COUNCIL DECISION

of 25 January 1999

adopting a specific programme for research and technological development, including demonstration, to be carried out by means of direct actions for the European Community (1998 to 2002) by the Joint Research Centre

(1999/174/EC)

THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty establishing the European Community, and in particular Article 130i(4) thereof,

Having regard to the proposal from the Commission [1],

Having regard to the opinion of the European Parliament [2],

Having regard to the opinion of the Economic and Social Committee [3],

(1) Whereas by Decision No 182/1999/EC [4], the European Parliament and the Council adopted the fifth framework programme of the European Community (hereinafter referred to as the fifth framework programme) for research, technological development and demonstration (hereinafter referred to as RTD) activities for the period 1998 to 2002 setting out the general outlines and scientific and technological objectives of the activities to be carried out by the Joint Research Centre (JRC) for the European Community;

(2) Whereas Article 130i(3) of the Treaty stipulates that the framework programme shall be implemented through specific programmes developed within each activity under the framework programme, and that each specific programme shall define the detailed rules for implementing it, fix its duration and provide for the means deemed necessary;

(3) Whereas, in accordance with Article 4(2) of Decision No 1110/94/EC of the European Parliament and of the Council of 26 April 1994 concerning the fourth framework programme of the European Community activities in the field of research, technological development and demonstration (1994 to 1998) [5] and Article 7(3) of the Council Decision on the specific programmes implementing the direct actions of the fourth framework programme, the Commission has arranged for an external assessment to be conducted which it has transmitted to the European Parliament, the Council, the Economic and Social Committee and the Committee of the Regions together with its conclusions and comments;

(4) Whereas, in accordance with Article 130j of the Treaty, Council Decision 1999/65/EC of 22 December 1998 concerning the rules for the participation of undertakings, research centres and universities and for the dissemination of research results for the implementation of the fifth framework programme of the European Community (1998 to 2002) [6] (hereinafter referred to as 'the rules for participation and dissemination') applies to this specific programme as regards dissemination of research results; whereas these rules allow the participation of the Joint Research Centre in the indirect actions covered by this specific programme;

(5) Whereas, for the purpose of implementing this programme, in addition to cooperation covered by the Agreement on the European Economic Area or by an Association Agreement, it may be appropriate to engage in international cooperation activities, in particular on the basis of Article 130m of the Treaty, with third countries or international organisations;

(6) Whereas implementation of this programme will also comprise activities and mechanisms aimed at stimulating, disseminating and exploiting RTD results, in particular *vis-à-vis* small and medium-sized enterprises (SMEs), and activities to stimulate the mobility and training of researchers;

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(1) OJ C 260, 18.8.1998, p. 105.
(2) Opinion delivered on 15 December 1998 (not yet published in the Official Journal).
(3) OJ C 407, 28.12.1998, p. 123.
(4) OJ L 26, 1.2.1999, p. 1.
(5) OJ L 126, 18.5.1994, p. 1. Decision as last amended by Decision No 2535/97/EC (OJ L 347, 18.12.1997, p. 1).
(6) OJ L 26, 1.2.1999, p. 46.

(7) Whereas research activities under the fifth framework programme should also be geared towards innovation in order to contribute, *inter alia*, to the objectives of the first action plan for innovation; whereas the JRC should actively pursue activities in innovation and technology transfer;

(8) Whereas the equal opportunities policy of the Community must be taken into account in the implementation of this programme;

(9) Whereas the implementation of this programme should be monitored with a view to adapting it, where appropriate, to scientific and technological developments and needs; whereas in due course there should also be an assessment of progress with the programme by independent experts;

(10) Whereas, in the implementation of this programme, the Board of Governors of the JRC is consulted by the Commission in accordance with the relevant provisions of the Commission Decision concerning the organisation of the JRC; whereas the current provisions are set out in Commission Decision 96/282/Euratom [1];

(11) Whereas the Board of Governors of the JRC has been consulted on the scientific and technological content of this specific programme,

HAS ADOPTED THIS DECISION:

Article 1

In accordance with Article 3(1) of the fifth framework programme, a specific programme related to direct actions of research and technological development, including demonstration, to be carried out by the JRC (hereinafter referred to as the specific programme) is hereby adopted for the period from 25 January 1999 to 31 December 2002.

