

JRC newsletter



A close look at soaring food prices



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SCIENCE FOR ENVIRONMENT POLICY - STRENGTHENING THE KNOWLEDGE BASE



“We need to look more closely at ways to reward environmental research”

EU environment policy needs to be based on solid scientific evidence, because everyone involved – from the ministers who decide on the legislation down to the people who implement it – needs to be convinced of its worth.

The facts, figures and analyses that emerge from research by JRC scientists feed policy-makers, who weave this evidence into policies to generate improved environmental outcomes for the citizens. It’s a vital process – successful environment policy depends on high quality ‘knowledge’ from the scientific community to address problems efficiently and cost-effectively.

Science can provide innovations to generate breakthroughs that will solve emerging environmental challenges. But policy-oriented research faces numerous challenges. Often it is not rewarded in the same way as scientific research, with no rigorous peer review or publication process. Neither is it motivated (like industrial research) by patenting and the prospect of commercialisation. The lack of reward mechanisms consequently attracts less interest and investment. I am very much aware that we need to look more closely at ways of rewarding such research. Horizon 2020 spells out the obligation for EU-funded research to support policy, and that is a step forward in valorising policy research inputs.

The fact is we need research like never before. Many adverse global trends are characterised by complex, interlinked mechanisms and processes. Science needs to help us address these trends, identifying risks for our environment and circumscribing the uncertainties we face in new technologies such as the exploitation of unconventional gases. We need science to spell out alternative paths of development, and to sell ideas like resource efficiency, the green economy and low-carbon living to a sceptical public. Tipping points have to be identified and illustrated in ways that suggest a better way of living. That means more engagement with social sciences, and exploring ways to alter behaviour across all

sections of society. Trends need to be reversed and progress towards goals needs to be demonstrated. Science and scientists will have a key role to play in transforming the economy, creating growth and jobs and fostering the increased sense of well-being that can come from an improved environment.

Some of the research we will need is already underway. Researchers are already engaged in mapping and assessing the ecosystems and the benefits that nature provides ‘for free’, for example. I hope the result will give us hard figures that show how our economies depend on healthy, resilient ecosystems. Water supply and pollution is problematic in many parts of the European Union, and the science underpinning the Commission’s Water Blueprint – due out soon – will be an important step forward in addressing those and other water issues. We will also need good science to protect our soils and ensure sustainable land use to reduce land degradation – an objective set out in the Rio+20 outcome. In these and many other issues the Joint Research Centre has provided key data to support policy, and I trust that the excellent collaboration will continue.

Science of course is only useful when it reaches its target audience. Policy-makers need regular information about recent findings, so services like the “Science for Environment Policy News Alert” do help in bridging the gap between researchers and those who depend on their results.

My hope is that the future will bring an even closer relationship between the scientific and the policy-making communities. In thanking JRC colleagues for their support so far, I would add that far from being almost done, our work on environment has hardly begun. We still know far less than we need to know. But whatever else happens in the EU economy, scientific research into the environment will be a growth area. That we can guarantee.

Janez Potočnik,
EU Commissioner for Environment

Scientific support for nuclear decommissioning

Nuclear decommissioning is an industrial activity that is growing strongly worldwide, creating many opportunities for high-skilled workers. The European Union has acquired a large know-how in the decommissioning field and today it can position itself strongly at the top level in the world market. The EU scientific community has a key role to play to support European industry in its endeavour, contributing to innovation, standardisation and development of best technologies for decommissioning.

In the framework of the European Forum for Science and Industry, the JRC organised a roundtable discussion on “Scientific support for nuclear decommissioning” on 11 September 2012. The aim was to bring high level representatives from industry and science together to share best practices, identify bottle necks and consider future prospects and priorities for European nuclear decommissioning.

As a main conclusion of the meeting, the importance of further sharing of experiences in the emerging decommissioning market was emphasised, as the identification and dissemination of relevant information will strengthen the know-how of the EU. The importance of innovation allowing waste reduction resulting from decommissioning activities was also underlined by many speakers, as waste has a significant economic and environmental impact. The need to harmonise and standardise the techniques, approaches and regulatory requirements was considered essential.

The roundtable was chaired by Dominique Ristori, JRC Director-General, and attended by about 120 experts, amongst them Štefan Chudoba, State Secretary of the Ministry of Education, Science, Research and Sport of the Slovak Republic, Christophe Béhar, Director of the Nuclear Energy Division of the French CEA and



JRC's Director-General Mr. Dominique Ristori.



120 experts attended the roundtable.

Hartmut Pamme, Vice President of Nuclear Power Plants of the German RWE utility. Several other managers of industries and institutes involved in nuclear decommissioning participated to the discussion.

The meeting proved to be an excellent opportunity to discuss the need for scientific support and innovation for decommissioning at EU level. The JRC intends to further build on the outcome of the roundtable.

Short facts

The estimated commercial market value of this activity in Europe is 81 Billion Euro.

The EU represents the largest decommissioning market in the world.

On average, decommissioning costs are between 155 and 387 euros per kWe installed (except for gas-cooled reactors).

Waste treatment and disposal account for 20-40% of decommissioning costs.

Out of the 135 operating reactors, 95 licenses will expire between now and 2025 (without considering possible life extension).

All Member States impose adequate funds to be set aside for decommissioning.



JRC's crop monitoring and market analysis:



It's been a season of bad news for farmers and vulnerable communities across the globe – prolonged and severe droughts as well as poor rainfall during the monsoon period have reduced harvest forecasts and threatened to skyrocket food prices. Indeed, the world prices of maize increased by about 24 % over the summer, reaching an all-time high of 333 USD (256 EUR) for a tonne in August (World Bank).

This price increase has driven up the global food price index in August and September provided by the FAO. It stood at 213 points, confirming a steady increase over the past ten years, but still remaining below the record 238 points of February 2008.

