Tel: +352 26192537, Fax: +352 26192535, www.fnr.lu) as soon as possible.



PPS Science Policy will not consider their proposal.

- Interested parties must submit an expression of interest, using exclusively the form available on the PPS Science Policy website (<http://www.belspo.be>), no later than **7 July 2008**. **Only those who submit an expression of interest may later submit a complete proposal.** The expressions of interest will be used by PPS Science Policy **only** in order to **seek foreign experts for the evaluation of the research proposals.**
- The proposals must be sent **in five copies** to the following address:

PPS SCIENCE POLICY
RESEARCH PROGRAMME "SCIENCE FOR A SUSTAINABLE DEVELOPMENT"
CALL 5
WETENSCHAPSSTRAAT 8 RUE DE LA SCIENCE
1000 BRUSSELS

The proposals must **also be sent in electronic form** to:

SSD_call5@belspo.be

The proposals (paper and electronic versions) must reach PPS Science Policy no later than

17 August 2009 at 12:00.

- **Closing dates:**

Expressions of interest: 7 July 2009
Research proposals: 17 August 2009 at 12:00.



1. THE PROGRAMME “SCIENCE FOR A SUSTAINABLE DEVELOPMENT”

1.1 Context

The following elements of the international, European, and national contexts may act as important beacons for maintaining economic growth, appropriate social development, and protection of the environment. They offer a frame of reference for the various actions planned within the Programme.

1.1.1 At the international level

- Belgium’s various commitments in the framework of different international Conventions and Agreements, the recommendations formulated by various international organisations, and all the European directives, strategic plans, implementation plans... with which Belgium must comply in the areas involved.
- The efforts been made for some time now with regard to the creation of a European Research Area (6th Framework Programme, 7th Framework Programme), in particular the strengthening of cooperation at the level of research projects and programmes (Networks of Excellence, ERA-NETs).

1.1.2 At the national level

- The priorities defined in the various government coalition agreements, in the various (sectoral and trans-sectoral) policy plans and policy strategies elaborated at the National level , Federal level or at the level of the Regions and the Communities.

The position of PPS Science Policy within the Belgian research landscape, which offers possibilities for:

- the analysis of trans-sectoral or horizontal themes corresponding to the competences of different federal departments;
- the analysis of issues managed at different levels of authority (federal, Regions, Communities).

1.2 Objectives of the Programme and Implementation modalities

1.2.1 Strategic and operational objectives

From a **strategic** perspective, the objectives of the Programme are:

- to preserve and develop the scientific potential in various strategically important areas, with the objective of reducing scientific uncertainties and anticipating future needs for knowledge;
- to offer the authorities of the country the scientific support required for the preparation, implementation, and follow-up of a supranational, federal, regional, or local policy in and between these areas;
- to offer the Belgian research potential in the areas involved the possibility of integrating itself into the various research initiatives at the European and international levels, in particular within the European Research Area.

From an **operational** perspective, the proposed Programme will contribute to developing scientific knowledge and instruments (databases, models, concepts, indicators, etc.) aiming to:

- the analysis of processes: understanding, monitoring, evaluating, and forecasting processes and their mutual interactions which constitute the basis of the functioning of both anthropogenic and natural systems;



- the study of impacts: evaluating the effects of changes in/the evolution of processes and their mutual interactions at the environmental, social, and economic levels;
- the development, follow-up, and evaluation of (existing and/or future) policy measures, on the basis of criteria such as efficiency, feasibility, acceptability... Among other things, the research will study policy measures focused on prevention, adaptation, remediation, management...

1.2.2 Diversified implementation

To fulfil these objectives, the Programme provides a diversified approach which:

- combines **sectoral**, **trans-sectoral**, and **integrated** approaches to the concerned issues;
- encourages **interdisciplinary** research so as to offer support to decision-making on the basis of an integration of different dimensions, perspectives, etc. of the issues concerned and to promote dialogue and information exchange between scientists, decision-makers, and other involved actors;
- offers space for **oriented basic research** and **targeted research actions**:
 - **oriented basic research** will anticipate needs, especially at policy level, by playing a future-oriented and/or alarm-sounding role and by eliminating specific uncertainties, in order to offer a scientific basis for decision-making. Oriented basic research also contributes to (inter)national research efforts.
 - **targeted actions** aim to formulate, within a relatively short time span, answers to specific policy issues at the (inter)national level. This may involve applied research, exercises integrating scientific results, proposals for harmonising, standardising data and information...
- offers possibilities for the **internationalisation of Belgian research**, via:
 - the opening up of this Programme to foreign researchers;
 - initiatives promoting cooperation and synergies between national thematic research programmes, such as ERA-NETS² (European Research Area –Networks). PPS Science Policy is currently involved in a number of ERA-NET projects². This opens the way to developing and implementing joint transnational activities such as joint calls, project clustering, etc.;
 - support for the participation of Belgian researchers in international and supranational research programmes and networks, such as those of the European Science Foundation, the European Union, the International Energy Agency, the United Nations, the International Council for Science, etc.
- promotes **cooperation between research projects** funded within the different research areas of the Programme and/or in the framework of other initiatives of PPS Science Policy when these are mutually complementary or demonstrate common areas of interest (**clustering**). The aim is to

² ERA-NET TRANSPORT (transport research), MARINERA (marine sciences), BIODIVERSA (biodiversity research), AMPERA (Accidental Marine Pollution), EUROPOLAR ERA-NET (polar research), SKEP (Science based knowledge for environmental policy), CIRCLE (Climate Impact Research Coordination for a Larger Europe), ERA-EnvHealth (Coordination of national environment and health research programmes). (<http://www.cordis.lu/coordination/eranel.htm>) (<http://cordis.europa.eu/coordination/projects.htm>)



ensure greater coherency in research and to give the research added value in specific fields.

1.3 Research priorities

The priority research areas of the present Programme are linked to the national and international context described above. The whole set of priority research areas was chosen because of the need to address the complex, global, interrelated problems underlying a sustainable development policy. This choice is a response to strategic needs, at different levels of authority, for policy-supporting research and to the challenge of maintaining and developing national scientific expertise in complex and strategically important areas.

The **priority research areas** are:

- **Energy**
- **Transport and mobility**
- **Agri-food**
- **Health and environment**
- **Climate (including Antarctica)**
- **Biodiversity (including Antarctica and the North Sea)**
- **Atmosphere and terrestrial (including freshwater) and marine ecosystems (including Antarctica and the North Sea)**
- **Transversal Research:** In order to better translate/operationalise the concept of sustainable development, in and between the priority areas, **transversal and generic research** is necessary.

The goal of the research actions is to support specific decision-making in relation to both sector-related and trans-sectoral problems. The Programme thus promotes **interactions between the priority research areas**, so as to respond to common and complex problems such as air pollution (tropospheric ozone, aerosols...), environment-health relations, the impacts of genetically modified organisms (GMOs), the life cycle of products and services, renewable forms of energy, the challenge of globalisation, the integrated management of coasts and basins...