Article 2

1. The amount deemed necessary for the execution of direct actions by the JRC under this programme is EUR 739 million.

An indicative breakdown of this amount is given in Annex I.

2. Of the amount in paragraph 1:

— EUR 189 million is for the period 1998 to 1999,

and

— EUR 550 million is for the period 2000 to 2002.

In the case referred to in Article 2(1)(c) of the fifth framework programme, the Council shall adapt the latter figure in accordance with Article 2(1)(c), second indent of the fifth framework programme. Pending a decision by the Council, this specific programme shall not be implemented beyond the provision of the first indent.

3. The budgetary authority shall, in compliance with the scientific and technological objectives and priorities laid down in this Decision, set the appropriations for each financial year taking into account the availability of resources within the multiannual financial perspective.

Article 3

1. The general outlines, the scientific and technological objectives and the priorities for the specific programme are set out in Annex II. They are consistent with the principles and the three categories of selection criteria indicated in Annex I to the fifth framework programme.

2. The rules for dissemination of results shall apply to this specific programme.

3. The detailed rules for financial participation by the Community in the specific programme are those referred to in Article 4 of the fifth framework programme.

Direct RTD actions are defined in Annexes II and IV to the fifth framework programme.

Specific rules for implementing the programme are set out in Annex III to this Decision.

[1] OJ L 107, 30.4.1996, p. 12.

Article 4

In the light of the criteria referred to in Article 3(1), and the scientific and technological objectives and priorities set out in Annex II, the Commission:

(a) shall monitor, with appropriate assistance from independent external experts, the implementation of the specific programme and, where appopriate, submit proposals to the Council for adapting it, in accordance with Article 5(1) of the fifth framework programme;

(b) shall arrange for the external assessment provided for in Article 5(2) of the fifth framework programme to be conducted concerning the activities carried out in the fields covered by the specific programme.

Article 5

1. The Commission shall draw up a work programme specifiying:

(a) in greater detail, the objectives and RTD priorities of Annex II;

(b) the indicative timetable for the implementation of the specific programme.

2. The work programme shall be updated where appropriate and be made available by the Commission to all interested parties in a user-friendly form, including in electronic form.

Article 6

1. The Commission shall be responsible for the implementation of this specific programme, carried out by the JRC.

2. The Board of Governors of the JRC (hereinafter referred to as the Board of Governors) shall be consulted by the Commission in this task, in accordance with the relevant provisions concerning the organisation of the JRC.

3. The Commission shall regularly inform the Board of Governors of the implementation of this specific programme.

Article 7

The Commission may request the JRC to execute, on the basis of the criterion of mutual benefit, projects with legal entities established in third countries when this contributes effectively to the execution of direct actions.

Article 8

In accordance with Article 5(4) of the fifth framework programme, the Commission shall regularly inform the Council and the European Parliament of the overall progress of the implementation of the programme.

Article 9

This Decision is addressed to the Member States.

Done at Brussels, 25 January 1999.

For the Council
The President
J. FISCHER

ANNEX I

INDICATIVE BREAKDOWN OF THE AMOUNT DEEMED NECESSARY

(million EUR)

Type of activity	Amount
Serving the citizen	292
Enhancing sustainability	321
Underpinning European competitiveness	126
Total	739 (1) (2)

(1) Of which approximately 6 % may be allocated to exploratory research.
(2) This total includes the JRC's budget contribution necessary for its participation in shared-cost actions.

ANNEX II

THE GENERAL OUTLINES, SCIENTIFIC AND TECHNOLOGICAL OBJECTIVES AND PRIORITIES

A. THE MISSION OF JRC

The mission of JRC is to provide customer-driven scientific and technical support for the conception, development, implementation and monitoring of Community policies. As a service of the European Commission, the JRC functions as a reference centre of science and technology for the Community. Close to the policy-making process, it serves the common interest of the Member States, while being independent of commercial or national interests.

Carrying out specific high-level research in close contact with industry and other bodies, the JRC supports the policy-maker in addressing the concerns of the individual citizen, improving the interaction between man and the environment and promoting sustainable development.