The commodity price spike was a result of adverse weather conditions around the world which heavily affected harvests. Over the summer, lack of rainfall and high temperatures left farmers from Africa to India and Australia struggling with reduced harvest and producers in the US experiencing one of the worst growing seasons in 50 years. Poor weather conditions in Russia and the Black Sea region have slashed harvest forecasts for wheat, while unseasonal rains in Brazil, the world's largest sugar exporter,



have hampered sugarcane harvest. According to the JRC Monitoring Agricultural Resources (MARS) Bulletin on Crop Monitoring in Europe published in September, heat and dry weather in most of southern and south-eastern Europe is expected to lead to a reduction in this year's EU-27 grain maize yield by 20 % compared to 2011 yields.

Besides expected low harvest in wheat and maize in specific regions, another driving element has been the uncertainty related to the amplitude of the damages and international trade disruption. In addition, the soaring wheat and maize prices provoked soybean prices to follow suit because all three crops can be used as feedstock. The complementary nature of the three commodities explains the upward spiral in general.

JRC's crop forecasting through remote sensing and bio-physical modelling

The JRC has been running a crop forecasting system since 1992, providing timely and accurate crop production forecast for the EU and neighbouring countries. Its MARS Crop Yield Forecasting System relies on remote sensing and meteorological observations, agro-meteorological modelling and statistical analysis. These are used to monitor the vegetation status and to provide simulations of crop growth for cereals, oil seeds, protein crops, sugar beet, potatoes, pastures and rice. The results of the yield monitoring activities are compiled in the MARS Bulletin, a report published regularly throughout the European growing season.

Since 2005, the MARS team has been monitoring food insecure areas worldwide, in co-operation

with European partners and the FAO. As of 2011, the MARS team is developing a global extension of its forecasting system to cover major agricultural regions such as Russia, Ukraine, Black Sea and Kazakhstan; China, India and Australia; Argentina and Brazil; Canada and the USA. Since 2012, the EU forecasts have been included in the crop balance sheets that the Commission's Directorate-General for Agriculture and Rural Development provides to FAO's Agriculture Market Information System as an EU contribution to the monitoring of global agriculture.

The most recent food security bulletins of July and August cover the Horn of Africa and the Sahel belt, respectively.

What is different compared to the previous food crisis?

The volatility of prices revive memories of the 2007-2008 food crisis, which led to popular unrest in a number of countries across the globe, raised fears for vulnerable groups in developing countries, and prompted calls for action to manage the impact on the agriculture of increasingly frequent extreme weather events.

Using its agro-economic modelling platform iMAP, the JRC has calculated the potential impact of export restrictive policies of the major Black Sea export countries Russia, Ukraine and Kazakhstan, replicating the 2010 drought when the wheat production decreased to 68 Mt in that region. The simulation shows that the introduction of a restrictive export quota (3.3 Million tonnes) on wheat by these three countries would imply an increase of the world wheat prices by 7% on the top of the 23% price increased linked to the drought.

a close look at soaring food prices

JRC's economic analysis of global agro-food markets

The integrated Modelling Platform for Agro-economic Commodity and Policy Analysis (iMAP), developed and managed by JRC's Institute for Prospective Technological Studies (IPTS), addresses a broad range of topics linked to the economic assessment of agricultural and rural development policies, as well as those concerning related topics such as trade, renewable energies, environment and climate change.

This policy support-oriented platform disposes of a number of well-established partial and general equilibrium models as well as econometric tools. It is continuously being further developed in cooperation with the research community.

These models are used in stand-alone mode or in combination, to provide results and recommendations in a timely manner and satisfy high standards of scientific quality and transparency.

An important service to the policy decision-making process are agricultural market projections for a ten years horizon, prepared under the jointly with the Commission's Directorate-General for Agriculture and Rural Development, providing the benchmark for counterfactual analysis of a wide range of policies.

Yet, similar price instability in the past has prompted strong production response. It remains to be seen whether this pattern will be repeated in the medium term to meet growing demand and calm down the markets.

Impacts on producers and consumers

Food prices hikes have different impacts on different stakeholders. Grain farmers might sustain harvest losses, but they are able to make up for them through increasing market prices, insurance or safety net policies, at least in the US. Meat and milk producers could suffer production disruption resulting from the high prices of the main ingredients for feeding their livestock.

Consumers in developing countries remain the most vulnerable. A higher food bill is to be expected, especially in net-food importing countries, which

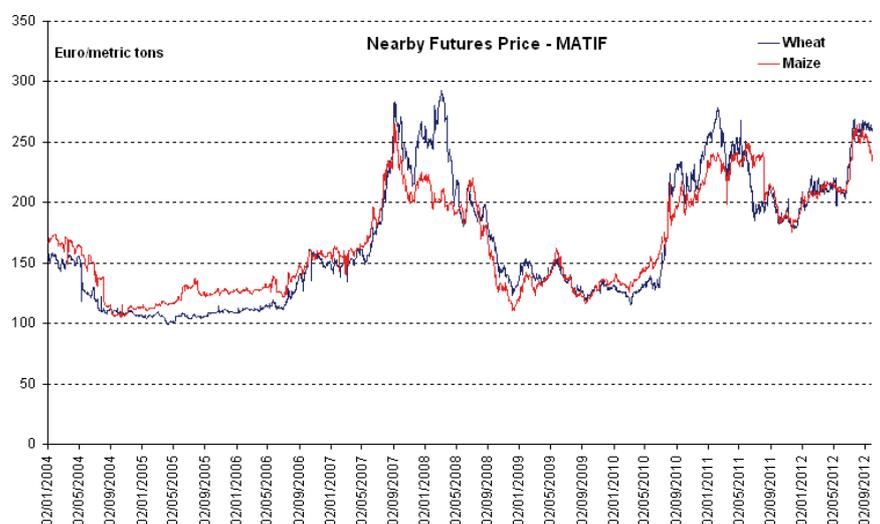
could be further aggravated by a strong US currency. The Sahel region is already in a deep hunger crisis and poor countries in North Africa and the Middle East will see higher bread prices. Price increases are also foreseen in countries of Latin American and Sub-Saharan Africa where many populations rely on a maize-based diet.

