

Thematic evaluation of the Sustainable  
Management of Natural Resources activities  
of the JRC in the EC FP7 Programme

Final Report September 2010

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## **The Evaluation Panel**

Professor Peringe Grennfelt (chairman), Swedish Environmental Research Institute, Sweden

Director General, Professor Lea Kauppi, Finnish Environment Institute, Finland

Professor Victor Jetten, University of Twente, The Netherlands

Dr Stella Canna Michaelidou, Former Act Permanent Secretary Ministry of Health and

Director of the State General Laboratory, Cyprus

Professor Bedrich Moldan, Czech Republic, Charles University,

Scientific Director, Dr Jean-François Soussana, INRA, France

Dr. Ingvar Thorn (rapporteur), Sweden

Dr Steven Eisenreich, (observer) JRC, Belgium

## **Preface by the Chairman**

This report is the Midterm Review of the thematic area Sustainable Management of Natural Resources of the Joint Research Centre (JRC). The report covers the first half of the 7th Framework Programme. The evaluation was carried out between June and September 2010 by a panel of six European experts representing different disciplines.

The background of the evaluation is presented in chapter 1, and in chapter 2 there is a discussion of the role of JRC in the European science-policy landscape. The panel found it particularly important to highlight this issue since the increasing policy role raises both unique opportunities and high expectations on the Thematic Area. In chapter 3 we present general observations and recommendations from our evaluation and finally in chapter 4, we have collected specific comments in relation to the areas evaluated.

It was an honour to chair the panel and a privilege to work with such distinguished and committed colleagues. Their objective and perceptive judgements form the basis of this report. It was also satisfying to see that we all agreed on the conclusions and recommendations. We all had great help from our rapporteur Dr. Ingvar Thorn, who assisted us in organising the outcome of our work and also made important contributions to the report. We are also grateful to Dr Steven Eisenreich, who served as an observer and supported our work with important comments on the role of JRC.

The panel appreciates the achievements of JRC in realising its mission, and acknowledge its place as a service within the Commission. The panel found that JRC is continuing its work on consolidating its position as an independent source of knowledge and expertise in support of the Commission and the EU policy agenda in general.

The evaluation was made at a time of change in research directions and organisation of the JRC. The JRC strategy and vision for 2020 was published immediately before the evaluation and the panel was informed about substantial organisational changes by 2011. The panel appreciates the work with the strategy and vision and the organisational changes and would like to give its strong support. However, some of our comments may be invalid or of less value in the perspective of the new organisation.

On behalf of the panel I wish to express our gratitude to the staff of the JRC and particularly to Dr Pamela Kennedy and Ms Hilde de Bondt for their support and assistance throughout our work.

Gothenburg 10 September

Peringe Grennfelt

## **Executive summary**

This report presents the Mid-term Evaluation of the 7th Framework Programme (FP7) of the thematic area Sustainable management of natural resources at the Joint Research Centre (JRC). The evaluation covers the period 2007 up to spring 2010. It was undertaken by a panel of six international experts. The panel was primarily looking at the institute's ability to deliver both appropriate services to the Commission and scientific research of high quality. The panel also considered the change in orientation of the institute towards issues of more direct need for the EU policies as well as towards a stronger integration of the institute's research and other activities around the policy issues.

The thematic area was evaluated between June and September 2010 and included a site visit to Ispra, Italy on 7-9 July.

This executive summary is focused around a set of key observations, conclusions and recommendations. In the main report the issues are further discussed along the following headlines; Policy relevance, Scientific achievements, Performance, Value to users, Organization and Forward looking. Even if the text often refers to JRC, the views and recommendations are only applicable to the areas evaluated.

## **Observations**

### **General and policy relevance**

The panel strongly supports the JRC mission, as expressed in the new JRC Strategy 2020 (The JRC Strategy 2010-2020), to provide customer-driven scientific and technical support for the conception, development, implementation and monitoring of EU policies. The JRC also functions as a reference centre of science and technology for the Union. Close to the policy making process, it serves the common interest of the Member States, while being independent from special interests, whether private or national.

The panel welcomes the stronger policy support direction of JRC and its role as an adviser to the Commission, which makes science more visible in the work within the policy-directed Directorates General. With this new strategy, the institute is in a unique position for the development of European policies. However, complementary research, often of the same magnitude or larger, is conducted in many Member States. This research is as important for the overall policy development and all together the research forms the building blocks on which a sound and trustworthy European policy can be built. JRC has a particular role in making sure that the advice given to the Commission is based on a wider knowledge than that produced within the organization itself.

The scientific research within the thematic area is in general of high policy relevance. Actions are in most cases focusing on relevant issues for long and short term EU policies. They are also focusing on issues, where scientific research is of particular importance and can make a difference. The research covers issues from underpinning long-term policy development, e.g. with respect to climate change and future agriculture policies, to the implementation of policies, e.g. the Water Framework Directive and air pollution directives.

With the new overarching objective of JRC to provide science-based policy options there is a need to further develop the ability to cover the whole policy cycle in a more holistic approach and to include a wider set of stakeholders than presently addressed.

The panel found that most Actions aim at translating science into policy-relevant products and usually succeed well in that. However the focus on Actions seems sometimes to have led to an ad-hoc organization of Actions defined by the organizational structure. An internal discussion on sustainability aspect of the thematic area, may lead to more policy-relevant approaches.

The panel noticed with satisfaction the increased global focus in the research and pointed to the importance for JRC to further assess global aspects within areas of strategic interest for the Union. Such areas include climate change, natural resources, agriculture and desertification.

The panel noticed with some concern the decision to decrease funding of human health research and pointed to the importance of including human health aspects in the further development of policies.

### **Scientific originality and achievements**

In general, the reviewed scientific research is of very high quality. The panel saw some examples of excellent and original research, being in the forefront of the scientific development. The panel was particularly impressed by the research on atmospheric processes in relation to climate change and air pollution.

In addition to its own research, the JRC has an important role in assessing and translating science to the European scale.

Issues related to natural resources and the environment are becoming increasingly complex and scientific research on these issues needs to be integrated even further in the future. JRC is in a good position and can develop more holistic approaches to address different interactions of issues such as sustainability and climate change scenarios. The panel saw in particular the need for a further integration between Actions related to Common Agricultural Policy (CAP) and Actions related to the impact of agriculture on the environment.

At present most scientific research and derived products focus on describing the state of the natural resources and environmental processes. The sustainability aspect is not always visible. Focusing more on assessing consequences of policy measures from a sustainability point of view, is a logical next step if JRC wishes to play a stronger role in policy support.

### **Performance**

JRC has responded very well to the objectives expressed in FP7. This means *i.e.* that the organization has further prioritized research towards policy relevant areas, without undermining its scientific excellence and production.

JRC, with its particular role as a pan-European scientific organization, is very good in bringing together institutes from Member States, assisting and facilitating solutions through networking. It is playing a key role in the development and implementation of many policy initiatives (e.g. INSPIRE, Water Framework Directive, the directive on air quality). The networks have various tasks; scientific research, harmonization of measurements, intercomparison of models etc.