The research must take into account the (complexity of) interactions between the priority research areas. This constitutes an essential guideline throughout the programme (calls for proposals, project selection and management, the valorisation of research results).

For this are planned:

- the integration of interactions and common themes in the appropriate calls;
- joint calls between priority research areas;
- the "clustering" of projects covering different aspects of common and complex problems.

Within these priority research areas, the Programme encourages the submission of proposals dealing with **standardisation**.

The priority research areas and their mutual interactions are described in **Annex I** to this document. Each research area is developed in detail in the corresponding call.

1.4 Continuity with SPSP I, SPSP II, the "Workers' Healthcare" and "Standardisation" programmes

The research programme "Science for a Sustainable Development" is the continuation of the first and second Scientific Support Plan for a Sustainable Development Policy (SPSP I (1996-2001) and SPSP II (2000-2005)).



Compared to SPSP I and II, the Programme integrates new themes, namely "Health and Environment" and "Standardisation". These themes build upon the previous programmes "Workers' healthcare" and "Standardisation and Technical Regulation", which both formed part of the "Scientific Support Plan for integrating the concepts of quality and safety of production environments, processes, and goods into a context of sustainable development" (1998-2003).

On the one hand, all submitters of research proposals **must take account of the research activities conducted in the previous programmes** (see www.belspo.be/fedra).

On the other hand, a **research proposal that is a continuation of a project** funded in the framework of the aforementioned programmes must **clearly describe the relationship of the new proposal to the previous project and its added value** with respect to it. PPS Science Policy will provide the experts in charge of the scientific evaluation of the proposals (see point 4.2) with the relevant English-language material (final and/or interim scientific reports, findings of evaluations, etc.).

These elements will be taken into consideration when evaluating the research proposals.

1.5 Complementarities with other research actions

The research will be performed taking into account:

- the other (previous and/or current) research actions of PPS Science Policy:
 - the research programmes Information Society, Belgian Coordinated Collections of Micro-organisms (BCCM), Social Cohesion, Agora, Earth Observation Research Programme (STEREO), Interuniversity Attraction Poles (IUAP), Technological Attraction Poles (TAP), Action in Support of the Federal Authority's Strategic Priorities, Society and future, etc.;
 - research within the federal scientific institutions.
- other research actions carried out at the federal, regional or community levels.

According to the priority research areas of the Programme, the calls for proposals will establish more direct links with some of these research actions (see e.g. point 3.4).

1.6 Indicative calendar of the calls for proposals

Taking into account the resources made available for the period 2005-2009, call 5 will be the last call of the programme "Science for a sustainable development".



2. CONTENT OF THE PRESENT CALL

2.1. Context

This call for proposals is in response to the need to fill in certain key lacunae in both understanding and expertise with regard to the primary research fields covered by the present programme.

It has been constructed in such a way as to make full use of the programme's concept and goals; interdisciplinary, transversal research designed to serve as a resource for political decision-making.

In a sustainable development context, policies designed to address issues of climate change (mitigation/adaptation) are considered a priority.

Thus two axes of research are proposed:

-The first axis, aimed at reducing releases of greenhouse gases, focuses specifically on household energy consumption, including transport and accommodation. It aims to better identify and understand the most influential factors for more energy efficiency.

-With a view to optimizing our adaptation to climate change, the second axis will examine and evaluate the ways in which Belgian ecosystems currently operate to influence climate.

2.2 Research subjects

Within the framework of this call, the research subjects to prioritize are detailed below. Research may cover one or more of these subjects.

Climate mitigation by increasing household energy efficiency

In the "Energy – Climate" package introduced on the 13 November 2008 by the European Commission and approved by the European Council in December 2008, a new raft of wide ranging measures was proposed in the field of energy conservation, aimed at meeting the European goals of reducing greenhouse gases by 20 %, increasing the share of energy from renewable sources by 20%, as well as achieving an overall increase of 20 % in energy efficiency by the year 2020.

In order to reach these goals, the first priority in terms of policy direction and social practice is a very substantial and general improvement in energy efficiency throughout all important economic sectors and during the entire life cycle of products. These objectives can only be attained by paying particular attention to the demand side of the economy in order to keep total energy demand under control. Rational energy use is not only a key element in reaching, at least, a 20% reduction in greenhouse gas emissions by 2020, but will also contribute to supply security while better preparing households for possible energy price evolution.

Managing energy demand has shown itself to be a very real challenge for the way we think and behave. While consumers are generally in favour of greater energy efficiency and also of increasing the market share of renewables, this is not necessarily reflected in their buying habits or other related behaviour. In this context, the factors that influence household energy demand, as well as the interaction and concordance of strategies to be deployed with regard to key actors in the field of energy consumption, need to be better understood. In this call for proposals, we shall concentrate research efforts on household energy demand, whether it accommodation or transport related.

The studies presented in this call for proposals aim to:



- Investigate how to modify the variables, develop driving forces and shift the social, cultural, technological, economic and political barriers to household energy consumption reduction (behaviour with regard to energy use, purchasing decisions and investments...). These studies will either bear on one specific type of energy consuming commodity or compartment, or on the entire range of household energy consumption, including accommodation and transport;
- Analyse the way in which the different actors deal with their obligation to reduce greenhouse gas emissions by 20% and improve energy efficiency in their strategies (of decision, communication, R&D...). The actors concerned: public authorities, service providers, architects, entrepreneurs, installation services, advertising agencies, energy utilities and distributors, sales personnel... implicated in the major energy consuming sectors (such as building, transport, etc.) or in the sale of energy consuming equipment (such as vehicles and household appliances);
- Analyse the policies, measures and legislative instruments, both past and present, designed to affect household energy consumption and recommend new and more adequate policies. Taken into account will not only be the energy consumption impact of such policies and measures, but also their budgetary, employment, social, environmental and economic impact. In addition, the way policies are articulated, the ways in which they may reinforce one another, as well as the ways in which they might negate or oppose one another (as being initiated by different powers) shall also be researched. Comparisons with the way the same issues are handled in neighbouring countries may also prove to be of value.

Evaluation of Belgian ecosystem services within the context of climate change

Our society benefits “free of charge” from a multitude of services rendered by our ecosystems. Among these one may list those services which relate to provisioning (e.g.: food crops, water, wood), to regulation (e.g.: climate control, the promotion and maintenance of health...) to support (e.g.: nutritional cycles, food chain, pollination...) to culture and the preservation of options (e.g.: conservation of genetic and species diversity for the future)

Multiple pressures, such as changing land use and land cover, an increase in pollution, over-exploitation of resources and climate change itself jeopardize the integrity of ecosystems, set deadlines on the services they currently provide and risk affecting the health and well-being of society in general.

In reaction to the loss of these ecosystem services, humanity develops substitutes that have already and will undoubtedly continue to cost much more than the preservation and protection of these same services originally so freely offered by nature.