What are the short and medium-term prospects?

According to preliminary JRC projections based on financial markets' expectations calculated by means of a two-factor affine Gaussian theoretical model for commodity futures, high prices are here to stay. Wheat prices are not expected to fall before late spring 2013 and maize not before the end of summer 2013.

In the medium term, that is within the next two to ten years, the European Commission expects cereal markets being characterised by tight market conditions, low stock levels and prices remaining above long term averages. These projections and (uncertainty) analyses are carried out on the basis of state-of-the-art economic models available in the iMAP modelling platform (see above), in collaboration with the Commission's Directorate-General for Agriculture and Rural Development.

The projected development is supported by factors such as the growth in global food demand and a prolongation of the long-term decline in food crop productivity growth. It remains however, as every outlook, subject to a number of uncertainties.



Overview of maize and wheat nearby prices since 2004 at the futures exchange and clearing house MATIF (Paris).

Sulphur emissions in Mediterranean harbours

Read more: Impact of a European directive on ship emissions on air quality in Mediterranean harbours, C. Schembari et al, in Atmospheric Environment (2012). <http://ccaqu.jrc.ec.europa.eu>

Sulphur dioxide emissions from shipping have decreased significantly in EU ports, thanks to stricter EU regulations. JRC scientists measured key air quality parameters during 2009 and 2010 in Mediterranean harbours before and after new EU rules on sulphur content in fuels for ships at berth or at anchor in ports entered into force in January 2010. The measurements were carried out using a monitoring station placed on board the Crociere line cruise ships, which followed a weekly route in the Western Mediterranean. The results showed that in three of the four EU harbours studied, the concentration of sulphur dioxide had fallen by an average of 66%.

Measurements taken in the port of Tunis, where the EU policy does not apply, showed that levels of this noxious substance were unchanged over the period of study. This indicates that the significant decrease in sulphur dioxide emissions are a direct result of the introduction of EU policy.

Sulphur dioxide is one of the main chemicals responsible for the formation of acid rain and particulate air pollution, posing risks to health and the environment. The results of the study were published in the journal *Atmospheric Environment*.

Per capita CO₂ emissions in China reach EU levels

Global emissions of CO₂ increased by 3% last year, according to the annual report 'Trends in global CO₂ emissions', co-written by the JRC and PBL Netherlands Environmental Assessment Agency. In China, average emissions of CO₂ increased by 9% to 7.2 tonnes per capita, which is within the lower end of the range of emissions characteristic of the major industrialised countries. By comparison, the European Union's CO₂ emissions dropped by 3% to 7.5 tonnes per capita. The United States remain one of the largest emitters of CO₂, with 17.3 tonnes per capita. This is despite a decline in 2008, from 18.8 tonnes per capita, which was due to the

recession between 2008-2009, high oil prices and an increased share of natural gas.

A total of 34 billion tonnes of CO₂ were emitted in 2011, of which China contributed 29%, the United States 16% and the European Union 11%. Scientific literature suggests that cumulative CO₂ emissions in the period 2000-2050 should not exceed 1 000 to 1 500 billion tonnes if we are to limit the rise in average global temperature to 2°C above pre-industrial levels. If the current global trend of increasing CO₂ emissions continues however, global levels of CO₂ will surpass this limit within the two next decades.

Read more: <http://edgar.jrc.ec.europa.eu>

'Business as usual' means continuous decline of global air quality

Read more: Effects of business-as-usual anthropogenic emissions on air quality, A. Pozzer et al in Atmospheric Chemistry and Physics (2012).

A paper co-authored by JRC researchers and published in the journal *Atmospheric Chemistry and Physics* demonstrates the extent to which global air quality will deteriorate by 2050 if manmade emissions remain at current levels and air quality legislation is not reinforced. Since air pollution is a major health risk, further deterioration of air quality could have severe effects on human health.

JRC scientists contributed to the paper by providing emissions information for a 'business-as-usual' scenario, which assumed that no

additional emission control measures beyond those implemented in 2005 would be put into place. According to the paper, the air quality experienced by the average global citizen in 2050 under this scenario would be almost as poor as that experienced by the average citizen in East Asia today. The authors refer to the scenario as "representing a pessimistic (but plausible) future". Current JRC research activities focus on identifying smart strategies for the cost-effective reduction of air pollution by combining air pollution and climate policies.





Commission studies shale gas impacts

A JRC report on market impacts of unconventional fossil fuels, in particular shale gas, was released in September, together with two other Commission reports covering environmental and climate change aspects. The study shows that following the widespread development of unconventional gas in the US, greater supplies of liquefied natural gas (LNG) have become available at global level, indirectly influencing EU gas prices. The study suggests that under a best case scenario, taking into account environmental considerations, future shale gas production in Europe could help the EU prevent a sharp increase in its energy import dependence over the next 30 years. It also reveals

the sometimes considerable uncertainty about recoverable volumes, technological developments, public acceptance and access to land and markets.

Shale gas extraction has become a topical issue in Europe, attracting the interest of several market players and giving rise to a number of public concerns. The three studies look at the potential effects of this fuels on energy markets and climate change, as well as the potential risks shale gas developments and associated hydraulic fracturing ("fracking") may present to human health and the environment.