In the background material, as well as in the discussions during the evaluation, the panel sometimes missed sufficient awareness of JRC's own qualifications and performance in relation to other research institutes and groups in Europe. With the central role of JRC in policy development, it is important that the organization takes into account the outcome of the parallel research going on in the Member States or elsewhere. While JRC maintains a good European overview, research institutes in Member States may well be in a better position to understand particular regional circumstances.

The panel found several examples of JRC's contribution to the European Research Area (ERA), in particular through coordinating research activities in a pan-European perspective and promoting exchange of scientists. The panel, however, also identified some lack of awareness and strategy on what ERA is meant in general and how the organization actively can contribute to its development in particular.

### **Value for customers and stakeholders**

There is no doubt that the research within the thematic area is of great importance for the policy development and implementation within the European Union. There are several examples on how JRC directly has contributed with scientific material to political decisions; the 2020 strategy on Energy and Climate, the Water Framework Directive and the Common Agricultural Policy. The organization's increasing strength in socio-economic and cost-benefit analyses is important for this development.

The numerous tools and software products developed at JRC are important for science and policy development and also for assessing performance of scientific models. Some of the products are of very high quality and suitable for common use on a European level. Others are more directed towards general assessments and not applicable at scales of interest for Member States. In addition, the many tools, products and web services could be better organized and integrated in a context or framework of sustainable resource management, which would enhance their value to the stakeholders and public.

Of particular importance for European policy is the scientific and technical development in support of the INSPIRE Directive. This work is highly relevant both for the Commission and for the Member States. Once implemented, the system will form a basis for integration of spatial data from a variety of disciplines for many purposes both within Member States and aggregated regionally up to a pan-European level.

JRC has also provided support for harmonization and standardization including certified reference materials as well as guidance books like the one on LCA. These tools contribute to harmonized procedures in the EU and even worldwide.

### **Human resources**

JRC has been able to recruit highly competent staff for most Actions. The panel noticed, however, with some concern that the Commission's recruitment rules are causing a problem for the organization. The high proportion of temporary staff in some Units may also be of concern, given the substantial manpower required for recruiting and training. The total number of administrative staff – including central services and staff within institutes - appears to be unusually high at JRC.

### ***Recommendations***

Based on our observations and discussions during the site visit the panel would like to put forward the following main recommendations:

- JRC should further develop its role as key policy adviser to the Commission by making use of the large amount of research that is conducted within Europe as a whole.
- JRC should reconsider its decision to decrease its research on human health aspects in particular those related to sustainable management of natural resources and at least maintain its competence in order to follow and network with the ongoing intense scientific research on health impacts.
- JRC should continue and further develop its work on assessing global aspects within areas of strategic importance for the European Union.
- The organization should further develop its role in integration, coordination and facilitation of networks. In addition to already ongoing activities the panel sees other areas, where this infrastructure role can be of particular importance.

- JRC should develop a strategy and communicate its role within the European Research Area. In this development JRC should put particular emphasis on developing and maintaining European infrastructures and tools suitable for assessing different policy options, scenarios and scientific models.
- JRC should develop a strategy for capacity building, maintenance and hosting of successful products/services to wider groups of customers, stakeholders and even consumers.
- The recruitment policies need to be improved. The Commission rules for permanent staff recruitment, which JRC has to follow, may severely affect the ability of the institute to maintain and develop its high scientific standard. The rules may also lead to lack of leadership in crucial areas due to the unacceptable long recruitment process.



# 1. Introduction

## ***Background***

The ex-post FP6 evaluation strongly suggested that the JRC should make “smaller, competence or sector-oriented external evaluations”. The JRC decided to follow this recommendation and introduced the term “thematic evaluations” for these smaller evaluations, to indicate a distinction from “programme evaluation”. Sustainable Management of Natural Resources was selected as one of the Thematic Areas.

The JRC is currently developing a corporate strategy around a number of core themes (Thematic Areas) as recommended in the ex-post FP6 evaluation; and the organization is gradually converging towards a new programme structure.

## ***Terms of reference***

The terms of reference for the panel of experts set up by the JRC was given the task to carry out a thematic evaluation of the organization’s activities in the field of Sustainable Management of Natural Resources in the context of an overall EC FP7 interim evaluation of the JRC’s direct actions.

The overall objective of the panel was to evaluate of the quality of the research activities, the programme’s implementation and management, and the progress towards the relevant objectives set in the FP7 Council Decisions concerning activities of the JRC in the field of ‘Sustainable Management of Natural Resources’. Where possible, and as a kind of benchmark, the panel was asked to give an expert view on the performance level of the relevant activities as they are carried out in the JRC.

In the context of the general quality approach of the JRC, this evaluation should also help the organisation with the continuous improvement of its science-based policy support and assist the JRC senior management with detailed orientations for the remaining part of FP7.

## ***Methods***

The terms of reference, as provided by JRC, contain several key questions, which the panel has aggregated to six evaluation criteria according to the table below.

JRC Actions in this Thematic Area were presented for the panel by JRC staff during the site visit (7-9 July), together with comprehensive documentation for all Actions, divided into three sub-groups plus a summary of highlights selected from the Actions allocated to each group.

The three groups were:

- Natural resources, Environmental Monitoring and Information Systems
- Climate Change and Air Quality
- Sustainable Agriculture and Rural Development

When referring to JRC in the following text, the views and recommendations refer to the JRC overarching evaluation theme of “Sustainable management of natural resources”.

<b>Criteria</b>	<b>JRC evaluation questions according to Terms of Reference</b>
Policy relevance	<p>Rationale/Relevance</p> <p>To what extent are the objectives and the approach of the activities in this thematic area pertinent to the needs and problems European of policy makers?</p> <p>To what extent is the policy support work based on relevant, sound and innovative science results?</p> <p>To what extent do the JRC activities in this area provide (Community) added value</p> <p>How does this added value compare to the baseline options (i.e. no EU-policy/no change from FP6 to FP7)?</p>
Scientific originality and achievements	<p>To what degree do the JRC activities in this thematic area support the creation of the European Research Area, e.g. through provision of access to JRC's facilities and contribution to the mobility and training of (young) researchers?</p> <p>To what degree did the JRC participate in networking activities under the indirect actions of FP7 and what is the level of the network partners?</p> <p>From an expert point of view, how does the work in this thematic area compare to similar work done at top organisations in the relevant fields?</p>
Performance	<p>Implementation</p> <p>To what extent does the JRC has the competences required for achieving its objectives in this thematic area set in the context of the EC FP7?</p> <p>Is the balance between the different activities in this area appropriate and is the level of funding adequate to achieve the objective set in the context of the EC FP7?</p> <p>Are the facilities of the JRC appropriate for achieving its objectives in this thematic area set in the context of the EC FP7?</p> <p>To what extent does the JRC run its activities in this thematic area in a cost-effective manner?</p> <p>Are the arrangements for planning, monitoring, reporting and evaluation appropriate and effective? Are they transparent?</p> <p>To what extent does the JRC give a follow-up to the recommendations of the JRC FP6 Ex-post evaluation ("King-report")?</p>
Value for customers and stakeholders	<p>Achievements and performance level</p> <p>What are the indications in the early outcomes of the activities that the overall and specific objectives of the EC FP7 can be met?</p> <p>Referring to the consideration of the Council Decisions ("whereas" clauses) to what extent do the JRC's FP7 direct actions in this area:</p> <p>a) Provide customer driven support to European policy makers?</p> <p>b) Engage in international cooperation activities for the purpose of implementing the JRC programme?</p> <p>c) Promote the integration of New Member States' /Candidate Countries' organisations and researchers in its activities in particular on the implementation of the S&amp;T components of the <i>acquis communautaire</i>?</p>
Forward looking	<p>What options should be explored for the future orientation of the thematic areas and the overall non-nuclear activities of the JRC in view of the EU 2020 strategy?</p>
Organisation	No JRC questions