The results of the Millennium Ecosystem Assessment (2005) demonstrate that at a global level, 60% of our ecosystem services are currently in a state of degradation and that a sustainable world economy can only be based on healthy ecosystems. Since the publication of this report, the number of studies attempting to put a ballpark figure on the real cost of such loss of biodiversity and associated services (e.g.: The Economics of Ecosystem and Biodiversity study) continues to grow.

In Belgium, however, few studies have been carried on that are able to attribute a value, whether monetary or other, to the services rendered by our ecosystems, although such information would seem to be a precondition to their evaluation within policies tailored to their maintenance. The choice of units of investigation, as well as of the appropriate scales to which ecosystem services can be referred, are determinant when developing, implementing and evaluating policies relating to them.

The aim of the present call for proposals is to fill in such gaps in our knowledge and understanding. The research studies will be largely interdisciplinary (ecology, sociology, geography, economy, environmental law...). They will bear upon the services rendered by one or other major Belgian ecosystem, whether it be forest, agriculture, marine, coastal, fresh water or natural reserve.



These research elements will contribute to a process of reflection that will take place within a cluster entitled “Feasibility of evaluating services rendered by Belgian ecosystems” of which they will constitute several case studies.

The methodologies and approaches used will take international developments into account. The research will endeavour to provide answers to the following types of question:

- Which are the most important ecosystem services for Belgium: the most pertinent for society, or the most vulnerable to climatic and human pressure? What objective criteria can be suggested to best improve these services?
- Which methodologies are best suited to a quantitative description of these services (evaluation should bear on direct and indirect, utility as well as non-utility values of such ecosystem services)? The aggregation of values associated with ecosystem services, as well as those connected with the transfer of ecosystem benefits will be studied.
- What scales and units of measurement are most appropriate to a study of ecosystem services?
- What would the loss of these ecosystem services represent in terms of the cost to society and the country’s economy?
- Are the benefits of conservatory and regulatory activities sufficient to justify their cost?
- What types of political instruments need to be drawn up, what legislation needs to be adapted to ensure the sustainability of ecosystem services in Belgium?



3. PROFILE OF THE PROPOSALS

3.1. Profile

Research proposals should make use of existing research results in the field as well as justify the chosen case studies.

According to the financed projects, a co-operation will be eventually organised by the PPS Science Policy.

3.2. Duration and Budget

The present call offers room for **2-year research projects**.

Taking into account the resources made available, the projects selected within the framework of the present call will start at the end of 2009.

The overall available budget for this call is 1,50 millions Euro. The total project budget is limited to 360.000 Euro.

The average budget per partner, for the entire duration of the project, amounts to maximum 80.000 € per year.

3.3. Submission modalities

3.3.1 Network

Each proposal is submitted by an **interdisciplinary network**, composed of 2 to 5 funded teams belonging to at least two separate Belgian scientific institutions, of which at least one is a university institution.

The network partners must conduct complementary activities related to a common issue and its integration.

All funded teams will jointly share all obligations and responsibilities during the implementation of the project. The contributions of the different network partners may differ according to the content. Accordingly, different partners may receive different shares of the total budget and devote different numbers of man-months to the research, provided they all bear in mind the principles of a network project.

The call is intended for **Belgian university institutions, public scientific institutes, non-profit research centres, and specialised consulting offices**. These last-mentioned can be financed up to maximum 25% of the total budget requested by the network.

The project may require punctual expertise, which can be delivered in the form of **subcontracting**. The cost of this subcontracting may under no circumstances exceed 10% of the total budget requested by the network.

If it brings in an added value to the project and to the development of Belgian expertise, submitters may propose a cooperation with **non-Belgian universities or public research institutes** (except for international institutions such as the Joint Research Centre):



- This participation will take place on a **co-funding** basis. The funding of non-Belgian partners by PPS Science Policy will under no circumstances amount to more than 20% of the total budget requested by the network. The non-Belgian partner is responsible for the co-funding, from other sources, for at least the same amount as the amount asked from PPS Science Policy.
- For the participation by the “Université du Luxembourg” or by a public research institute from the Grand Duchy of Luxembourg, the “Fonds National de la Recherche Luxembourg” disposes of a budget of 270.000 euro for co-funding the research activities of Luxembourgian partners. In order to know more about the conditions of co-funding by the “Fonds National de la Recherche Luxembourg”, Luxembourgian candidates should contact Mr Carlo Duprel (carlo.duprel@fnr.lu, Tel: +352 26192537, Fax: +352 26192535, www.fnr.lu) as soon as possible.

The research network must be able to deal with the problem tackled on the national scale. In this context, cooperation between partners from **different Communities or Regions** is encouraged.

The personnel funded in the project **must be recruited under an employment contract**. As a consequence, no scholarship student can be taken on in the framework of the project.

3.3.2 Coordination

A **coordinator** (belonging to a Belgian research institute in accordance with point 3.2.1, § 4) must be designated in each proposal. In addition to his/her scientific and management qualifications, the project coordinator must be able to synthesise and integrate the research results so as to promote applications and support to decision-making. The specific role of the coordinator is:

- to coordinate all activities to be carried out in the framework of the project;
- to coordinate the internal meetings between the network members;
- to coordinate the meetings with the Follow-up Committee and production of the reports on these meetings;
- to coordinate the production of the interim and final project reports intended for PPS Science Policy;
- to inform PPS Science Policy of any problems that might interfere with the proper implementation of the project;
- to coordinate the synthesis and translation of research results, with a view to applications and support to decision-making;
- to coordinate the publication and dissemination of research results.

3.4. Follow-up Committee, Valorisation, and Data

3.4.1 Follow-up Committee

Each selected project is accompanied by a Follow-up Committee. The objective of this committee is to provide **active follow-up** of the project and to promote **valorisation of the research**. It will carry out this role via the exchange and provision of data and information and by giving advice, suggesting valorisation avenues... This committee is convened once or twice a year (or more, if necessary).

The Follow-up Committee is composed of **potential users of the results**, such as representatives of public authorities at the national, regional, European, or international level, social actors, scientists, industrial actors... The members of the Follow-up Committee are non-funded partners.



In the research proposal, the submitters must describe the profile of the members of the Follow-up Committee (institutions and a list of possible members). The actual composition will be established in consultation with PPS Science Policy. The committee will consist of at least 5 people.

3.4.2 Valorisation

Each research proposal must include **concrete proposals for valorising** the research. This might involve, for example, the organisation of thematic debates and meetings, proposals for disseminating and popularising the results, proposals to integrate data into computerised databases on the national and international levels, the elaboration of targeted messages intended for experts, policy makers, or managers regarding the content of specific results, including its limitations, the related uncertainties, the hypotheses and methods used, etc. The target groups of these valorisation proposals must be explicitly described.