Read more:
Unconventional Gas: Potential Energy Market Impacts in the European Union, I. Pearson et al, JRC Scientific and Technical Reports (2012).
Doi: 10.2790/52499

Measuring nanomaterials – a technical challenge for scientists

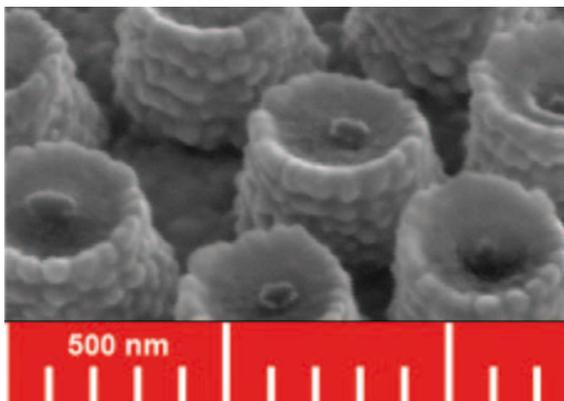
A range of measurement methods as well as thorough check and validation of their reliability are required to determine whether materials meet the definition for nanoparticles as proposed by the European Commission. These are the main conclusions of a new JRC report which presents an in-depth review of methods available to measure the size of nanoparticles.

The report, "Requirements on measurements for the implementation of the European Commission

definition of the term 'nanomaterial'", identifies key challenges for measuring nanoparticle size in a regulatory context, following the recently recommended definition of the term 'nanomaterial'. The Commission proposal of October 2011 defines nanomaterial as "natural, incidental or manufactured material containing particles, in an unbound state or as an aggregate or as an agglomerate and where, for 50 % or more of the particles in the number size distribution, one or more external dimensions is in the size range 1 nm-100 nm".

The authors of the report discuss the related generic measurement issues and review the capabilities of the measurement methods currently available, including techniques such as electron microscopy, dynamic light scattering and centrifugal liquid sedimentation, to name a few. It highlights that the inclusion of aggregates in the definition, the ambiguity of the term "external dimension" and the difficulty to measure and count particles at the lower size range of the definition (smaller than 10 nm) pose significant practical challenges. The reliability of each of the measurement methods used in combined approaches will need to be thoroughly checked in dedicated method validation studies.

Read more:
Requirements on measurements for the implementation of the European Commission definition of the term 'nanomaterial', T. Linsinger et al, JRC Reference Reports (2012).
Doi: 10.2787/63995



The nanofabrication process of a polymer prepared with colloidal lithography in order to produce a sensor for the study of protein interaction.

Testing chemical migration from plastic kitchenware into food

Read more:
<http://ihcp.jrc.ec.europa.eu>

A JRC co-ordinated comparison of the tests which analyse migration of formaldehyde in foods in more than 60 official EU labs, showed that all 23 national reference laboratories who sent in results reported accurately, and that 85% of all results sent in by all labs were accurate. The migration of formaldehyde from melamine kitchenware is strictly regulated in the EU under

the Regulation for plastics materials and articles in contact with foods. The exercise was set up to investigate to what extent laboratories could successfully measure the substances at low levels, at the legislative limit, and at twice that level.

The exercise was carried out following the adoption of an EU regulation in 2011, which lays down the import conditions for polyamide and melamine kitchenware from China and Hong Kong. JRC has developed technical guidelines for the controls carried out by EU official laboratories based in different member states. The laboratories tested formaldehyde-containing melamine spoons, immersed in 3% acetic acid, which is the worst case scenario foreseen for a kitchen tool, exceeding to a great extent the real-life situations of a plastic spoon being used in e.g. tomato sauce. In addition, the scientists checked whether different sample preparation methods could lead to different results.



The Joint Research Centre publishes results from proficiency testing of formaldehyde release from food contact materials.

Hip prostheses: close monitoring at EU level could improve safety of patients

A new JRC report on hip replacement surgery summarises current knowledge and recommends measures to address complications and failed

expectations. Hip replacement surgeries, also known as total hip arthroplasty (THA), involve removing a degenerated hip joint and replacing it with a prosthesis, an artificial joint. In recent years, a new generation prosthesis has been launched, designed to last at least 20 years. However, patients have experienced complications such as inflammatory reactions and formation of pseudotumors.

Hip prostheses consist of a ball component, made of metal or ceramic, and a counterpart in the shape of a spherical ball, which has an insert or liner made of plastic, ceramic or metal. Concerns about the safety of the modern devices have risen especially because conventional metal-on-metal hip prostheses have a long tradition and were not affected by such problems in the past.

The report "Total Hip Arthroplasty - State of the Art, Challenges and Prospects" recommends clinical investigations and the establishment of detailed registers of arthroplasty and its follow-up, co-ordinated at European level in order to monitor the long-term performance of hip implants. These measures should ensure that patients are not exposed to unjustifiable long-term risks and that the safety and effectiveness of new and innovative hip prostheses can be guaranteed to the best of one's knowledge.



Hip-joint, total replacement, insertion without bone-cement.

Read more:
Total hip arthroplasty: state of the art, challenges and prospects, U. Holzwarth et al, JRC Scientific and Policy Reports (2012).

Doi: 10.2788/31679

Harmonised framework to assess noise

Environmental noise is a major public health concern in Europe. According to the recent report by the World Health Organisation (WHO) and the JRC, traffic-related noise may account for over one million healthy life years lost per year in the EU and other countries in western Europe. Urbanisation and a steep increase in traffic are the main drivers of escalating noise exposure. The social costs of traffic, rail and road noise across the EU were recently estimated at EUR 40 billion per year, equivalent to 0.35% of the EU's GDP.

A new Commission report introduces a common methodological framework for noise mapping across the EU (CNOSSOS-EU) in support of European legislation on monitoring and reducing noise pollution. This framework is based on state-of-the-art scientific and technical know-how and was developed by JRC on behalf of the Directorate-General for Environment in collaboration with experts nominated by the EU Member States, the European Environment Agency, the European Aviation Safety Agency and the World Health Organisation. In 2017, CNOSSOS-EU will replace existing methods used by the EU Member

States to assess exposure to noise, and will provide consistent and comparable figures on road traffic, railway traffic, aircraft and industrial noise exposure.