## 2. JRC as part of the European Research Area and Framework Programme 7

In June 2010, just before the evaluation, JRC adopted a new strategy for the period up to 2020 (The JRC Strategy 2010-2020). Inherent to this strategy, the JRC's vision encapsulates its ambition to focus increasingly on the assessment of science-based policy options, to enable the EU policy makers to make well informed choices which take into account state of the art knowledge in science and technology:

*"The JRC's vision is to be a trusted provider of science-based policy options to EU policy makers to address key challenges facing our society, underpinned by internationally-recognised research."*

The JRC sits in a central position in Europe and its institutions with respect to providing scientific and technical support to policy making. The European Commission works in the policy cycle with both the EU institutions (EC/EP) and the EU Member States. With the JRC firmly embedded in the Commission, it forms collaborative and customer-client relationships with the key policy DGs.

The policy development within the European Union is increasingly dependent on support from science. This has been obvious for environmental issues but is becoming more and more important for the management of natural resources in general. With the new strategy of JRC, the institution occupies a unique position for the policy development in Europe. The panel welcomes the stronger policy support direction of JRC and its role as a strong policy adviser to the Commission, which makes science more visible in the work within the policy-directed Directorates.

However, policy-directed science of importance for Europe does not occur only within JRC. Similar research, often of the same magnitude or larger, is done within many Member States. This research is as important for the overall policy development and all together the research forms the building blocks on which a sound and trustworthy European policy can be built. In addition, Member States form their policies, mostly based on the national research and therefore a close scientific collaboration between Member States and JRC is important for a common European policy basis. JRC has a particular role as a builder of networks and also in making sure that the advice given to the Commission is based on a wider knowledge than that produced within the institute itself.

The research organisations in the Member States and the research institutions supported by the EC constitute the European Research Area (ERA). The ERA, developed as a central element under the Lisbon strategy, is composed of all research and development activities, programmes and policies in Europe, which involve a transnational perspective. Together, ERA components enable researchers, research institutions and businesses to increasingly circulate, compete and co-operate across borders. The aim is to give all European research organizations access to a Europe-wide open space for knowledge and technologies in which transnational synergies and complementarities are fully exploited. JRC, as a research institution without national interests, has a central role in promoting and realizing the overall objective of the ERA.

The panel strongly supports the JRC mission to provide customer-driven scientific and technical support for the conception, development, implementation and monitoring of EU policies, also for the theme Sustainable use of natural resources. As a service of the European Commission, the JRC functions as a reference centre of science and technology for the union. Close to the policy making process, it serves the common interest of the Member States, while being independent of special interests, whether private or national.

### **3. Analysis of findings**

The panel has summarised its findings in the following general opinions and recommendations aggregated in the evaluation criteria: policy relevance, scientific originality and achievements, performance, value for customers and stakeholders, forward looking; and organisational issues.

#### ***Policy relevance***

##### **General**

The scientific research within the thematic area is in general of high policy relevance. The activities are in most cases focusing on issues, where scientific research is of particular importance and can make a difference. The research covers issues from underpinning long term policy development, e.g. with respect to climate change and future agriculture policies, to the implementation of policies, e.g. support to the implementation of Water Framework Directive and the Marine Strategy Framework Directive, and how to monitor air pollution in relation to the air quality directive. Some of the research has led to early warning systems that are directly useful to Member States, such as flood risk and forest fires.

##### **Globalization**

Several Actions take a global perspective providing science and spatial information on continental and global scales. These Actions are of importance both for continental and global problems but also related to developing countries. The Actions directly contribute to the increasing role Europe aims to play “as a partner in the world”, by strengthening the capacity of the EU in development policy. Major contributions are made to deforestation related policies (REDD) at a global level (UNFCCC), with estimates of past and present forest cover using advanced remote sensing techniques. The newly started desertification work has had a good impact at UNCCD level.

The panel was very pleased to see this development and recommends that JRC continues its work on assessing global aspects within areas of strategic importance for the European Union. These areas may include the impact of EU policies on the rest of the World and vice versa, the socio-economic and ecosystem changes outside Europe, which may influence the European Union. Areas, which the panel believes could be of particular importance, are related to energy, minerals, agriculture, climate change, deforestation and desertification.

##### **Human health**

The panel is aware that “Environment and Health” is part of another Thematic Area “Safety of Food and Consumer Products”. However, human health and wellbeing have a broader framing and are important drivers for European policies on sustainable management of natural resources. It is of particular interest for air pollution but also of significant importance for climate policies (adaptation) and for policies related to water and agriculture. The importance of the link between human health/wellbeing and ecosystem services/biodiversity has recently received increased attention globally.

The panel has been informed that the research on Environment and Health will have reduced funding from JRC in the future. Whilst the panel does understand that this is a strategic decision to be taken by JRC, the panel would like to express its concerns. Prevention policies are strategic for improving health in Europe and require sound scientific assessment of the state of environment and of natural resources. Whilst health care falls under the competence of Member States, the impacts of policies on health and the related prevention policies have to be dealt at EU level. Examples such as the impact of indoor air and atmospheric air pollution on health, which is indirectly addressed by EMEP, and the role of heavy metals and organic micropollutants, which are studied by ATEAM, are clear examples of links that could be further assessed in this area.

The panel recommends JRC to maintain and develop its competence in the human health area and network with the intense scientific research on health impacts, thus being able to take human health effects into account in sustainability assessments.

### **Policy relevance in relation to the JRC vision**

The new vision for JRC states that it should provide science-based policy options. The realization of the vision implies the widening of scope of research from assessing the state of the natural environment and the identification of environmental impacts to the whole policy cycle, either by reallocation of the organization's own resources more to socio-economics or establishing strong networks with other relevant research institutions.

“Policy options” may also mean a different and wider set of stakeholders than addressed now (policy makers) namely the target groups, such as farmers, which in turn suggests building a stronger expertise in communication. Furthermore it may mean a change in scale from pan-European to regional (such as river basins and urban areas) and local level.

The Actions provide a wealth of accessible, spatial information on natural resources and their temporal changes. However, the sustainability aspect is often only implicit and not explicitly addressed. Also changes in the “state” of natural resources are shown as a result of climate/climate change as the only “driver or pressure”, while EU policies are seen mainly as a response. In reality, it may well be that EU policies have a far larger and more immediate influence on the state of the environment than climate change. JRC has the information needed to be much more pro-active in assessing consequences of policies, rather than policies as a reaction to other pressures. This would also upgrade many information systems from providing “interesting background information” to a system showing consequences of EU actions.