In implementing its mission, the JRC will endeavour to coordinate RTD activities carried out in the Member States. Its work depends on intensive networking with public and private institutions in the Member States through, for example, research networks, joint projects or staff exchanges. This is important because the JRC's mission is complementary to the indirect action part of the fifth framework programme; while the indirect actions will continue to be the main mechanism for developing and testing new ideas, the JRC's role is to help apply them in the service of the policy-maker.

B. OBJECTIVE: SUPPORT THE MANAGEMENT OF CHANGE

Progress in technology, especially in the life sciences and information technology, is changing the way we live, the way we do business and the world we live in. These changes are complex and interrelated so those involved with policy need support in understanding how to harness the technologies to provide better services to the citizen, to allow industry to take advantage of new opportunities and to promote policies that protect the citizen from the risks that accompany the benefits of such changes. JRC, as the scientific arm of the Commission, must be able to underpin the management of change by supporting the Community policy-making process through: facilitating a better understanding of emerging issues; providing scientific and technical support to the elaboration and implementation of policies; providing realistic monitoring of the effectiveness of policy measures.

The two selection criteria for JRC activities are:

— relevance to Community policies. An understanding of the policy agenda allows JRC research to be timely and support the formulation of policy where it is most needed,

— subsidiarity. This has two aspects. Firstly the research must be in an area where Community involvement is appropriate and secondly it should be appropriate for this involvement to be through the JRC. Thus JRC operates in areas such as cross-border issues, consumer protection and anti-fraud where its unique pan-European identity provides an added-value.

C. THE JRC PROGRAMME

JRC's specific programme for the fifth framework programme reflects the large changes that have taken place in Europe and the wider world in the past 10 years. While these changes have all been beneficial for growth and prosperity, care is needed to ensure that the growth continues, that European industry can compete on a fair basis within the internal market and on the wider world market, that the growth is sustainable and that Europe's citizens can live in a clean and safe environment.

Accordingly JRC's programme has been divided into three main themes:

I. Serving the citizen

II. Enhancing sustainability

III. Underpinning European competitiveness

The objective of the first theme is to provide support to policy that protects individual citizens. This includes measures to give the consumer confidence that the food he or she eats or buys is identified and labelled correctly, that he or she is protected against fraud, that he or she can fully utilise the benefits of modern medicine, that the information that he or she receives is dependable and that he or she is protected against natural and man-made hazards.

The second main theme is sustainability; achieving growth while protecting the environment, conserving natural resources, maintaining biodiversity and ensuring that the Community can continue funding the relevant policies and avoiding that efforts in these regards are not undermined by fraud. It is a major Community policy objective that environmental considerations be integrated into all other policies and framing legislation that achieves this integration while maintaining a broad free market policy is a major challenge to legislators. JRC will support sustainability through analysis of the environmental impact of policy options, through support to anti-fraud measures in the agriculture and fishery policies, through support to the international effort to prevent global change and through the study of how European ecosystems are changing and could be preserved.

The main objective of the third theme is to contribute to the Community's industrial competitiveness policy by supporting the transfer of knowledge and research results from the scientific community to industrial users. The JRC will for example exploit its specific expertise to facilitate the utilisation of the latest technologies by emerging industries, such as earth observation and advanced materials (e.g. biomaterials). Other appropriate actions will be taken to support key policy areas such as enlargement and integration of candidate countries into a common internal market, pre-accession and EU-Mediterranean cooperation, where further efforts are required to optimise potential synergies between the scientific and industrial communities of the EU and its partner countries.

Two horizontal elements run through all three JRC research themes. The first of these, measurements, standards and testing, constitutes one of the key specialities of the JRC. The second is a techno-economic intelligence that can provide EU institutions with timely advice concerning the development of new technologies, the likelihood of breakthroughs, the social challenges that they pose and their possible impact on policy. This includes monitoring developments in the other major industrialised trading blocs to determine what lessons can be learned. Both these tasks are generic to all JRC activities — even where not explicitly mentioned.

Finally the programme which follows should not to be considered a rigid blueprint for the work programme of JRC over the next four years but rather a general outline that reflects the current view of the policy agenda and its priorities. Changes to the JRC programme are to be expected as science and technology advance and as the policy agenda and the priorities of the customer change.