3.4.3 Use and management of data

Concerning the use of existing data or the collection of new data, proposal submitters should take the following guidelines into account:

- Whenever possible, the partners should make use of existing (administrative or non-administrative) databases to meet the needs of their research. For this they must check beforehand whether the data are accessible, at what cost, and how much time it will take to acquire the data. Should it appear after the start of the research that due to partner negligence or insufficient knowledge of the field the data files will *not* be available in time, this may constitute a reason for PPS Science Policy to cancel the contract.
- If the proposal requires collecting new data (e.g. via a survey), the team must justify with **clear and convincing arguments** its choice of methodology, referring to the objectives of the study and specifying why this particular form of data collection is required and preferable to other approaches. This means the proposers must provide sound and detailed argumentation in support of the chosen methodology (sampling, etc.) and highlighting its added value as compared to existing databases. In addition the partners must provide the budget required for this data collection.
- As the data collected in the framework of the proposed research must be available to other users for other purposes, the proposal must clearly indicate when and in what format the data are made accessible, specifying which categories of users are likely to benefit from access to the data.

3.4.4 Intellectual Property

Foreground shall be the property of the Institution carrying out the work generating that foreground, as mentioned in article 13.2 of the general conditions of the contract (annexe 2).

For the research areas North Sea, Biodiversity and Antarctic, the researchers must bear in mind that the analysis and measurement data must nevertheless be transferred to specific data banks like IDOD/BMDC (<http://www.mumm.ac.be/datacentre>), AMD (Antarctic Master Directory (<http://gcmd.gsfc.nasa.gov/KeywordSearch/Home.do?Portal=amd&MetadataType=0>), data bank BIOBEL from the Biodiversity platform (<http://www.biodiversity.be>).

3.5. Interactions with other PPS Science Policy initiatives

3.5.1 Space Research and Applications Service



Like other sources of information, remote sensing from space can contribute to better understanding and monitoring the evolution of the ecosystem Earth. Scientific expertise in this area is being progressively developed in Belgium, particularly through the various phases of the programmes TELSAT, STEREO I and II, and VG. Research within these programmes ranges from thematic basic research to pre-operational applications.

In order to make possible the conversion of earth observation data to useful "information", a multidisciplinary approach is necessary which requires close cooperation between the above-mentioned programmes and the programme "Science for a Sustainable Development".

This cooperation is translated into the following specific modalities:

- provision of earth observation data to the research teams on the basis of a justified request;
- reinforcement of the capacity to support the user community in general, via maintenance of an 'EODesk-type' information and help service: <http://telsat.belspo.be>.

3.5.2 Service for International, Interfederal, and Interdepartmental Coordination³

Certain projects (or parts of projects) may give rise to ulterior **complementary research** in the framework of **a specific international cooperation**. In order to be eligible for this type of project extension at a later stage, candidates must already include in the proposal, at this stage, a declaration of intent (section 4 of the submission file; see point 4.1.2). In this declaration they must list the potential foreign partners and describe the added value to be brought in by this cooperation.

This complementary research must be situated within the context of:

- either the federal government's commitments related to research in the framework of international organisations, such as the various relevant organisations of the United Nations/UNESCO (the Intergovernmental Oceanographic Commission (<http://ioc.unesco.org>), the World Heritage Programme); the World Conservation Union (<http://www.iucn.org>); Diversitas (<http://www.diversitas-international.org>); NATO - CCMS (Committee on the Challenges of Modern Society); the International Energy Agency (Implementing Agreements), etc.;
- or the bilateral agreements for science and technology with Argentina, Brazil, Bulgaria, China, Russia and Vietnam.

These complementary research projects will have a maximum duration of 2 years and can result from a request from one or several partners of the network.

The funding of this type of complementary project can cover both the research activities of the Belgian partners and the planned stay of foreign collaborators.

³ Note: the possibility of including a non-Belgian partner in the network (see point 3.2.1) is different from the possibility of complementary research in collaboration with the Service for International, Interfederal, and Interdepartmental Coordination, as described in point 3.4.2.



4. PROCEDURES

This paragraph describes the procedures for submitting a proposal, the project selection procedures, and the principal contractual obligations applying to selected projects.

4.1 How to answer this call for proposals?

The submission takes place in two steps, first by filing an expression of interest and then by filing a research proposal.

Only those who submit an expression of interest before the stipulated deadline may later submit a complete proposal.

4.1.1 Expressions of interest

Interested parties must submit an expression of interest, using the form intended for this purpose. These expressions of interest will be used by PPS Science Policy **only** in order to **seek foreign experts for the evaluation of the research proposals**.

Expressions of interest are submitted in **English**.

Interested parties are asked to use EXCLUSIVELY the form available at the PPS Science Policy website:

<http://www.belspo.be>

The expression of interest must be sent in electronic form to the following address:

SSD_call5@belspo.be

The expression of interest must reach PPS Science Policy no later than:

Thursday 7 July 2009

PPS Science Policy will ignore expressions of interest submitted after the closing date.

Only those who submit an expression of interest in time may later submit a complete proposal.

4.1.2 Proposal submission

General guidelines

The proposal is submitted by an **individual team** or by an **interdisciplinary network** in accordance with the conditions set forth in point 3.



The submitter is asked to use **exclusively** the forms that are downloadable from the internet site of PPS Science Policy (<http://www.belspo.be>).

No annexes to the submission file will be taken into consideration during the evaluation and selection procedure.

Each proposal must be submitted in **English** in **5 copies**⁴.

The proposal must be sent to the following address:

PPS SCIENCE POLICY
RESEARCH PROGRAMME "SCIENCE FOR A SUSTAINABLE DEVELOPMENT"
CALL 5
WETENSCHAPSSTRAAT 8 RUE DE LA SCIENCE
1 000 BRUSSELS

The proposal must also be sent in electronic form to the following address:

SSD_call5@belspo.be

The proposal (paper and electronic versions) must reach PPS Science Policy no later than:

Monday 17 August 2009 at 12:00.

PPS Science Policy will disregard proposals submitted after the above-mentioned closing date and time.

Forms

Each proposal form includes three separate sections.

Section 1 - Administrative data

Section 2 - Description of the proposal

Section 3 - Qualification and experience of the participants

Section 4 - International cooperation - **optional**

The forms can be obtained from the PPS Science Policy
website at the following address:

<http://www.belspo.be>

4.2 Evaluation and selection

4.2.1 Bases for the evaluation

⁴ If the submitters deem it useful, a version can also be submitted in the coordinator's language.



Proposals submitted in the framework of this call will be evaluated externally by foreign scientific experts qualified in the research field involved.

Only **complete submission files** (the English-language version) are presented for evaluation. **No annex** to the submission file will be taken into consideration during the evaluation and selection procedures.

The present text of the call for proposals serves as the basis for evaluating and selecting the proposals.

4.2.2 Evaluation criteria

The general evaluation criteria to be taken into consideration by the experts are the following⁵:

Compliance with the aims, content, and characteristics of the Programme in general (see point 1) and of the present call in particular (see point 2).

Scientific quality

- Clarity of the objectives and tasks, relevance of the method, positioning with respect to the state of the art in the proposed area
- Scientific originality of the proposed research, the innovative character of the expected results, strengthening of existing expertise, contribution of the proposed research to ongoing research in the area involved.