## ***Scientific originality and achievements***

### **General**

In general, the reviewed scientific research is of very high quality. The panel saw also some examples of excellent and original research, being in the forefront of the scientific development. Especially, the research on atmospheric processes in relation to climate change and air pollution is impressive. Within this area JRC has established an important niche of high scientific relevance.

In exploratory research, the added value of JRC should be carefully evaluated case-by-case keeping in mind the competence of existing top research institutions in Europe. The real strength of JRC in developing the European Research Area is in integration, coordination and facilitation of networks as well as the close links to policy making. The exploratory research initiatives should be evaluated in the relevant, realistic policy framework: where and how is the initiative assumed to contribute to the development of policies.

The panel has not made a bibliographic analysis of scientific production, but our general impression is that the scientific output within the Thematic Area is comparable with similar research organizations in Europe.

### **Scientific independence**

While JRC is part of the European Commission and develops policy relevant and science based expertise, there should be clear recognition of its scientific independence from its customers. Indeed, with sensitive areas like biofuels, recent examples show that scientific independence has been achieved in this Thematic Area. Internal and external reviews of Actions, quality assurance and control, full traceability to peer-reviewed literature are procedures, which need to be strictly set in order to minimize risks of mistakes in reports produced by JRC, especially in some sensitive issues (GMOs, climate change, biofuels etc...). In this respect, more efforts need to be placed on estimating uncertainties taking into

account: i) epistemic uncertainties (from imperfect scientific knowledge), ii) data uncertainties and iii) the stochastic nature of key processes (e.g. climate, price volatility) involved in the sustainable management of natural resources.

### **Integration across themes**

Issues related to natural resources and the environment are becoming increasingly complex and also scientific research on these issues needs to be integrated even further in the future. JRC is in a good position to consider the various aspects of an issue, especially in relation to sustainability and climate change. The panel saw in particular the need for a further integration between actions related to Common Agricultural Policy (CAP) and Actions related to the impact of agriculture on the environment. CAP related Actions are not explicitly dealing with impacts on soils, water and air quality, on biodiversity etc. Conversely, Actions focused on natural resources and environmental impacts such as ATEAM and the study e.g. on the fate of pesticides in the environment, do not explicitly refer to CAP policy tools. The increased priority on sustainability assessments means a necessary further development of JRC's competence, together with networking with scientific institutes engaged in dynamic scientific areas, such as environmental economics and ecosystem services.

### **Balancing high quality science and policy relevance**

Being an applied research organization, working close to policy development, it is a challenge to keep the scientific level at the forefront in terms of originality and exploration of new areas. In general JRC has been able to balance scientific quality and policy relevance quite well.

## ***Performance***

### **General**

The area Sustainable management of natural resources is developing well in relation to the objective of the 7th Framework Programme. Specific comments on the performance with respect to thematic areas and Actions are given in chapter 4.

### **JRC as a focal point for scientific networks**

JRC has been successful in bringing together organizations from Member States, and in several cases played a key role in assisting and facilitating solutions through networking (e.g. INSPIRE and Water Framework Directive). The European perspective allows JRC to take this viewpoint, which for another institute at European level may be difficult (even if that institute might be scientifically better qualified). Within this context, JRC in some cases is the best qualified organization and in others is the best placed because of its mandate.

### **Relation to research outside JRC**

In the discussions as well as in some of the background material, the panel sometimes observed a lack of awareness of JRC's own performance in relation to the performance of other research institutes and groups. With the central role of JRC with respect to policy development, it is important that the organization, when using its results for policy advice, takes into account the outcome of the parallel research going on in the Member States or elsewhere. During our discussions the panel found a couple of examples of this lack of awareness and self-criticism that is so essential for science.

### **Contribution to the European Research Area**

Since one of the evaluation questions was directed towards JRC's contribution to the European Research Area (ERA), the panel spent some time on assessing this question. The panel found several examples on the realization of the ideas of ERA, e.g. through coordinating research activities in a (pan)-European perspective and supporting exchange of scientists. At the same time the panel realized that there is a lack of strategy and awareness within JRC on what ERA means in general and how the organization actively can contribute to its development in particular. The central role of JRC in the European research landscape, gives the organization excellent opportunities for an active contribution on a European level.

In particular the panel would like to see JRC further developing its role in integration, coordination and facilitating of scientific networks and also keeping the link to policymaking. This may include already ongoing activities but there are also other areas, where the infrastructure role can be of particular importance.

The panel saw several examples on how JRC is taking a pan-European perspective in its research fulfilling both the intention of the ERA and European policy needs within a large variety of areas.

The panel recommends the JRC to develop a strategy on its role within the European Research Area and in this development put particular emphasis on developing and maintaining European infrastructures and tools suitable for sustainability assessments.

## ***Value for customers and stakeholders***

### **General**

There is no doubt that the research at JRC is of large and sometimes crucial importance for the policy development and implementation within the European Union. There are several examples on how JRC directly has contributed with scientific material to political decisions; the 2020 strategy on Energy and Climate, the Water Framework Directive and the Common Agricultural Policy to mention a few. The institute's increasing strength in socio-economic and cost-benefit analyses is important for this development.

### **Harmonization of methodologies**

JRC is good in benchmarking and producing key documents that provide a basis for harmonization and standardization (life cycle work, reference materials work, new MAPLE action). These tools contribute to the harmonization of procedures in the EU and even worldwide.

Of particular importance for European policy is the scientific and technical development in support of the INSPIRE Directive. This work is highly relevant both for the Commission and for Member States. Once implemented, the system will form a basis for integration of spatial data from a variety of disciplines for a variety of purposes both within Member States and aggregated regionally up to a pan-European level.

### **Tools and software products**

One of the main directions of the research and development at JRC is the development of tools and software products, both for supporting science and policy but also for assessing performance of scientific models. Some of the products are of very high quality and suitable for common use on a European level. Others are directed more towards general assessments and are not applicable at scales of interest for Member States.

Almost every Action results in a GIS and WEB based tool with the purpose to assess some natural resource at European or even global scale. The IES website provides access to 26 (!) tools and portals, each of which lead to further web services, links and information. Attention should be paid to the dissemination and utilization of different tools and services. A discussion at unit or even at institute level and comparison of capacity and knowledge, would lead to a clearer outreach and guidelines as to which tool can be used for which policy. The involvement of communication experts and expected customers already early in the R&D process would facilitate the efficient dissemination and also allow scientists to concentrate in their field of expertise.

Another challenge regarding the development of tools and software is the maintenance of a successful product. Often customers - DGs and Member States - want JRC to continue supporting and running the tool.

Also, the panel recommends JRC to develop a strategy for capacity building, maintenance and outsourcing, at the right time, of successful products/services to wider groups of customers, stakeholders and even consumers.

### ***Forward looking***

Bearing in mind the importance of time perspective in judgment of policy support or policy relevance, the thematic research must be supplemented with anticipatory and exploratory research based on systematic horizon scanning.