I. SERVING THE CITIZEN

The first theme of JRC's research is centred on the citizen. The objective is to support those Community policies that are intended to protect him or her, provide him or her with information, maintain his or her health and protect his or her safety.

Consumer policy and consumer health protection are most important factors in Community policy and, in fact, the legal basis for consumer protection will be further strengthened by the Amsterdam Treaty. The main objectives of the policy are to protect the consumer in the internal market; to reinforce market transparency; to improve consumer confidence, especially by more complete and

effective information and education; develop a system of dialogue and consultation between the European Commission and organisations representing consumers, and improve the dialogue between the latter and industry; and to ensure that the interests of the consumer are given due consideration in the development of other Community policies. The JRC will provide scientific support for this policy.

Along with biotechnology, information technology is the fastest moving technology and the EC's information society initiative, while recognising that progress is driven by market forces, ensures that policy fully takes advantages of the benefits of the technology and that individuals can depend on information that has been processed securely. The JRC will support the initiative through technical advice on dependable services and improving the ease of access to information.

The third thrust of the JRC's effort in services to the citizens is in health. The objective here is to exploit specific technologies where the JRC has unique technologies and expertise for the diagnosis and treatment of disease.

Beside safety of food and feed products, Community measures to protect the safety of citizens include, among others, car safety legislation, directives on industrial safety and construction guidelines. The JRC will provide a technical backup to these measures, determine how new technologies can help cope with natural disasters with a cross-border dimension, such as flooding, and contribute to the Union effort on civilian de-mining through appropriate coordination and support activities.

I.1. **Consumer protection**

For consumer health EC institutions manage scientific committees whose work is based on excellence, independence and transparency; carry out inspections to ensure that rules of hygiene and food safety are respected; and evaluate and assess possible risks to consumer health.

This marked strengthening of consumer policy has been prompted by the general desire to match, on the one hand, the rapid growth in the possibilities offered by advanced technologies to increase the variety and lower the costs of products in the market by, on the other hand, adequate measures to protect consumers. It is clear that a strong scientific support to this policy is required, both to understand the complex issues involved and to apply the latest technology for checking the quality and origins of products. The JRC will support Community policy in this area by applying emerging technologies for consumer protection measures and will be ready to assess and react to new hazards as they occur. This work will involve:

— research to underpin the harmonisation and validation of methods for quality and safety analysis of feeding stuffs, including possible European harmonisation of standards for organic foods, and for animal feedstuffs, food, beverages, and consumer products; provision of references for the determination of food and beverages authenticity and origin, for the establishment of inspection practices and for risk-assessment; methods and references in support of food-labelling and development of anti-fraud techniques,

— support to the implementation of Community policy on biotechnology including methods for the monitoring and detection of genetically modified organisms and risk-assessment studies,

— toxicological studies on the impact and health effects of diverse food contaminants, toxic chemicals (e.g. endocrine disrupters) and pathogenic micro-organisms; establishment of models and procedures for risk-assessment,

— validation of safe alternative procedures to *in-vivo* experiments currently used to determine the toxicological hazards posed by chemicals, pharmaceuticals and consumer products.

I.2. **Medical and health applications**

Several JRC generated technologies related to nuclear engineering, metrology, informatics and material sciences have potential applications in the area of medicine and healthcare and are sufficiently mature for further development. The implementation of this work will rely on the use of JRC facilities and unique expertise, and will continue to be carried out in networks together with the medical and pharmaceutical communities. It will include:

— active support, including validation and standardisation, to development of anti-cancer therapies based on nuclear technologies, applications of boron neutron capture therapies and alpha-immuno therapies and to medical imaging,

— prenormative research and validation of testing methods for bio-compatible materials and bio-mechanical components; qualification of certain medical equipment for the harmonisation of norms and standards; development, production and certification of reference materials for clinical diagnostics and validation of testing instruments,

— support to telematics systems for the secure exchange of regulatory information on pharmaceuticals in the EC.