The JRC Reference report on "Common Noise Assessment Methods in Europe (CNOSSOS-EU)", represents the technical basis for amending Annex II of the Environmental Noise Directive (2002/49/EC).



A new set of methods will allow for harmonised measuring of noise pollution in the EU.

Read more:
Common Noise Assessment Methods in Europe (CNOSSOS-EU), S. Kephelopoulou et al, JRC Reference Reports (2012). Doi: 10.2788/31776

European business maintain R&D despite crisis

According to a recent survey carried out by the JRC, top EU businesses expect their investments in research and development to grow by an average of 4% annually over 2012 to 2014. This average investment expectation is lower than that of last year (5%), reflecting the worsening economic climate.

The 2012 EU Survey on R&D Investment Business Trends published in collaboration with the European Commission's Directorate-General for Research and Innovation, is based on information from 187 companies that constitute roughly 40% of the total R&D investment from the top 1,000 EU based investors. It also highlights the differ-

ences between sectors. For example, the software and computer services sector expects the highest growth in R&D investments over 2012-2014 of 11% per year, which is higher than the average growth in R&D investments the sector experienced over 2007-2010. In contrast, the pharmaceuticals and biotechnology sector expect growth in R&D investments to be 3% on average per year over 2012-2014, which is lower than the average rate observed over 2007-2010.

By end-2012 the European Commission will publish its next EU Industrial R&D Investment Scoreboard, which ranks the worldwide biggest companies investing in R&D.

Read more:
Monitoring industrial research: The 2012 Survey on R&D Investment Business Trends, A. Tübke et al. Doi:10.2791/83075

International experts analyse impacts of GMO crops

The JRC has released the proceedings of an international workshop on socio-economic impacts of genetically modified (GM) crops, a joint workshop organised by the JRC and the Food and Agriculture Organization (FAO) of United Nations on the socio-economic impact of GMO cultivation worldwide. The workshop recommended further independent and robust studies as well as strict science based safety assessments in order to reach a more objective and transparent reflection on GMO.

The workshop was held in November 2011 to review for policy makers the main findings of scientists who conduct research in the field of socio-economic assessment. EU Member States were invited to collect and exchange relevant information on the implications of the placing on the market of GMOs including socio-economic benefits and risks and agronomic sustainability.

Read more:
<http://ipts.jrc.ec.europa.eu>

EU fishing fleet made an economic recovery in 2010

After two consecutive years of declining profitability, the EU fleet made a recovery in 2010, moving from an overall loss making position to one of profit. This is one of the findings of the 2012 Annual Economic Report (AER) on the European Fishing Fleet carried out by the JRC. This growth occurred despite higher fuel costs in 2010, which is one of the major expenditures for the fishing fleet. The most significant factors that contributed to this increase in net profit in 2010 compared to 2009 were an increase in landings value and average first-sale prices, an increase in

Read more:
<http://stecf.jrc.ec.europa.eu/reports/economic>



the total weight caught and a decrease in labour costs.

Analysis of economic performance by Member State revealed a mixed picture. The data suggest that only 11 out of 21 Member States generated a net profit in 2010, compared to 12 in 2009. In addition there are differences between regions, countries and fleet segments concerned. For example, fish caught in the Mediterranean and Black Sea fetched the highest average price per kilogramme of fish, at 4.80 €/kg compared to 0.34 €/kg of fish for the Baltic Sea.

Profit margins in the EU fishing fleets are in general very low. According to the data submitted by EU countries, total operating costs were higher than total income for several fleets and were, on average 92% of total income in 2010. This is in fact an improvement compared to the situation in 2008 (96 %) and 2009 (95 %).

The 2012 annual economic report on the EU fishing fleet provides a comprehensive overview of the latest information available on the structure and economic performance of the EU Member States fishing fleets. The report is jointly coordinated by the JRC and the Commission's Directorate-General for Maritime Affairs and Fisheries. It was produced by a working group of experts convened under the Scientific, Technical and Economic Committee for Fisheries (STECF) and economic experts of the JRC.

JRC verifies indexes for global innovation and the impact of the web

As a part of its support to scientific innovation and analysis, the JRC's Institute for the Protection and the Security of the Citizen (IPSC) has thoroughly assessed and revised two important indices: the Global Innovation Index 2012 (GII 2012) and the World Wide Web Foundation's Web Index.

The GII 2012 measures the innovation capabilities of 141 countries. It was released on 3 July by INSEAD, a leading graduate business school along with the World Intellectual Property Organization (WIPO) a specialized agency of the United Nations. This index ranks six EU countries and Switzerland among the top 10. The GII 2012 was thoroughly assessed and revised by JRC

Read more:
<http://www.webfoundation.org/projects/the-web-index/>
<http://www.globalinnovationindex.org/gii>

researchers, whose recommendations contributed to the conceptual and statistical coherence of the index, its structure, and the impact of key modelling assumptions on its scores and ranks.

The Web Index is attempting to measure how well all the countries of the world are using the Web in relation to its primary characteristics of openness and decentralisation. This analysis is the result of rising concern about unfair limitations being put on access to the Web by authoritarian governments as well as internet providers who attempt to up costs and slow down traffic. The JRC has analysed the robustness of this new index to measure the impact of the web on society. The index was launched on 5 September in London.

New Commission strategy to boost the construction sector

The European Commission in July launched a strategy to boost the construction sector in the EU, in which Eurocodes, a set of European standards for the design of buildings and other civil engineering works, play a key role. Defining standards to be applied in building and construction, the Eurocodes help European construction companies to work with greater ease in other Member States, hence strengthening the competitiveness of the sector. Construction is a crucial part of the European economy, generating almost 10% of EU GDP and providing 20 million jobs.