It is also necessary for JRC to develop and network to scenario work on sustainability, including Member State projects, in order to strengthen the policy support role by demonstrating the consequences of policy changes and providing different policy options.

There is a wealth of information available to policy makers on natural resources, including changes in natural resources over time. An important added value could be realized by creating a few example cases on how to integrate the sustainable management of natural resources to sector policies, e.g. linking spatial patterns of CAP regulations to river sediment loadings, or drought information.

Such case studies could also make the notion of sustainability much more explicit. While the various Actions provide important information about the state of natural resources based on good science, the sustainability aspect is not shown explicitly. Scenarios and “what if” questions may quantify the effect of future decisions on sustainability of the environment etc. Coupling of socio-economics and biophysical modelling could also strengthen the role of policies on natural resources and biodiversity in Europe and globally. The concept of ecosystem services, very much linked to the broader sustainability notion, could also develop the connections between biodiversity and human health.

### ***Organizational issues***

#### **Human resources**

The staff is highly motivated and committed to its work. The scientific competence is high and a wide range of skills is developed.

The core competence is mainly in the permanent staff, which should be maintained at an appropriate level, while enhancing mobility across units and across actions. A high proportion of temporary staff may be of concern, given the substantial investment required for recruiting and training temporary staff.

JRC may also play a more important role for higher education in Europe by increasing links with universities. Through training a higher number of PhD students, JRC will both contribute to the European Research Area and facilitate dissemination of JRC research in Member States.

The total number of administrative staff – including central services and staff within institutes - appears to be comparatively high. It was unclear to the panel if this was due to high administrative burden from the Commission or due to the complex organization. JRC should consider possibilities in streamlining the administration, rather than the research activities. For instance, some decision-making procedures appear as too complex and could be simplified.

The recruitment policies need to be improved. The panel was concerned by the fact that JRC has to follow the ordinary Commission rules for permanent staff recruitment. This procedure may severely reduce the ability of the institute to keep and develop its high scientific standard but also result in a lack of leadership in crucial areas due to the unacceptable long recruitment process.



**Cross-institute collaborations**

The research on sustainable management of natural resources is mainly divided between IES at Ispra and IPTS at Seville. For several areas, there is a need for close collaboration and interaction between the two institutes. The distance needs not to be a problem, but it requires some attention. This is in particular the case when research related to natural science should be integrated with socio-economic aspects and used for scenario analyses. It is therefore important to have a mutual understanding of the research at collaborating institutes to take the full advantage of the collective competence of JRC. This issue is of course of high relevance for cross-theme issues, in particular energy, where there is a strong need for a close collaboration.

## 4. Evaluation of subgroups

### ***Natural Resources, Environmental Monitoring and Information Systems***

16 Actions were included in this sub-theme:

- Env RM, Environmental Reference Materials
- IMES, Isotopic Measurements for Environmental Support
- COSIN-JRC, Community Spatial Information Network
- INSPIRE, Infrastructure for Spatial Information in Europe
- ATEAM, Aquatic and Terrestrial Ecosystems Assessment and Monitoring
- EEWAI, European Ecological Water Quality and Inter-calibration
- FOREST, Forest Data and Information Systems
- SOIL, Soil Data and Information Systems
- ENSURE, Env. Assessment of European Waste and the Sustainable Use of Resources
- DESERT, Desertification, land degradation and draught
- PROCAS, Protection and Conservation of European Seas
- MONDE, Monitoring Natural Resources for Development Co-operation
- FOODSEC, Food Security Assessment
- TREES 3, Global Forest Resource Monitoring
- CID, Community Image Data Portal
- FLOODS, Floods - prediction, mitigation, impact assessment

#### **Policy relevance**

Much of the work undertaken is directly supporting the development and implementation of EU legislation, particularly the Water Framework Directive and the Marine Strategy Framework Directive, while other activities aim at improving the knowledge base of policy making by developing assessment methodologies and tools.

EU legislation in the field of the environment is developing rapidly. The uniform implementation and monitoring of different directives require the harmonization of methodologies and practices. Several Actions support the establishment and improvement of a quality infrastructure in Europe, with particular focus on environmental measurements. Ultimately, this will result in more reliable data being available to environmental agencies and decision makers throughout the EU. The strong and direct link between research, testing and standardisation will also improve European competitiveness. The focus of these Actions in the period 2007- March 2010 was on water, particulate matter suspended in air (see section Climate Change and Air Quality later in this chapter), and biofuels. A specific task has been to develop isotopic methods for source apportionment of environmental pollution and for food authentication purposes.

The provision of certified materials and the development of new methodologies for the better and unified implementation of EU legislation are of high relevance to the Commission, as well as to the Member States. Traditionally the methods and procedures used in the Member States have been variable. For the new Member States the value of this work is particularly high, because their old standards were quite different from western European ones.

Several Actions are responsible for, or contribute to, the scientific and technical co-ordination of and support for the INSPIRE Directive. This work is highly relevant to DG Environment as well as other DG's and Member States since a harmonized infrastructure for spatial information allows information to be integrated from a variety of disciplines for a variety of uses. This in turn is urgently needed when implementing expanding Community legislation on the environment and sustainable management on natural resources. Member States have

to provide data within the scope of INSPIRE using the same definitions and a common exchange format. This facilitates pan-European and cross-border aggregation and analysis, application development (e.g. information systems, reporting systems, forecasting models) as well as data access. JRC has also significantly contributed to the international development of geoinformatics (GEO/GEOSS, GMES).

At a global and European level a major effort has been made in the development of early warning systems, notably on food security (MARS), flood risk assessment (LISFLOOD and spin-offs) and forest fires (EFFIS). These products are successful, based on sound science and actively used by relevant institutes at Member States. These beneficiaries are aware of the strengths and weaknesses of these systems and know how to use them well. The LISFLOOD methodology clearly has spin-offs in water balance related natural resource assessments (such as drought and land degradation). The drought forecasting is clearly still under development and it is less clear which end-users it is targeted to. Furthermore, much needed European databases and portals are set up for soils (European Soil Portal, European Soil Map Server and ESDAC) and forests (EFDAC), which are of direct use to e.g. the Soil Thematic Strategy.

JRC Actions focused on biodiversity in Africa are one of the many efforts on that continent. Although the 'African' efforts include well-known organisations, African countries themselves have set up organisations to guard natural resources (such as the Nile Basin Initiative, African Conservation Foundation etc.). JRC might consider strengthening the ties with these organizations.

### **Scientific originality and achievements**

The Actions in this group are partly based on original science, and partly on well-developed and tested scientific knowledge. In this sense 'scientific originality' is not always a good criterion for good science! New tools and analytical methods have been developed, but the most valuable scientific achievements are probably based on new ways of combining existing data at a European scale. The innovative part lies in the construction of a policy relevant system on a European scale and overcoming scientific scale related obstacles. The IES scientists have built up very good experience in using advanced image classification and pattern recognition techniques and occasionally developed innovative algorithms such as the work in global tropical forest cover assessment. IES is at the forefront of this kind of work.

One way of dealing with large-scale natural resource analysis and natural hazards is using indicator systems, proxies that are indicative of a problem. However, it is not always clear why new sets need to be developed or combined in this thematic area, as there have been many efforts in this respect.