I.3. **Benefiting from the information society**

The JRC's information technology expertise will be used to support dependability aspects of the EC's information society initiative and to strengthen fraud control measures. The work includes:

— support to the dependability initiative including defined tests and tools of reliability, research on systems' survivability, dependability characterisation of services and qualification procedures for embedded systems; application and demonstration of emerging networking technologies, decision support systems and medical data systems; use of research results in statistical and geographic information applications,

— support to anti-fraud measures including the development and operation of effective, reliable and safe communication systems amongst public authorities in Member States and the Commission, development of an early-warning system and methods for analysis and control of large quantities of information from different sources.

I.4. **Safety of the citizen: man-made hazards and natural hazards**

The EC has a number of measures to protect individuals against hazards. These include standards in car construction, high pressure equipment, obligations on the labelling and notification of dangerous chemicals and the notification of accidents. The JRC plays an active part in the implementation of these policies and in support for the development of new safety measures:

— support of Community industrial safety regulations through analysis of industrial accident data, supply of information to the competent authorities and industry and technical advice to the Commission,

— design, development, validation and harmonisation of inspection procedures for high pressure equipment, with a view to provide maximum safety at the work place; support to the development and implementation of new standards. Interactions of hydrogen with structural materials and preparation of industrial safety norms and standards,

— monitoring, control and management of chemical products: implementation and improvement of regulations for the notification, authorisation, classification and labelling of new and existing chemicals; research on environmental risk-assessment,

— maintenance and further development of a research platform contributing to the scientific and technical basis needed for civilian land de-mining operations; compilation of an index of mine types and their signatures; development of strategies for examining mine fields and establishing secure detection and destruction methods; establishment of reference criteria and standards and validation of clearing methods and available devices,

— chemical characterisation and tools for the determination of the origin of illicit drugs,

— characterisation of the structural safety of transport vehicles and crash barriers; calibration of test facilities in the Member States together with the validation of simulation methods intended to complement traditional impact tests,

— support to the establishment of a common European reporting system for in-flight incidents including analysis of the influence of human error,

— support to the formulation and development of construction standards (Eurocodes); research to ensure safety and reliability of buildings and civil engineering structures against seismic movements, rapid impacts and traffic vibrations including applications for the preservation of significant monuments for the European cultural heritage, assessment of their degradation and techniques for their restoration,

— applications of earth observation techniques for the risk and damage assessment, monitoring and post-crisis management of natural hazards such as forest fires, floods, landslides, droughts, and coastal storms.

II. ENHANCING SUSTAINABILITY

Technological development, sustainable growth, respect and care for the environment are key issues for the Community, enshrined in the Treaty and pursued through common policies and actions.

The Community's fifth environmental action programme (1992 to 2000) forms the basis of environment policy of the EC and describes the challenge of the 1990s as making progress towards sustainable development. A recently published action plan identifies five priority areas where Community action needs to be stepped up. These are firstly improved integration of the environment into other policies such as agriculture, transport, energy, industry and tourism; secondly the use of a wider range of instruments, especially market based instruments but also structural policy, to implement Community policy; thirdly improving the implementation and enforcement of Community legislation; fourthly a raising of public awareness; and lastly a raising of the Union's profile in international affairs — strengthening cooperation with central and east European countries and the Mediterranean partnership countries, enhancing the EU's role in international environmental actions and dealing with trade and environmental issues.

The JRC's scientific and technical services will provide the expertise necessary to help in the understanding of the issues involved and to support the implementation of all five points of the action plan. Its broad range of disciplines will contribute to the establishment of sound and feasible limits for pollutants, the production of commonly accepted reference materials and measurements for monitoring them, the determination of the impact of proposed legislation, the identification of the best available technologies and the assessment of available scientific knowledge for improving industrial processes and reduce pollution, the understanding of global climate change processes and their impact, the identification of new technologies that could affect sustainability. Particular efforts will be made in the energy and transport sectors.

The JRC research aimed at enhancing sustainability will provide support to the Commission, the European Parliament, the Member States and relevant EU agencies, and will include the following targeted issues.

II.1. **Integration of environmental protection in other Community policies**

The Commission is obliged by the Treaty to assess the consequences of any proposal that has an impact on the environment and to endeavour to integrate sustainability objectives into all sectoral policies such as agriculture, energy, transport and regional development. The JRC will support this effort through:

— socio- and techno-economic studies to improve the integration of environmental protection in sectoral Community policies, including case studies and development of methods to measure and analyse regulatory instruments (e.g. 'green accounting'),

— research on land cover and land use dynamics, regional and urban development trends; research on agro-environmental issues mainly using earth observation; coastal zone management, development and harmonisation of indicators of environmental degradation.