Scientific support to decision-making

- The link between the project's potential scientific results and the scientific support required in order to prepare and implement a supranational, federal, regional, or local sustainable development policy.

Quality of the research team(s)/network

- Experience and international contacts of the submitters
- Added value of the network
- Complementarity of the partners' skills
- Clarity of the division of tasks between partners
- A balanced distribution of funds among the partners
- Realism of the requested resources (duration, budget, personnel)
- Added value of foreign partner's contribution

Quality of the management and coordination

- The coordinator's scientific quality and management, synthesising, and communication skills.

Interdisciplinarity

- An interdisciplinary approach in order to meet the requirements of the sustainable development concept, in particular cooperation between natural sciences and human sciences.

Elaboration of the proposal in a sustainable development context

- How and to what extent social, economic, and environmental dimensions are integrated into the proposal;
- How the proposal takes into account the relevance and/or applicability of fundamental sustainable development principles (the precautionary principle, the prevention principle, the principle of

⁵ The proposals for complementary research within the framework of an international cooperation will form the object of a simultaneous but separate evaluation by the same experts, according to criteria the most important of which are the added value of the cooperation and the scientific qualities of the foreign partner.



vertical and horizontal policy integration, the polluter pays principle, the subsidiarity principle, the principles of solidarity, social justice, and participation...), particularly in the formulation of policy advice.

Valorisation

- Pertinence of proposals for disseminating and making available the information, especially in a perspective of support to policy decision-making;
- The member profile and role of the Follow-up Committee.

Added value with regard to projects funded under previous programmes (SPSD I, SPSP II, “Workers’ Healthcare”, and “Standardisation”) (see point 1.4)

4.2.3 Selection

The research project selection procedure will take place in two phases: a scientific evaluation, followed by a strategic choice. The scientific evaluation is performed by foreign scientific experts qualified in the research areas of the submitted proposals. The strategic choice is made between the scientifically best-ranked and best-grounded projects.

4.3 Contractual Obligations

4.3.1 Contracts

For the selected proposals a contract is drawn up between PPS Science Policy and the network of funded teams.

For this, the submitters of the proposal will be asked at the end of the evaluation and selection procedure to concisely formulate the specifications on the basis of which the contract is to be drawn up. This **technical annex** to the contract will be drawn up in consultation with PPS Science Policy and will take into account the recommendations formulated by the foreign experts and the Programme Committee. Adaptations to the original proposal may relate to the content of the research, the composition of the network or Follow-up Committee, the choice of the coordinator, the proposals for valorising the research, etc.

PPS Science Policy grant the selected projects the **funds required** for their implementation. PPS Science Policy shall reimburse at most, and up to the amount specified in the granted budget, the real costs substantiated by the people responsible for the contract provided those costs are directly related to the implementation of the project.

4.3.2 Intermediary Evaluation

All research projects are subject to one evaluation, whose modalities are specified in the research contract. These evaluations, conducted by foreign experts, concern the project’s scientific quality (methodology and interim results) and strategic impact, in the light of its initial objectives. The evaluation will result in recommendations for the continuance (or discontinuance) of the project.

4.3.3 Reports

The contract will define the various reports to be submitted to PPS Science Policy. These reports are to



be included in the project work plan and the cost of preparing them (including translations) is to be covered by the project budget.

4.3.4 Data, Results, and Ownership

Foreground shall be the property of the Institution carrying out the work generating that foreground, as mentioned in article 13.2 of the general conditions of the contract (annexe 2).

For the research areas North Sea, Biodiversity and Antarctic, the researchers must bear in mind that the analysis and measurement data will nevertheless be transferred to specific data banks like IDOD/BMDC (<http://www.mumm.ac.be/datacentre>), AMD (Antarctic Master Directory (<http://gcmd.gsfc.nasa.gov/KeywordSearch/Home.do?Portal=amd&MetadataType=0>), data bank BIOBEL from the Biodiversity platform (<http://www.biodiversity.be>).



5. CONTACT INFORMATION

All additional information can be obtained at the following telephone numbers and e-mail addresses:

Secretariat

Mme A. Delis + 32 (0)2 238 37 61

deli@belspo.be

Contact persons

Mme C. Mathieu, + 32 (0)2 238 34 93

math@belspo.be

Mme M.-C. Bex, + 32 (0)2 238 34 81

bexm@belspo.be



ANNEX I. Description of the research areas and their interactions (excerpt of the Memorandum to the Council of Ministers)

This annex contains an excerpt from the Memorandum to the Council of Ministers, approved on 4 March 2005, which briefly describes the content of the research programme “Science for a Sustainable Development”. This annex concerns:

- A. The 7 priority research areas of the Programme (energy, transport and mobility, Agro-food, health and environment, climate, biodiversity, atmosphere and terrestrial and marine ecosystems);
- B. Standardisation within the priority research areas;
- C. Interactions between priority research areas;
- D. The “Transversal Research” part.

This description offers an overall picture of the content of the Programme and constitutes the starting point for elaborating the calls for proposals. Each element of the Programme is worked out in detail in the involved calls (see point 1.6), taking scientific developments and the evolution of needs in the area of policy support into account. Research proposals must therefore be based on the calls for proposals and not only on this excerpt from the Memorandum to the Council of Ministers.

A. Priority Research Areas

1. Energy

The domestic gross consumption of energy in Belgium is rising from year to year, just as it is in Europe and throughout the world. In Europe this is leading to an ever-increasing dependency on fossil fuels, which has pernicious consequences for the security of energy supplies, the environment and health, geopolitical equilibria, fuel prices... An active energy policy, a top-priority sector for every economy, cannot be carried out without a policy for simultaneously managing demand and supply.

Within the Programme the priority research topics are:

- **Rational energy use** (REU) with the study of the social, cultural and economic variables which influence the energy consumption of households, the study of technical variables such as those influencing the energy efficiency of buildings, the study of communication instruments to promote changes in behaviour, the evaluation of the REU programmes and other policy instruments, the study of the role of new processes that can improve energy efficiency, such as soft chemistry (new materials and superconductivity)...
- **Alternative and/or renewable forms of energy** (wind, biomass, sun, hydrogen, etc.) with the analysis of growth possibilities (by amongst others comparing successful examples of dissemination of various technologies abroad), barriers to their introduction and the consequences of their development (employment, security of the network, emission of greenhouse gases, etc.), analysis of the role of biotechnology, etc., in a sustainable development perspective.
- **Organisation of energy systems over the medium and long terms:** socio-economic study of the potential of technological improvements of energy systems (use of residual heat during energy transformation in centralised versus decentralised systems, reduction of losses during energy transport and energy production, vulnerability, dependency on a single form of energy versus usability of a diversified range of sources, integration of cogeneration including on a non-industrial scale, combination of energy sources for multiple objectives (e.g. fuel cells for both heating and transport) in order to increase efficiency and effectiveness).