Relatively many publications are based on local case studies mainly from northern Italy. Both marine and aquatic sciences as well as biodiversity research are very well developed in Europe and worldwide. Therefore the JRC could rather explore if more added value could be found via networking with the best groups at universities or national research institutes and facilitating the combination of knowledge in novel ways. They might sometimes be better positioned to do the work. The work undertaken to support the implementation of WFD already provides good examples of this.

The question about the scientific originality is somewhat misleading in case of Actions, which develop and maintain key GIS infrastructures for the whole EU (and the JRC). Their main role is not to produce scientific publications, but to ensure the high quality and interoperability of these infrastructures. JRC reached a significant milestone, when the INSPIRE Committee in 2009 approved the Implementing Rules for "Interoperability of spatial data sets and services" and the Amendments of the "Network Service Regulation for download and transformation".

## **Performance**

Overall, the scientific performance of the actions is good. The scientific competence is high and a wide range of skills and knowledge is developed and maintained. Results of actions are being integrated which provides a lot of added value and streamlining.

The scientific output is good both in high ranking scientific journals as in other scientific literature although not always equally distributed over the Actions. With regard to European policy support, variation in performance is observed. Some groups have performed very well, whilst in some cases the added value of JRC less obvious.

In several areas, JRC has very skilfully coordinated and facilitated the process of networking and collaboration with the Member States and relevant European organizations.

Also actions working on harmonization have been productive in their field. Eleven new reference materials have been produced between 2007 and 2010 covering different matrices, from water to air particulate matter and other materials relevant to environmental monitoring. This thematic area has also actively expanded its reference material activities into new areas, e.g. biofuels.

## **Value for customers**

In general, the Actions with clearly defined customers have provided valuable products and in case of more indirect support to policies by improving the knowledge base.

Through harmonization the measurements performed throughout the European Union and worldwide are becoming comparable. Environmental agencies in the Member States obtain reliable monitoring data and are able to compare data delivered by different laboratories and from different Member States without re-measuring. Reliable data allow environmental agencies to take the correct decisions based on this data, avoiding potentially expensive measures based on wrong data.

There is a growing need for data on natural resources and the environment at European and national level which puts a heavy burden on Member States. The realization of INSPIRE will significantly reduce unnecessary duplication of data collection and promote their harmonization, dissemination and use. JRC's role as the overall technical coordinator of INSPIRE has been and continues to be crucial for the customers.

The various web-based information systems and portals provide good baseline data and spatial overviews for different policies. The institute has also the capacity to organize and maintain international networks and contribute substantially in the international policy arena, often having even a leading role.

While there is substantial information online, it could be better organized, so that also users which are not scientifically trained, could easily find their way around and see which tools lead to which kind of information. One may also ask whether the end-users are always aware of the limitations of the end-products. Many of the model results are not meant to be interpreted at a pixel precise level because of the techniques used. These products should be accompanied with very clear warnings and disclaimers specifying the limitations.

## **Organisational issues**

Further integration across Actions, groups and institutes should be strongly promoted. For example, the assessment of EU policies on natural resources is an area, which needs to be addressed in a more integrated manner across units and across institutes. A stronger integration between the Actions in the thematic area is required in this respect. Actions focusing on agriculture are not dealing explicitly with CAP impacts on the environment. Good agricultural and environmental conditions could be well studied in this framework. Conversely, some environmentally oriented Actions study e.g. the fate of pesticides in the

environment, but do not explicitly refer to CAP policy tools. The High Nature Value farmland is also dealing with biodiversity in farmland and is cited as a highlight in an IES report, but the role of CAP policy for nature value farmland would require further studies. Links and integration across Actions /Units or institutes should be strengthened to provide added value across sub-themes and more cost effective use of the JRC resources.

On the aquatic and marine field, bringing together different groups (remote sensing, marine, freshwater) from different Units of JRC would already provide valuable new combinations of expertise. This would promote the understanding of land-sea interactions as well as the use on modern technologies in monitoring. In biodiversity and ecosystem services there seems to be a strong emphasis on the use of GIS tools, the group might benefit from closer collaboration with traditional biodiversity researchers and economists.

The new Action MAPLE was formed based on laboratory activities of three Actions. It would be good to consider an even larger merger of laboratory intensive activities within IES and other institutes where relevant.

## ***Climate Change and Air Quality***

The research under Climate Change and air pollution includes eight Actions

- GAPCC, Global Air Pollution and Climate Change,
- GHG-AFOLU, Greenhouse Gases in Agriculture, Forestry and Other Land Uses
- ICPA-SEI, Integrated Climate Policy Assessment: Scenarios and Economic Impacts
- ICPA-EEI, Integrated Climate Policy Assessment: Emissions and Economic Impacts
- SOLO, Systematic Observations of Land and Oceans
- FLOODS, Floods - prediction, mitigation, impact assessment
- APA, Air Pollution Assessments
- AIRMODE, Air Quality and Transport Modelling (only the air quality part was assessed in this evaluation)

The climate change research covers a wide range of areas including:

- Observations and research on climate-related parameters of land and ocean
- Theoretical modelling of changes in composition and properties of the atmosphere
- Integrated policy assessments related both to impacts on ecosystems and society
- Adaptation and mitigation measures
- Socio-economy including scenario development and analysis.

The air pollution activities include research and development related to urban and regional air quality. In particular JRC has a strong position in supporting the implementation of the air quality directives.

### **Policy relevance**

The research on both climate change and air pollution is of high relevance and to a large extent of immediate need for policy development both within the Europe Union and in the global perspective. There are several international organisations that have benefitted from the work including, IPCC, UNFCCC and CLRTAP.

For climate, the development of socio-economic competence and integrated assessment models has been particularly important for EU policies. The results have been directly applied to the development of several EU documents including directives and green and white papers. Due attention is given to the broadening of the policy scope from European to global.

Implementation of the air pollution directives following the CAFE initiative and the planning for a revision of the air quality directives require a continuous strengthening of the scientific understanding. JRC plays an important role in the further implementation of the air quality directive, in particular in harmonisation and standardisation of measurements and in testing and harmonisation of air quality models. The work is also important for the CLRTAP both through the EMEP station set up within the JRC Ispra site and through active support to the further development of EMEP activities.

The research on the link between air pollution and climate change has placed JRC in a strong position for further development of combined policies.

### **Scientific originality and achievements**

The research under climate change and air pollution is in general of high scientific quality and within some areas excellent, which is reflected in a continuous publication of papers in highly ranked journals. Some of the publications have received wide attention both from the scientific and the policy sides. The panel appreciates the good balance between scientifically excellent and highly policy relevant activities.

The panel would like in particular to highlight the work on global atmospheric modelling and the research related to those components that act both as air pollutants and influence climate

(in particular aerosols and tropospheric ozone). JRC has here successfully developed a niche based on its previous experience and knowledge in atmospheric chemistry. This niche is being further developed under FP7 making JRC one of the leading atmospheric transport and chemistry modelling research organisations globally.

Through the partnership with the PBL on the EDGAR emission database, JRC has direct access to emission data and has also the possibility of developing the database as well as analysing uncertainties and gaps. JRC has through EDGAR a strong position with respect to further development of its performance in the area.