The JRC's Institute for the Protection and Security of the Citizen (IPSC) has played a major role in designing the Eurocodes and is currently supporting their implementation, harmonization and further development. Since 2010 the Eurocodes have reached the final stage of national implementation by the Member States as they are now replacing all national standards, assuring harmonised safety levels for buildings and critical infrastructures within the EU. They still allow for the option of adapting them to each country's specific conditions related to climate, seismic risk or traditions.



Read more:
<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2012:0433:FIN:EN:PDF>

New frontier in nuclear material research

JRC scientists have successfully upgraded a nuclear magnetic resonance (NMR) spectrometer with a sample probe able to spin 20 times faster than what was previously possible. NMR spectroscopy is used for the determination of the physical and chemical properties of atoms or molecules. The new and improved 'solid state magic angle spinning' NMR spectrometer allows for a much better identification and analysis of nuclear fuel samples due to its significantly higher resolution.

Adapting the equipment for use on nuclear and highly radioactive material was a technical and scientific challenge due to the very high speed of rotation (55,000 rotations per second) and the need to meet stringent safety requirements. The upgraded equipment will be used to study e.g. atomic and molecular structure in fuel systems, safety relevant studies on reactor coolant interactions and long term behaviour of waste forms. This type of work provides essential contribution to the enhancement of nuclear safety.

Read more:
<http://itu.jrc.ec.europa.eu>

Nuclide chart – Enhanced knowledge of the elements' radioactivity

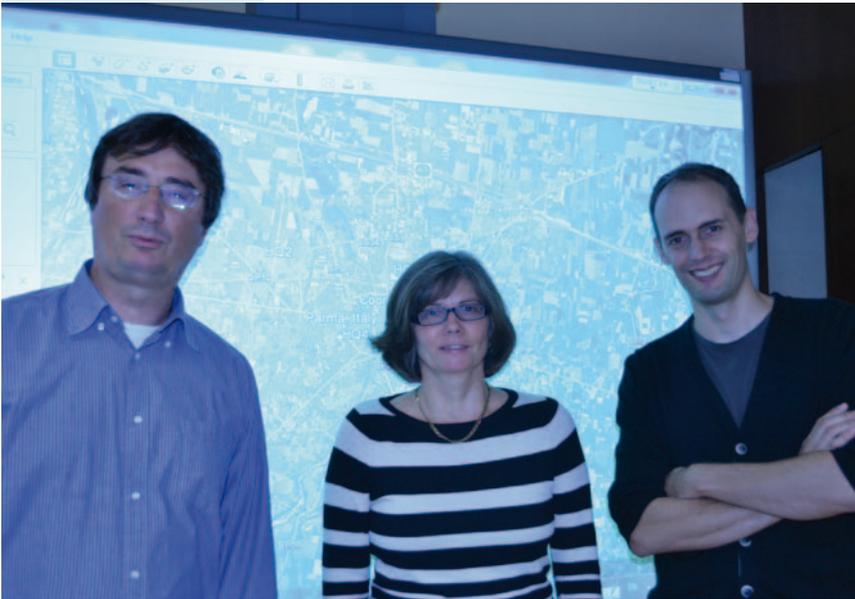
The eight edition of JRC's "Karlsruhe nuclide chart" has recently been launched. The chart is an extended periodic table of the elements displaying the radioactive attributes of each element and their known isotopes. The new edition contains new and updated radioactive decay data on 737 nuclides not available in the previous (2007) edition, as well as the most recent values of the atomic weights and isotope abundances. In total, nuclear data on 3847 nuclides are presented.

This publication supports the JRC's particular focus on the education and training of present and future scientists and engineers in the nuclear domain, as demanded by the Euratom Treaty. Beyond the more traditional physical sciences such as health physics and radiation protection, the chart is also widely used in the life and earth sciences, including medicine, agriculture and geology. There is an explanatory booklet available in English, German, French, Spanish, Chinese and Russian.

Read more:
<http://itu.jrc.ec.europa.eu>

Rio+20 experienced by JRC scientists

Preparing for natural disasters and improving EU abilities to respond to them is part of the job description of JRC scientists Tom De Groeve and Jutta Thielen-del Pozzo. In June, they participated in the UN Conference on Sustainable Development in Rio, to showcase their work and to meet South-American actors in their field.



JRC scientists Luca Montanarella, Jutta Thielen-del Pozzo and Tom De Groeve presented their work at the UN Conference of Sustainable Development in Rio.

“This continent is very prone to natural disasters, often causing humanitarian emergencies” said Tom. He explained that although they are working with numerous institutions worldwide, contacts with South America are not so intense and collaboration with the brand new Brazilian Centre for Monitoring and Altering for Natural Disasters (CEMADEN) is just kicking off.

And what was it like for them to be amid this swirl of 40 000 delegates, politicians and fellow scientists? After some initial organisational

hiccups in the setting up of the exhibit, they were impressed by the number of people and the diversity of groups that visited the EU Pavillon at the Parco dos Atletos. “After explaining our work on flood, fire or drought forecasting and monitoring to a group of engaged students, a Minister would visit accompanied by secretaries and security guards and show interest in our work on disaster impact assessment or how we characterise the vulnerability of populations with the help of satellite images” said Tom. Jutta added that “it was amazing to see how fast information was shared with the outside world – participants would listen to presentations, holding up iPads for photos and a few minutes later you would see their reports on a blog”.

Views about the outcome of Rio+20 are diverging and those who expected a universal, binding agreement to protect our planet’s eco systems certainly left frustrated. Not so the participating JRC scientists who all draw a positive conclusion.