II.2. **Pollution**

Community legislation requires that new industrial developments use the best available techniques in order to reduce pollution in an integrated manner, i.e., to take account of all forms of pollution, air, soil and water. As a support to this and all other pollution control management measures it is a prerequisite that systems be developed for detecting pollutants and that measurements throughout the Community be harmonised. The JRC's work will therefore involve:

— support to environmental legislation for integrated (e.g. water, air, soil) pollution prevention and control in industry; development of the reference framework for the use of best available techniques in several industrial sectors; assessment of the impact of legislation on competitiveness and employment,

— support to the international harmonisation of pollution-monitoring techniques; development and production of reference materials and measurements in different materials (e.g. soil, water, air, biota, etc.) for pollution control,

— research to underpin the harmonisation and validation of reference methods for the analysis of water quality, water monitoring, water treatment and water management; assessment of toxicological risks posed by water pollutants; interventions in emergency cases; procedures and criteria for water quality control; studies on water management practices and their impacts in geographical areas protected by EC legislation and in those prone to flooding and drought,

— development of techniques for localisation of soil contamination due to industrial activities and to monitor marine pollution events (e.g. algae blooms, oil spills) including the detection of vessels causing pollution,

— research to underpin harmonisation and validation of air quality control methods and criteria for air quality in urban and 'conurban' areas; impact of alternative fuels on air quality and emissions of micro-particles; surveillance of radioactivity in the environment; regional programmes for environmental monitoring of selected regions (e.g. the Alpine Convention).

II.3. **Global change**

By signing the Kyoto Protocol, industrialised nations have committed themselves to reducing greenhouse gas emissions. The European Union, which negotiated on behalf of the Member States, has promised to reduce emissions to 8 % below 1990 levels. The European Union needs strong technical support in order to maintain credibility as a party to the Climate Convention, strengthen its position

on the international scene, understand possible futures for Europe including implications for managed and unmanaged natural resources, public health and biodiversity, highlight risks and uncertainties and formulate appropriate policy. The JRC will support Community policy by:

— study on the fluxes of greenhouse gases and aerosols; research on the processes leading to greenhouse emissions; assessment of the consequences of the Kyoto Protocol on emission levels, air quality, climatic change and the European economy; support to European political initiatives,

— exploitation of Earth observation for mapping, monitoring and making an inventory of key global, marine and terrestrial resources. Global information systems and models will support the analysis and understanding of observed trends. Access to global datasets will be provided to European research networks.

II.4. **Energy and transport**

The final consumption of energy in Europe is divided almost equally between industry (29 %), transport (32 %) and the household and tertiary sectors (39 %). The majority of this is from fossil fuel with petroleum products dominating the transport sector and almost two thirds of all coal being used for the production of electricity. Only by effective measures to reduce emissions and replace fossil fuels with renewable energies can Europe respect international agreements and achieve sustainable growth. The 1996 Green Paper on renewable energy found that the EC Treaty offered ample scope for promoting renewable energy and suggested that the Community reinforce its policy in order to achieve a target 12 % of gross inland energy consumption by 2010. The JRC will support Community policy through:

— integration of renewable energies in energy systems and related socioeconomic studies; development of new testing techniques and proposals for the preparation of norms and standards for photovoltaic and solar thermal systems, the new generation of energy-storage systems, fuel cells and insulating and other energy-efficient materials and devices; study of hydrogen as a fuel with particular regard to safety issues and analysis of techno-economic aspects,

— contribution to the development and harmonisation of testing methods, inspection procedures, norms and standards for materials and components used in high-efficiency power generation systems and high temperature systems. Particular attention will be paid to the enhancement of the safety and operational lifetime and the reduction of emissions,

— research on the interaction between neutrons and materials; provision of neutron reference data for energy production in the framework of international conventions. Related techno-economic studies and high-level training as support to industry, with particular attention to partners in enlargement and pre-accession countries,

— development and validation of new emission control and reduction technologies for land, air and sea transport systems; analysis of data concerning various emission-reduction technologies and creation of a reference laboratory for coordination of round-robin experiments and networks; execution of cost-benefit studies and techno-economical modelling, and development of the technical standards base,

— appropriate studies to assess demand evolution for urban and regional transport systems in support of Community transport policy.