Particulate matter in the atmosphere is receiving an increasing interest due to its high importance for the radiation balance of the atmosphere but also due to its importance for human health. Within GAPCC, the role of PM is studied from both perspectives and JRC has significantly contributed to our overall scientific understanding of properties and origin of particles. The limited scientific understanding of the underlying mechanisms for the effects of air pollution on human health may however lead to inadequate air quality standards with large additional costs for the protection of the European citizens. Even if the panel is aware of the difficulties in developing research in the area, the panel was concerned that the limited resources allocated to research on health effects from air pollution are further decreased.

For air pollution, the panel will highlight the network and infrastructure that JRC has developed for testing, calibration etc. The activities are both of excellent quality and of high value for the Member States. The development of methods for harmonisation and quality assurance is normally not given enough credit in evaluations. The panel has however seen a targeted work of very high standard, which has significantly contributed to improved air quality data throughout Europe, in particular through the AQUILA network.

With respect to air quality modelling, the panel was particularly satisfied to see the FAIRMODE and ENSEMBLE initiatives.

The establishment and further development of the EMEP station at Ispra give researchers necessary experience and background data for their work on model development and harmonisation of monitoring methods.

JRC and EMEP are to some extent running similar activities with respect to harmonization and inter-calibration of measurement methods. In order to avoid duplication of work it is important that the activities at JRC and under EMEP are well streamlined.

### **Performance**

JRC has within this area adopted a responsibility for developing and maintaining scientific networks. This can be exemplified with the CLRTAP Task force on Hemispheric Transport of Air Pollution, where JRC has played a central role. The development and maintenance of an infrastructure for testing of models is also of particular value. The institute has also successfully combined the use of models and observations.

The air pollution group is performing its activities very well. Most of its work is well in line with the objectives of FP 7.

The involvement in measurements and development of methods that can be done elsewhere (ozone studies in the Mediterranean, remote sensing, Lombardia study, development of gas sensors) should only take limited resources from core activities within the field. This type of research can, however, be important for keeping the JRC's research close to reality and therefore the panel does not recommend terminating it completely.

A possible new area for research is on assessments in relation to the air quality directive. There are a several local and national initiatives taken all over Europe to improve air quality

to reach the AQ standards. The outcomes of these measures are not analysed and assessed in a comprehensive and homogenous way. Such analysis would be of large policy benefit for both the European Commission and the Member States. The panel therefore suggest the APA Action to develop its expertise in air pollution assessment according to the air quality directive. Since Member States have big problems in meeting the standards, there is a need for coordinated research activities on developing methods and evaluating measures taken or planned. JRC seems particularly well positioned for such work as an inter-institute collaboration between IES and IPTS.

### **Value for customers**

JRC has a strong position for the fulfilling some of the science-based requirements from UNFCCC. This includes the EU contribution to the global observatory system, GCOS. JRC is also actively contributing UNEP assessment of short lived climate forcings.

Climate Change research has been of particular importance for policy actions, not only for the EU bodies but also for the work under the UNFCCC. The panel saw several examples, e.g. the tool for the assessment of LULUCF measures, used by the EU in the UNFCCC negotiations.

JRC plays a central role in the development of air pollution policies. The research and networks contribute significantly to an efficient implementation and outcome of the existing policies at the European level. The requests from the Commission are mostly larger than the capacity at JRC. With the high expectations from the Commission and Member States, it is important that the groups can maintain some resources for high quality research.

### **Forward looking**

In order to further support the strategic role of EU, JRC should continue to strengthen a global perspective in its research on climate change. Under the uncertainties with respect to global agreements, the need for continued scientific support will increase, in particular in relation to the developing countries.

Socio-economic modelling plays a central role in the development of EU policies. It is important that the ongoing work continues but also that the modelling is supported to some extent by original research within the JRC.

In the future JRC should further develop its climate change competence focusing on areas where excellent research is going on within JRC. In addition to air pollution interactions, hydrological processes, agriculture and processes related to the functioning of ecosystems could provide such opportunities.



## ***Sustainable Agriculture and Rural Development***

Six Actions were included in this sub-group:

- AgriTrade: International trade, market prices volatility, CAP reform scenarios
- AgriTech: Costs of non-adoption of GM technology, future breeding methods etc
- Sustag: demography, structure of farms, rural economies, public goods.
- AgriEnv: Environmental monitoring and sustainable management approaches e.g. Technical definition of natural handicaps and indicators
- Agri4Cast: In season forecasting and analysis of crop yields and production; Crop growth and climate change modelling, land suitability analysis
- GeoCap: Support and develop information methods for land parcel identification system –geomatics applied to control and management of resources.

The common assets for all units are a) the highly motivated and competent staff, and b) the scientific excellence and expertise supported by a state of the art infrastructure. The work undertaken strongly influences science based policy and regulatory development and provides clear support to policy making at the DG levels. From the presentations and the material provided the overall evaluation is very positive whilst in some areas the potential of JRC has not yet been fully exploited. Some highlights are provided below.

### **Policy relevance**

These Actions have high policy relevance for the Common Agricultural Policy. Essential contributions, which are clearly of strategic importance, include:

- Delineation of regions within Europe with natural handicaps;
- Methodologies for reporting and validating the land cover and land use of agricultural areas in Europe, that form the basis for land based subsidies;
- Study of CAP reform scenarios affecting agricultural production, trade, development and rural economies;
- In season projections of arable crop yields.

However, the links with the sustainable management of natural resources has not yet been fully explored in an integrated manner, at least not in this sub-theme. The Work Program (2007-2013) under section 2.1 mentions specifically that ‘the focus will be on the use of natural resources, the impact of agricultural policies and measures on the environment, the effects of farming practices on soils and water conditions, biodiversity and landscapes’.

### **Scientific originality and achievements**

The main added value of the JRC is the integration at EU level of data delivered by Member States and the development of tools, platforms and models that can be used to support EU policies. This orientates the research activities in directions, which may be original, as can be seen from some high profile papers (e.g. in Nature Biotechnology) and from an award (GTAP award), which was obtained for developing an advanced European agricultural economics data basis. While these examples do show the originality that can be gained from these policy relevant research targets, in other cases the work is close to be mature and operational and can be seen as less original. This includes some developments concerning geo-referencing of land use and land cover, as well as the combination of criteria for natural handicaps. Operational tools for policy support and for negotiations between EC and Member States are unlikely to lead to peer-reviewed original research and this may create concerns for the limits to be set for a science based policy.

### **Performance**

The scientific staff shows strong sense of commitment to their mission and is highly motivated. The scientific competence is high and the skills are well developed in all areas of core activities of JRC. However additional staff and expertise in some specialised fields like socio-economics would further enhance the research products and the impacts of JRC on policy development.

Within the thematic area, appropriate links and coordination needs to be further developed, in order to ensure complementarities and added value between Seville and Ispra. Since Seville is a reference centre for economic issues, this thematic area should both have in house modelling capacity in Seville and full access to this reference centre in economics. Moreover, additional skills in economic modelling could be developed at Ispra in close connection with IPTS at Seville. Staff exchanges could help for cross-site integration. As some Actions in the agricultural sub-theme are split between Thematic Area 1 and Thematic Area 3, administrative procedures need to be adjusted to avoid double reporting.