- **Energy policy** with firstly the analytical or future-oriented study of such varied and interdependent themes as energy prices, energy supply security, liberalisation of the markets, expansion of the market, geopolitical considerations... and secondly the analysis of the role of energy in Belgian society (relationships between energy and employment, energy and poverty, energy and the economy, etc.).

2. Transport and Mobility

In various policy documents at the (inter)national, regional and local levels, sustainable transport and sustainable mobility are translated into concrete objectives such as: access to mobility, accessibility, traffic safety and traffic liveability, reduction of the external effects of transport... The objective is to reduce the tension between the increasing (needs for) mobility and the social, economic and environmental challenges entailed by it.

In the framework of this Programme, the following priority research topics - and their mutual interactions - are addressed:

- **Mobility and modal choice**
 - Mobility in time and space: land-use planning, urban planning, demographic trends; new forms of organisation in the economy, leisure, globalisation (increase in international transport), congestion...
 - Social and cultural aspects: right to mobility, trends in travel behaviour and modal choice (habit formation, price, impact of advertising and awareness-raising...)
 - The future of inter-modal and multimodal transport (in the framework of logistics, freight and passenger transport): interoperability, standardisation, competitiveness, cost evaluation, pricing policy, supply and financing of infrastructures...
 - Possibilities for and role of intelligent transport systems and technological innovations in arriving at a more sustainable mobility.
- **Transport and the environment**
 - Environmental impacts of transport: air quality, noise, odours, vibration, fragmentation of space...
 - Environmentally friendly technologies (for the various modes of transport): analysis of technical and socio-economic problems as well as possible solutions for the application of alternative energy sources (electricity, hydrogen, bio-energy (such as bio-ethanol), etc.);
 - Role and possibilities in the area of technical inspection and vehicle maintenance, environmental labels, the purchase, replacement and recycling of vehicles, environmentally friendly driving behaviour...
- **Traffic safety**
 - Social costs of traffic unsafety;
 - Analysis of behaviours; analysis of determining factors; relationship between types of road users;
 - Improvement and utilisation of statistical data;
 - Possibilities in the area of awareness-raising, training, regulations, enforcement, infrastructure measures, land-use planning...
 - Freight transport and safety;
 - Possibilities for and role of intelligent transport systems and technological innovations in the area of traffic safety.

The research concerns the analysis of both **processes and impacts** and the analysis, development, and evaluation of **policy measures**. The research must contribute to the **development of tools to support decision-making**. Specific attention should be paid to institutional aspects (e.g. the integration of



transport and environmental policy, the European context, etc.); mutual interactions between mobility, environmental, and traffic safety issues; possibilities, impediments, and effects at the social, economic and environmental levels.

3. Agro-food

The quality of both foodstuffs and the processes used for their production in industry or agriculture is a priority objective of the European and national governments.

In order to be able to guarantee this striving for quality, a great deal of research must be done, covering a variety of aspects, among others human health, impacts on the environment, as well as socio-economic dimensions of the sectors involved.

In order to be able to respond to these challenges, the following research topics are addressed in the Programme:

- **Food safety:** chemical safety and microbiological safety, pathogenic micro-organisms (priorities of the Federal Agency for the Safety of the Food Chain - FASFC), resistance to antibiotics, viruses, materials in contact with foodstuffs; study of and change in the current modes of consumption towards a sustainable food consumption.
- **Food allergies and food intolerances:** food-health interactions, study of the causes, identification tests, impact studies, behavioural analysis...
Especially in Belgium one is seeing an alarming increase in food intolerances and food allergies, particularly among young children.
- **Food and “novel foods”:** the study of diet, macro- and micro-nutrients, antioxidants, and oligo-elements, pre- and probiotics, health foods, vegetable oils, GMOs, the use of little-known biological resources...
Putting on the market “novel foods” combining nutritional effects and marketing, raises questions which must be answered by introducing a legal framework (directives and standards).
- **Integrated systems for quality management:** the study of environmental and quality management systems (HACCP (Hazard Analysis and Critical Control Point), LCA (Life Cycle Analysis), systems for rapid warnings about foods, standards, labels, specialised guides for best practices, traceability, authentication, reduction of pesticides, fertilisers, heavy metal contents, and the emission of greenhouse gases...).
Systems for quality management must also be adapted to the problems facing small producers (SMEs, artisans, etc.), who in our country are important partners in this economic sector.
- **Upcoming production methods - multifunctionality of production:**
 - New cultivation and production methods beyond the dominant methods of production and their social, economic and environmental impact.
 - Increasing the added value of existing products, a different use of production factors, collaborating on environmental protection and/or quality programmes, the production of “non-commodity” goods, making production factors and infrastructure available to third parties...
 - The analysis of agricultural environmental measures: caring for the quality of natural systems, the maintenance of biodiversity, landscape protection, tourism...
 - Study of the possibilities for valorising agricultural surpluses, among others via biofuels.

4. Health and Environment

The “Health and Environment” part is based on the finding that trends in both individual and collective



behaviours, in how people work or consume and produce goods and services, have new and sometimes unexpected effects on the environment and health. Indeed, it is estimated that 20% of all illnesses can be attributed to environmental factors, and one finds that certain population groups run an increased risk.

If we look at the WHO's definition of health⁶, we find that it integrates physical, psychological, and social well-being. Working in the health field thus entails that none of these aspects is neglected. This is a comprehensive issue where account must be taken of the numerous risk factors and their cumulative effects.

The research to be carried out under the Programme supports the elaboration or the adaptation of national or European policy strategies, policy plans, and programmes (NEHAP, the Government policy on well-being, CEHAPE, the programme for reducing plant protection agents and biocides in Belgium⁷, etc.).

In this context the research will concentrate on 2 lines of research and is limited to understanding hazards, their development, and their cumulative effects on health, as well as the development of methods for evaluating, managing, regulating and reducing risks:

- **Health risks related to biological, chemical, or physical exposures**

A horizontal and/or sector-related approach is taken to address health issues. This research spans the entire programme (transport, energy, climate, Agro-food, the terrestrial environment, the aquatic environment, the atmosphere) and must make it possible to attain greater insights into threats for human health. For example, the repercussions on health of food production and consumption will be worked out in synergy with the Programme's Agro-food theme (cf. sub themes "Food allergies and food intolerances" and "Food and novel foods").

- Since **the work environment** is a specific environment, it offers possibilities for better delineating some causal relationships than would be the case in a general environment. The research performed in this context can determine the pressure and impact of exposures more precisely and reach more reliable and faster decisions for various aspects of the problematic, particularly concerning the development of methods. Some research can fit into the study of a general environment, such as research on workplace contamination or the (bio)monitoring of employees exposed to existing or new hazardous products, to pesticides/biocides...

Well-being in the workplace is also studied by addressing organisational aspects, namely the study of psychosocial risks, musculoskeletal problems, and human errors. The research performed here will analyse, for different population groups (among others women and older employees), the following dimensions: organisational changes and their consequences, the limitations of the work organisation in specific involved sectors (government departments, agriculture and SMEs, etc.), subject to technological innovation and to the principles of highly demanding European regulations in terms of "quality systems", standardisation, or the evaluation and management of chemical hazards.