The JRC soil expert Luca Montanarella, who supported the Commission’s delegation in the negotiations on global soil protection and who participated as co-organiser and speaker in three side events, found the meeting to be “very useful and productive” and considers it to have been “a major success to have brought the topic of soil and land degradation to the attention of the world”. Naturally, his presentation at the side event on Soil Biodiversity focused on the success of the European Soil Biodiversity Atlas and the follow-up actions on a global level. The newly appointed Executive Secretary of the UN’s Secretariat of the Convention on Biological Diversity (CBD), the Brazilian Braulio Ferreira de Souza Dias, declared his full support for a global assessment and asked the European Commission, the FAO and the Brazilian soil survey to work together towards a Global Atlas of Soil Biodiversity.



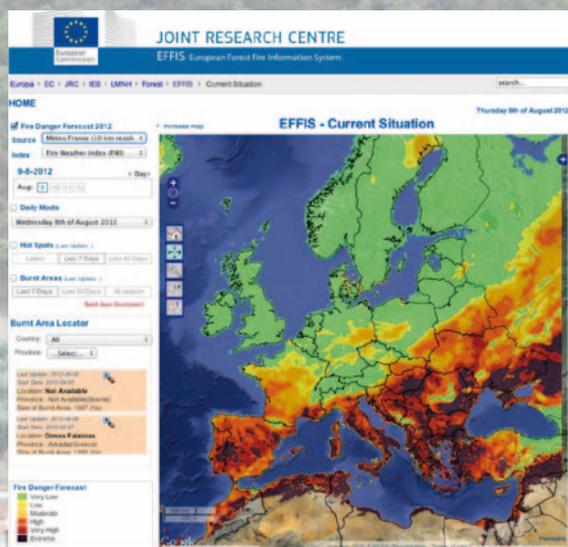
RIO+20
United Nations
Conference on
Sustainable
Development



EFFIS - monitoring the forest fire situation in Europe

The JRC plays a central role in the prevention and constant monitoring of forest fires in Europe through its online European Forest Fire Information System (EFFIS). In 1998, the JRC and the Directorate-General for Environment established the 'Forest Fire Experts Groups' with the objective of advising and developing methods for fire assessment. These activities led to the development of EFFIS which became operational in 2000. The tool is open to all European countries and, following an agreement with the UN's Food and Agricultural Organization (FAO), EFFIS has since been extended to all non-EU Mediterranean countries.

EFFIS provides updated and reliable information on wild land fires in Europe from pre-fire preparedness to post-fire evaluations. It supports forest fire prevention and fire-fighting services in Europe as well as the European Commission's Monitoring and Information Centre (ECHO MIC), based in Brussels, and other organisations in the field.



The free online tool provides fire danger forecast up to six days in advance, enhancing the preparedness of the countries at risk of fire. Fires are also monitored and mapped by EFFIS, providing near-real-time estimates of fire damages across Europe. Throughout the fire season (June – September) maps of forecasted fire danger are sent out on a daily basis to forest services and civil protection services of the EU. Maps and key data on fire danger and individual fire effects are available to the public on the EFFIS website.

Read more:
<http://effis.jrc.ec.europa.eu>

2012 – Severe forest fires in the Mediterranean region

In 2012, there was significant fire activity early in the fire season in southern Europe, with over 100 000 ha burned by the end of March.

In June, severe forest fires broke out in Greece, which had experienced hot and dry weather conditions combined with strong winds. July saw critical fire episodes in Spain and Portugal, which led to a number of human casualties. The situation at the beginning of August was more critical for the south eastern parts of Europe, particularly southern Italy, Greece and the Balkans. In September, conditions worsened again for Portugal, while they remained critical in the Balkans. The total burned area mapped by EFFIS

in southern EU this year until September 11 was about 400 000 ha. Meteorological fire danger was very high to extreme in south-eastern Europe during the second half of August and large fires were also active in Southern Italy and Greece. In the same period some large fires were observed in Spain while in Portugal remarkable fire activity occurred during the first week of September. Also the Balkan region was also severely affected, particularly Bosnia and Herzegovina, Montenegro and Albania. The total burned area mapped by EFFIS in the Balkans until September 11 is about 244 000 ha. Presently meteorological fire danger is still high to extreme in south-eastern Europe.

Breaking down language barriers with EMM's new translation system

The JRC's Europe Media Monitor (EMM) now offers the possibility to understand at a glance the content of articles even if written in a foreign language. The "Optima News Translation System" (ONTS), developed in-house by researchers of the JRC's Institute for the Protection and Security of the Citizen (IPSC), automatically translates news from ten languages into English.

EMM is a live media monitoring system which gathers around 150 000 news articles every day from over 3750 internet news websites from

around the world in over 62 different languages. Its new in-house translation system brings quality machine translation capability in the hands of EMM users, combined with a satisfactory level of privacy and security.

ONTS automatically translates into English the title and the description of each article in Arabic, Czech, Danish, Farsi, French, German, Italian, Polish, Portuguese and Spanish. It can be used by simply clicking on the "EN" symbol appearing below the title of each news article available in EMM.

Read more:
<http://emm.newsbrief.eu>

JRC's 3D technologies used in an Integrated Mobile Security Kit

The JRC contributes to the Integrated Mobile Security Kit (IMSK) project with the 3D technologies for change detection and situational awareness. These systems are based on the technologies that JRC has developed for nuclear

Read more:
<http://www.imsk.eu>



The Integrated Mobile Security Kit (IMSK).

safeguards applications and were further adapted to the specific requirements of the IMSK project.

The IMSK project is a major research and development project within EU's Seventh Framework Programme (FP7). It aims at developing a security solution for large events requiring temporary increased security, such as Olympic Games or political summits. The IMSK has a security system that is mobile and scalable in response to changing threats, can be easily updated with new and emerging sensors and technology, is rapidly deployable and detects substances in real time.

The IMSK project is run by a consortium consisting of 26 parties spread all over Europe ranging from large, internationally recognised defence companies to small-medium enterprises, universities and operational counter-terror professionals.