#### **Value for customers and stakeholders**

There is clearly high value of the Actions for the EC customers (especially for DG AGRI). More value could be gained for other DGs (e.g. DG environment) by better addressing the impacts of CAP policy tools on natural resources. It is already realised by the management, that JRC should become more proactive and anticipatory to the needs of customers (as stated in the new JRC Strategy 2010-2020). While efficient networking and benchmarking both with Member States and with international research organisations has been achieved in some research units, a clear strategy for building European and international collaboration at the scale of the agriculture sub-theme is lacking.

Concerning the stakeholders, farmers may benefit from the methodologies (e.g. georeferencing, in season modelling of crop yields etc.) developed in this sub-theme. Member States and EU regions are also clearly benefiting from the work. More links with the civil society could be developed.

The groups are engaged in a number of collaborative R&D projects within FP7. This contributes to ERA. Another contribution could be developed through mobility (e.g. Marie Curie networks) and by increasing the short-term staff exchange and collaboration with national research institutes. JRC could further enhance its contribution to ERA by providing access to its facilities to more scientists mainly from MS but also at a more global scale. The same applies to training of PhD students.

## 5. References

The JRC Corporate Strategy 2010-2020.

[http://ec.europa.eu/dgs/jrc/downloads/jrc\\_strategy\\_2010\\_short\\_en.pdf](http://ec.europa.eu/dgs/jrc/downloads/jrc_strategy_2010_short_en.pdf)

The Europe 2020 Agenda [http://ec.europa.eu/research/infrastructures/index\\_en.cfm](http://ec.europa.eu/research/infrastructures/index_en.cfm)

[http://ec.europa.eu/research/era/2020\\_era\\_vision\\_en.html](http://ec.europa.eu/research/era/2020_era_vision_en.html)

[http://ec.europa.eu/research/era/index\\_en.htm](http://ec.europa.eu/research/era/index_en.htm)

## Appendix 1. Abbreviations

AQ	Air Quality
AQUILA	Air Quality Reference Laboratories
CAFE	Clean Air for Europe
CAP	Common Agricultural Policies
CLRTAP	Convention on Long Range Transport of Air Pollution
DG	Directorate General (e.g. Energy, MOVE, ENV, CLIMA, SANCO, RELEX and RTD)
EC	European Commission
EP	European Parliament
ERA	European Research Area
EU	European Union
EFFIS	European Forest Fire Information System
EMEP	European Monitoring Environment Programme
EDGAR	Emission Database for Global Atmospheric Research
ESDAC	European Soil Data Centre
ESDB	European Soil Data Base
ENSEMBLE	Reconciling National Forecasts of Atmospheric Dispersion
FAIRMODE	Forum for Air Quality Modelling in Europe
FP7	Framework Programme 7
GIS	Geographical Information System
GEO	Group of Earth Observations
GEOSS	Global Earth Observation System of Systems
GMO	Genetically Modified Organisms
GMES	Global Monitoring Environment and Security
GTAP	Global Trade Analysis Project
IES	Institute for Environment and Sustainability
IPTS	Institute for Prospective Technology Studies
INSPIRE	Infrastructure for Spatial Information in Europe
JRC	Joint Research Centre
LCA	Life Cycle Analysis
LISFLOOD	Distributed Water Balance and Flood Simulation Model
LULUCF	Land Use, Land Use Change and Forestry
MAPLE	Monitoring Across Policies and Environmental Media
MARS	Monitoring Agricultural ResourceS
MS	Member States
PBL	Netherlands Environmental Assessment Agency
PM	Particulate Matters
REDD	Reducing Emissions from Deforestation and Forest Degradation
RTD	Research, Technology and Development
UNCCD	United Nations Convention to Combat Desertification
UNFCCC	United Nations Framework Convention on Climate Change
WFD	Water Framework Directive

## Appendix 2. Programme for the visit to Ispra 7-9 July 2010

### JRC FP-7 Interim Evaluation

#### Thematic Review Sustainable management of natural resources July 7-9, 2010 Ispra

##### *Preliminary outline*

<b>Time</b>	<b>Action</b>	<b>Speaker</b>	<b>Location</b>	<b>Participation</b>
<b>July 6</b>	Arrival in Ispra (evening)			
<b>July 7</b>				
0900 09:15-10:00	Welcome Putting the review in Context What is expected from the Thematic Evaluations	L. Hordijk D. Wilkinson	New Auditorium Chair – L. Hordijk	Panel Members Directors HoUs Action Leaders Communication Manager(s) Programme Manager(s) <i>(first hour together with IHCP)</i>
10:00-10:15	Introduction of Panel members Terms of Reference	P. Grennfelt		
10:15-10:45	Priority activities and achievements in FP-7	L. Hordijk		
10:45-11:15	Coffee			<i>As above</i>
11:15-12:15	Internal meeting of the Panel		Michelangelo	
12:20-13:55	Lunch			<i>Panel, L.H. PK.</i>
14:00-15:30	Introductory presentation for Groups 1, and 3	<i>A. Belward F. Raes S. Kay</i>		<i>Panel, Directors, HoUs</i>
15:45-17:45	1 <sup>st</sup> Break-out session for Groups 1, 2 and 3, including Laboratory visit(s)		Raffaello Leonardo 26b	Panel members, HoUs, Action Leaders, representatives from Action staff
17:45-18:15	Internal meeting of the Panel		Michelangelo	
18:20	Closure - first day			
19:45	Dinner		<i>TBD</i>	<i>Panel, Directors and HoUs, PK, HS</i>
<b>July 8</b>				
09:00-10:30	2 <sup>nd</sup> Break-out session for Groups 1, 2 and 3;		Raffaello Leonardo 26b	Panel, members, HoUs, Action Leaders, representatives from Action staff
10:30-10:45	Coffee			
10:45-11:30	Visit to EMEP Station			Panel, IES staff
11:30-12:30	Internal meeting of the panel		Michelangelo	
12:30-13:55	Lunch		<i>TBD</i>	<i>Panel, Directors, HoUs, Action Leaders,</i>
14:00-16:45	3 <sup>rd</sup> Break-out session for Groups 1, and 2 including Laboratory visit(s)		Raffaello Leonardo 26b	Panel members, HoUs, Action Leaders, representatives from Action staff
17:00-18:00	Internal meeting of the panel		Michelangelo	
18:00	Closure – second day			
<b>July 9</b>				
09:00-10:00	Follow-up meeting (questions		Leonardo	Panel, Directors, HoUs,

	from the panel)			Programme Manager(s), Communication Manager(s)
10:00-12:15	Internal meeting of the Panel		Michelangelo	
12:15-13:55	Lunch			<i>TBD</i>
14:00-15:00	Presentation of preliminary results		Leonardo	Panel, Directors, HoUs
15:00-15:20	Coffee			
15:30-16:15	Issues of further work by the Panel		Michelangelo	Panel
16:15-16:30	Closure	L. Hordijk		