5. Climate

The priority research lines take into account (among others) the recommendations of the

6 A general condition of physical, mental, and social well-being that does not consist merely of the absence of any disease or handicap.

7 Decision of the Council of Ministers of 10 December 2004.



Intergovernmental Panel on Climate Change (IPCC) and the European Council's Working Party on International Environmental Issues - Climate Change (WPIE/CC) and support the implementation of the Climate Convention, the Kyoto Protocol, and the definition of new post-Kyoto reduction targets. Research on climate change is carried out on various geographic scales: national, European, and global, with specific attention paid to Antarctica.

Research is necessary for:

Understanding the climate system

- Studying the evolution and causes of climate change (natural versus anthropogenic origin);
- Better understanding the mechanisms and factors which influence the climate system (biogeochemical cycles, aerosols, stratospheric ozone, the ocean CO₂ balance...);
- Contributing to the international efforts to identify the various "pathways" which allow the reduction targets to be reached (cf. art 2 UNFCCC);
- The development of projections of future climate evolutions on the basis of climate modelling on the global and regional levels;
- Introducing scientific elements for evaluating the level of "dangerous interference" (art. 2 of the UNFCCC).

Analysing impacts, adaptation, and vulnerability (particularly in Belgium)

- Evaluating the impact of the climate change in combination with other pressure factors on hydrological cycles, sea level, the availability of water reserves, and their management in various sectors (agriculture, transport, energy, etc.);
- Evaluating the risks and the impacts of extreme climatic events on ecological systems and vulnerable socio-economic sectors;
- Evaluating from a scientific and socio-economic perspective the adaptive measures which are necessary in order to anticipate this impact.

Supporting the preparation and evaluation of measures to mitigate climate change

- Evaluating from an economic, social, environment and legal perspective the measures relating to:
 - the sequestration potential in terrestrial and marine ecosystems;
 - reducing greenhouse gas emissions in Belgium (taking into account the three Regions in Belgium and their mutual interactions, as well as relations with neighbouring countries);
 - reducing greenhouse gas emissions outside Belgian borders in the framework of Joint Implementation (JI) and Clean Development Mechanisms (CDM)...;
 - integrating climate policy into other areas, including development cooperation and foreign trade.

More sector-related studies (such as in the area of energy, transport, etc.) performed in the framework of these priority research areas can supplement the global instruments developed here.

6. Biodiversity

"Biodiversity" or "biological diversity" means the entirety of the living world. Along with the diversity of species (flora, fauna, micro-organisms), this also includes genetic diversity within a given species and the (terrestrial and aquatic) environments in which species live. Because biodiversity is the very basis of life on earth, with a broad offer of goods and services (production of food and fibres, carbon storage, nutrient cycles, resistance against climate, etc.), an increased loss of biodiversity such as that currently observed constitutes one of the major problems that we face. Europe and its Member States have undertaken to "halt the loss of biodiversity before 2010". This goal can only be attained with reliable and coordinated science.

In the framework of this Programme, the goal of the "biodiversity" research area is:



- to understand the causes of the loss of biodiversity: the impact of invasive species, fragmentation of the landscape, climate change, nitrogen pollution, etc.;
- to analyse the conditions and trends of populations, species, habitats and to evaluate ecological services which these species and systems provide;
- to identify priority responses concerning conservation, restoration, and the sustainable use of biodiversity and to provide scientific instruments for assessing the feasibility and efficiency of these responses.

This Programme addresses the *in situ* biodiversity of the marine ecosystems of the North Sea, the North Atlantic Ocean, and the Southern Ocean, as well as that of terrestrial ecosystems and Belgian freshwater areas. In a perspective of sustainable utilisation and conservation, the *ex situ* biological resources kept on our territory are also being studied.

7. Atmospheric, terrestrial (including freshwater), and marine ecosystems

In this research area, attention is paid to the three compartments of the earth system - i.e. the atmosphere (the troposphere and stratosphere), terrestrial ecosystems (incl. freshwater ecosystems), and marine ecosystems - and their mutual interactions.

The atmosphere is to be studied at the global as well European and local levels, to support air quality protection policy: LRTAP, the Vienna Convention and the Montreal Protocol, the Climate Convention (UNFCCC), and the Kyoto Protocol. Each of these agreements requires implementation in Belgium, which among others is based on research on the synergy or conflicts between conventions.

The study of terrestrial ecosystems will focus on our territory and also includes the research relating to surface water and river banks and valleys, so as to support the implementation of the European Water Framework Directive.

The marine ecosystems to be studied include the North Sea and Antarctica, where research is important for the implementation of (inter)national conventions and agreements signed by Belgium (including the Antarctic Treaty, the Madrid Protocol, the Belgian Law on the Protection of the Marine Environment, the Law on the institution of an EEZ (exclusive economic zone), the OSPAR Convention).

Research within these three compartments concentrates on the **“drivers” of ecosystem processes and on environmental policy problems**, such as changes in land use (soil erosion, acidification, depletion...) and biological and chemical interference (eutrophication, photochemical ozone and aerosols in the troposphere, the greenhouse effect, the thinning of the stratospheric ozone layer...) as a result of anthropogenic activities.

Since generally the same anthropogenic activities cause these problems and given the mutual interactions of and links between these various problems, there is a need for an integrated approach to both research and policy.

Research will attempt via **process studies** (understanding and quantifying chemical, biological, and physical processes) and the development of tools (quality monitoring systems, simulation models, etc.), to propose measures, instruments, and/or recommendations for the reduction of sources of pollution, the establishment of standards, the development and evaluation of integrated **management and policy measures**... Where possible, the studies will be supplemented with a socio-economic evaluation of the results.



Relevance of Antarctica research

Antarctica and the surrounding Southern Ocean (SO) are global climate regulators: as a "biological pump", the SO can help to mitigate the effects of increasing CO₂ discharge into the atmosphere; the further melting of ice sheets and glaciers as a result of climatic warming will have a significant effect on the total sea level increase, anthropogenic chemicals above Antarctica degrade the protective ozone layer... Research provides important information on climate evolution, the dynamics of ice caps and glaciers, and biogeochemical processes in and between the atmosphere and the SO, which in turn leads to understanding and modelling sea level and climate change.

Through its physical isolation, its extreme environment, and its unspoiled state, Antarctica also constitutes a unique ecosystem with special species and populations, that can serve as a model for understanding universal biological (ecological, physiological and biogeographical) processes. Research contributes to better understanding the complexity of biotic communities under extreme conditions and yields potential medical and industrial applications. Biodiversity research in Antarctica is also the basis of the proposed international measures for the protection of Antarctica and its surrounding oceans.