II.5. **Agriculture, rural development and fisheries**

Community policy is to make agriculture more competitive in world markets and to give new priority to sustainable rural development, consumer-friendly products and more environmentally sensitive practices. It should prepare for the enlargement to the East which means a 50 % increase of agricultural land and a doubling of the farm labour force. Fraud control is important because of the size of the budget involved and because of health concerns in the case of agriculture, and because of sustainability concerns in the case of fisheries. JRC will continue to play an active role in supporting policy through:

— prospective techno-economic studies and scenarios to support better understanding of long-term trends of policies related to the food chain and to regional development policies. Emphasis will be on the contribution of science and technology to these central Community policies and will consider the wider political context (e.g. enlargement, Mediterranean policy),

— studies on the evolution of the rural environment; earth observation monitoring of changes in rural and coastal areas (environmental impacts, forest development and management, trends in agriculture and aquaculture, tourism); coastal zone management,

— development and assessment of methods for the surveillance of regulated activities in the fisheries sector,

— development of agro-meteorological models for the prediction of crop yields (particularly with a view to EU enlargement); monitoring of results to ensure consistency with priorities of the common agricultural policy and anti-fraud measures; harmonisation and quality control of work done in Member States on farmers' declarations; reorientation of the agriculture information system towards priority sectors of agricultural activities; development of advanced statistical methods and sampling strategies to control subsidies at the decisive stage of the clearance of accounts,

— design and operation of a database for registering and monitoring livestock movements throughout the Community; technical support for the implementation of a reliable identification and labelling system for the entire Community herd, including overall quality control and electronic systems certification,

— development and production of certified reference materials and development of reference methods for securing the quality of agricultural products (e.g. nutritional components, trace contaminants in raw materials, etc.).

III. UNDERPINNING EUROPEAN COMPETITIVENESS

The primary contributions of the Community towards economic development, growth and the creation of employment are the promotion of industrial competitiveness and an efficient internal market in all products and services. The Community likewise negotiates trading agreements with third countries that ensure fair access to markets for Community products and stimulate economic growth in developing countries. Economic growth is also the objective of structural funding, including programmes such as PHARE and TACIS, that can help prepare less-favoured regions and countries for fuller integration in the internal market and the global economy.

Fair trading depends on internationally agreed standards and the JRC will continue to support the promotion and development of soundly-based European and international norms, standards, codes of practice and reference tools. Support to structural policy will include the transfer of technology developed in the JRC to industry and measures to stimulate the competitiveness on world markets of emerging industries such as the earth observation industry, where the JRC has specific expertise, and the development of a scientific infrastructure in the Mediterranean partnership countries. These efforts will be backed up by more generic studies to determine how technology is transferred from research to industry and how employment is affected by changing patterns of industry.

III.1. **Employment, technology and industrial competitiveness**

The issues related to employment and competitiveness will continue to dominate the political debate in Europe in the years to come. The JRC will support this issue through:

— investigation of the technology, employment and competitiveness interrelationship. Identification of best practices to foster growth and employment. Analysis of the influence of societal trends (age, gender, etc.), structural changes in sectors (industry, services, institutions, etc.) technology changes and Community policies (euro, enlargement and deregulation, etc.) on future competitiveness and employment in Europe,

— analysis of factors limiting the development of less-favoured European regions with a view to eliminating bottlenecks and improving competitiveness and employment; prospective analysis of Community research priorities and role of science and technology for regional development.