Relevance of North Sea and North Atlantic research

The North Sea is characterised by a very high productivity and highly diversified habitats, but it is also a sensitive ecosystem under heavy pressure from intense human activities. In order to arrive at a sustainable management and a sustainable exploitation of the North Sea, there is a need for research that focuses on deepening existing scientific knowledge about the structure and functioning of the North Sea ecosystem (including biodiversity) and the processes which take place within it, including responses to anthropogenic pressures and a better understanding of the social/economic impacts of direct and indirect human activities on the ecosystem.

Along with the Belgian part of the North Sea and in particular the coastal area, the areas through which it is directly influenced (the Channel, the Scheldt Estuary) and/or where the effluents of this part of the North Sea can have a measurable impact (the Southern Bight and the central North Sea) also deserve attention. The transition between the ocean and the North Sea is also an important area of study.

B. Standardisation within the priority research areas

The Programme encourages, within the priority research areas and if this appears relevant, the submission of proposals on standardisation.

Standardisation is a powerful means of achieving technical progress and developing the economy; it can contribute to a better quality of life in general by raising quality, safety, reliability, and efficiency levels. Standards have a positive effect on the entire society (business organisations, governments and economic leaders, suppliers and buyers of products and services, and finally consumers and users in general).

At the economic and social levels, standardisation is an instrument that harmonises and facilitates transactions, inspires trust, limits risks, and supports the dissemination of innovation.

Standardisation is also an essential instrument supporting the implementation of European environmental policy choices. The implementation of environmental policy (in the areas of noise pollution, waste, soil, biomonitoring, discharge of pollutants, etc.) requires appropriate standards for



tests, sampling, and analysis, since it is essential that environmental quality be comparably measured worldwide. This is the task of international standardisation.

Moreover, there is an increasing awareness of the importance of standards and how they are designed. The Commission (DG Enterprise and DG Environment) is preparing a communication on the integration of environmental aspects into European standardisation. The CEN is striving to fit all environmental aspects horizontally into all of its standards, even as they are being developed within a sectoral framework. The objective of all this is to ensure that no unnecessary barriers are introduced and to keep the negative impact on the environment as low as possible.

The research to be carried out in this framework must meet the following criteria:

- The research should fit within the priority research areas proposed in the Programme;
- It should be prenormative research making it possible to contribute to the development of standards;
- The research should make it possible to contribute to the identification of impacts, problems, and gaps related to standardisation in a sustainable development context;
- The research should analyse the role of standardisation as an instrument for a sustainable development policy.

C. Interactions between priority research areas

A trans-sectoral, integrated approach to research is needed for several reasons: to evaluate the impacts of a problem or the validity of a measure, strategy, or technology at the social, economic, and environmental levels; to take into account in an optimal manner the complexity of a problem, the reality in the field, and the institutional context; to contribute towards adequately fulfilling national and international commitments.

The Programme will therefore encourage **interactions between priority research areas**, making it possible to tackle common, complex problems such as:

- *air pollution (ozone, particles...)*, a problem common to the areas energy ↔ transport and mobility ↔ atmosphere, terrestrial and marine ecosystems ↔ climate ↔ health;
- impacts associated with *genetically modified organisms (GMOs)*, a, issue interfacing with Agro-food ↔ consumption ↔ health ↔ terrestrial ecosystems ↔ biodiversity;
- *the work/leisure relationship* interfacing with ↔ energy ↔ terrestrial and marine ecosystems ↔ biodiversity ↔ health;
- *product and process life cycles*, interfacing with terrestrial ecosystems ↔ atmosphere ↔ biodiversity ↔ energy ↔ Agro-food ↔ working conditions;
- *renewable forms of energy*, associated with the areas of energy ↔ agriculture ↔ terrestrial and marine ecosystems ↔ climate;
- the *global character of challenges*: production and consumption ↔ transport and mobility ↔ energy ↔ health ↔ biodiversity ↔ climate;
- the *integrated management of coasts or catchment areas, which is linked to the research areas* energy ↔ agriculture ↔ transport and mobility ↔ terrestrial and marine ecosystems ↔ climate ↔ biodiversity ↔ production and consumption;
- ...

The research must take into account the (complexity of) interactions between priority research areas. This constitutes an essential guideline throughout the Programme (calls for proposals, project selection and management, valorisation of research results).

For this are planned: integration of interactions and common themes into appropriate calls, *joint calls* between priority research areas (e.g. energy – transport, agro-food – biodiversity, health – climate,



health – Agro-food), the “clustering” of projects covering different aspects of common, complex problems...

D. “Transversal Research”

In order to better translate/operationalise the concept of sustainable development within and between the priority research areas, **transversal and generic research** is necessary. Accordingly, the Programme includes "Transversal Research" dealing with the following questions:

- Changing unsustainable production and consumption patterns;
- The role of the spatial and temporal dimensions of sustainable development;
- Devising and analysing instruments supporting a policy of sustainable development, in particular instruments aimed at a better balance between the social, economic, and environment-related pillars of sustainable development.

Sustainable development is all about **equating the human population with the available resources and space**. This implies analysing the links between the geographic or climatic framework of a region and all of the region’s economic, social and cultural productions. This requires a transversal approach and can be analysed via the different research themes.

In order to strengthen the coherence of the Programme, the transversal research topics should preferably be addressed in relation to the 7 proposed priority research areas, without excluding other areas that might contribute towards operationalising the sustainable development concept (e.g. residential construction).

Under this heading the following research topics are addressed:

- **Spatial dimensions of the sustainable use of the ecosystems**, underscoring the importance of policies for land-use planning, habitat, infrastructures, etc.;
- **Production patterns**, taking into account the economic, environmental, and social impacts throughout the production chain
- **Striving for sustainable consumption** at both the individual and collective levels (well-being, health, employment, quality of life, excessive debt burden, redistribution, pollution, waste, natural resources, etc.)
- **Time management in relation to consumption profiles and production methods** (leisure, combining a private and a professional life, flexibility of companies, etc.);
- **Globalisation of the economy** and its consequences, particularly with respect to geostrategy, North-South relations, the use of natural resources, climate change, inequality, and poverty
- **Social changes** (demographic development, (im)migration, etc.) and their implications in a sustainable development perspective
- **The quest for an economic development** (competitiveness of companies, employment...) **compatible with the sustainable management of human and natural capital** (uncoupling, dematerialisation, qualitative growth, etc.)
- **Ethical aspects linked to sustainable development**, notably in relation to the responsibility of the various actors, access to resources...
- Different **visions of sustainable development** and their implications
- **The role of decision-making processes** in striving for sustainable development
- **The multifunctionality of the primary, secondary and tertiary sectors**, i.e. agriculture, industry, and services
- The **role of standardisation** as an instrument for a sustainable development policy;
- **Resource management**; this includes analysing the present dependency on finite resources, analysis of bottlenecks over the short, medium and long terms, studying links between resource use, energy consumption, and environmental pollution, and conducting further research on how



to reduce the discrepancy between environmental stress and the environmental carrying capacity, the ecological footprint, and the ecological debt.