III.2. **Normative support to the international trading system**

Industries need predictable and reliable market access conditions before making the considerable investments needed for their penetration. There is also a need for all market operators to refer to well-established, verifiable and internationally accepted measurements, in order to ensure the transparency of market regulations and avoid unfair competition and unnecessary litigation. In pursuance of these objectives, the JRC will undertake:

— the characterisation, production, storage, stability testing and international distribution of Community Bureau of References (CBR) certified reference materials is underpinning many of the activities performed by JRC in support of different policies (environment, consumer protection, health, industrial competitiveness, etc.); production of industrial certified reference materials particularly when urgent intervention is needed or when stocks need to be replaced,

— development and performance of primary isotopic measurements; production of isotopic reference materials and establishment of a virtual institute of primary isotopic measurements with national measurement institutes, for transboundary comparability of chemical measurements, to support accreditation bodies and quality assurance systems and to realise traceability of chemical measurements to common references; support to Member States in building up their own metrology systems,

— development and validation of analytical reference methods for elements and their chemical forms, radionuclides and organic constituents; research on radionuclide metrology for the preparation of primary standards, equipment calibrations and determination of trace elements,

— prenormative research and support to the development of measurement and testing standards for materials in emerging technologies such as nanotechnologies.

III.3. **Innovation and technology transfer**

It is universally acknowledged that innovation drives competitiveness and growth. The JRC will support efforts to understand the processes that control the transfer of knowledge from the research sector to the private sector and take steps to maximise the benefit of its own technology to industry. The work includes:

— studies related to Europe's innovation system aiming at improving the exploitation of Europe's scientific and technological potential. Particular attention will be given to the identification of best methods and practices for the creation, transfer and trading of knowledge, organisation of enterprises, educational and training requirements and the specific needs of SMEs, developing the interface of JRC networks with the enterprise policy's networks,

— support to the development of a competitive and sustainable value-added earth observation industry in Europe by identification of new users, development of new products and services and development of tools support customers of earth observation data, information and services,

— exploitation of JRC results; studies to understand users' needs; selection of innovation and technology transfer projects for JRC-developed technologies; demonstrations to users and potential investors. Priority will be given to collaboration with high-technology SMEs.

III.4. **Enlargement, pre-accession and international cooperation**

The increased technology flows under the globalisation of markets, the current European Union external policy objectives and the need for efficient protection of the financial interest of the EC, call for strengthening dialogue and cooperation on science and technology issues with future partner countries. The JRC will support the enlargement process by sharing its knowledge with scientists from future Member States, hosting their scientists and encouraging them to use its facilities and join its networks. In particular, the JRC:

— will promote the association to international measurements evaluation programmes of relevant organisations in candidate countries to European Union enlargement and in other third countries; extension to industries and research institutions in these countries of the networks for advanced materials and standards,

— will develop the cooperation with southern and eastern Mediterranean partnership countries with a view to exchanging best practices, scientific knowledge and produce techno-economic input to the objectives of the Barcelona process,

— will develop a multidisciplinary database of harmonised and coherent geographical data for an enlarged European Union. The JRC will provide the necessary technical coordination and will foster the development of standards for software and methods aiming at the complete interoperability of geographic information systems.

ANNEX III

SPECIFIC RULES FOR IMPLEMENTING THE PROGRAMME

1. The Commission, after consulting the Board of Governors of the JRC, shall implement the direct actions on the basis of the scientific objectives and contents described in Annex II. The activities relating to this action shall be performed in the relevant institutes of the Joint Research Centre (JRC).

2. In the implementation of its activities, the JRC will, whenever appropriate and feasible, participate in or organise networks of public and private laboratories in the Member States or European research consortia. Particular attention shall be paid to cooperation with industry, especially with small and medium-sized enterprises. Research bodies established in third countries may also cooperate on projects of scientific and technological cooperation between the Community and the third countries concerned. Particular attention will be paid to cooperation with research laboratories and institutes in the countries of central and eastern Europe and the former Soviet Union.

   The knowledge gained through implementation of the projects will be disseminated by the JRC itself (taking into account possible limitations due to confidentiality issues).

3. The accompanying measures shall include:

   — the organisation of visits to JRC institutes of grant-holders, visiting scientists and seconded experts,

   — organisation of the secondment of JRC staff to national laboratories, industrial laboratories and universities,

   — specialised training in support of the elaboration or implementation of European policies and specialised training with emphasis on multidisciplinarity,

   — systematic exchange of information, through, *inter alia*, the organisation of scientific seminars, workshops and colloquiums and scientific publications,

   — the independent scientific and strategic evaluation of the performance of the projects and programmes.