CO-OPERATION AGREEMENTS

JRC and Israel Ministry for Energy and Water strengthen scientific cooperation

In the context of President Barroso's visit to Israel, the JRC and the Israel Ministry of Energy and Water Resources signed a Memorandum of Understanding to deepen their scientific cooperation in the fields of energy, in particular clean energy, and water desalination; with a focus on investigating the link between energy and water. The agreement fully complies with the EU-Israel European Neighbourhood Policy Action Plan adopted in 2005.

Both sides will encourage joint initiatives for ensuring a sustainable supply of energy and water in compliance with international environmental standards, with efficiency and sustainability at the forefront. Renewables, smart grids,

e-mobility and alternatives to fossil fuels will be the focal points of the energy-related cooperation. Water research cooperation will concentrate on desalination. All in which, Israel has a strong scientific expertise. The scientific challenges behind the link between energy and water will also be addressed.

The agreement will have an initial duration of five years and foresees joint research activities and scientific information/resource sharing. It was signed on 9 July in Jerusalem by Dominique Ristori, Director General of the JRC and Shaul Zemach, Director General of the Israel Ministry of Energy and Water Resources.



Signature of a Memorandum of Understanding between the JRC and the Israel Ministry of Energy and Water Resources.

Young scientific talent on visit

A group of young scientists recently spent a few days at JRC's Ispra site, visited its unique laboratories and discovered the science behind EU standards, norms and reference materials which can help to make buildings and consumer products safer and protect our natural resources and our health. The young scientists had successfully participated in the 23rd European Union Contest for Young Scientists and the German 'Jugend forscht' competition, and had received the visit to Ispra as an award.

After convincing the juries with innovative ideas such as a nano-taxi for gene transport, flexible displays to ban cribbing or a robotic swarm simulator, the twelve young inventors enjoyed meetings with experienced European scientists and the opportunity to discuss their findings and future plans with them.

Besides providing support to youth science competitions, the JRC also has its own initiatives to encourage young people to follow a career in science such as a bi-yearly Schools Day.

First JRC Ispra Summer School on European policies from a behavioural economics perspective

The first JRC Ispra Summer School on European policies from a behavioural economics perspective was organised on 31 August-1 September in Ispra and neighbouring Angera.

The summer school was aimed primarily at those working on issues covering to tax, employment, competition, innovation and general social policies

in the different European Institutions. Participants learnt about recent research results in an interactive way directly from some of the most renowned researchers in experimental social sciences. These insights will serve to open up new horizons in devising new and effective policy solutions to social and economic challenges.

Read more:
<http://ihcp.jrc.ec.europa.eu>

FUTURE EVENTS

Mapping scientific needs in the Arctic and Northern Areas, Brussels, 11 October

The initiative "Mapping scientific needs in the Arctic and northern areas", organised by the JRC and the Mission of Norway to the EU, aims at highlighting science and research needs within a European context to tackle the challenges and grasp opportunities in the Arctic and

northern areas. The event will focus on three priorities: climate change and climate adaptation, sustainable management of oil and gas resources, and renewable energy technologies. The environmental impact will be discussed throughout the different topics.

Read more:
<http://www.jrc.ec.europa.eu>

EXTERNAL RECOGNITION:

JRC scientists received the "2011 Award for Risk Reduction in Mechanical Engineering" (IPSC)

Four JRC scientists, together with other co-authors, have received the 2011 Award for Risk Reduction in Mechanical Engineering for their paper "Determination of the risk due to explosions in railway systems".

The award, issued by the Institution of Mechanical Engineers in London, recognises any eminent engineer who has contributed most in the understanding and/or reduction of risk in any area of

Mechanical Engineering. M. Larcher, F. Casadei, G. Giannopoulos and G. Solomos had contributed to an investigation on the effects of explosions inside rail systems. Because experiments in this field are very expensive or unrealistic, efficient numerical simulation methodologies have been developed, which use Fluid-structure interaction (FSI) calculations and suitable materials models. The award ceremony will take place on 26 September 2012.

Read more:
Proceedings of the Institution of Mechanical Engineers, Part F: Journal of Rail and Rapid Transit 2011
225: 373
Doi: 10.1243/09544097JRR385

Read more:
<http://www.jrc.ec.europa.eu/jobs>

Jobs at the JRC

Recently published – Applicants must submit their application no later than the indicated deadline

Brussels, Belgium

Seconded National Expert

- Analyst in foresight studies – 25 October

Petten, The Netherlands:

Post-doc researcher (Cat.30)

- Modelling the interaction between the EU energy policy goals and the deployment of low carbon energy technologies – 31 October

Seconded National Expert

- Expert in nuclear safety assessment – 25 October

Ispra, Italy:

Post-doc researcher (Cat.30)

- Crop Model Applications in Global Agricultural

Modelling – 21 October

- Nutrition and Health – 21 October
- Public Health Economics – 21 October
- Image-derived geospatial information integration and query – 21 October
- Fisheries data and GIS – 28 October
- Fisheries socio economics – 28 October

- GNSS Security Testbed & Performance – 28 October

- Knowledge discovery in databases of container itineraries and ship tracks – 28 October

- SAR imaging for maritime surveillance – 28 October

Senior researcher (Cat.40)

- Assessment of baselines for the tropical forest resources in South America – 21 October

- Towards IT-Ethics – 21 October

- Improvements in maritime awareness – 28 October

Ph.D. student (Cat.20)

- Interaction of nanoparticles with epithelial barrier – 14 October

Trainee

- Analysis of black carbon emissions based on technology-based inventory calculations, atmospheric measurements and source apportionment models – 24 October

The JRC Newsletter is a bi-monthly publication intended to provide JRC customers, stakeholders and other interested parties with an overview of recent highlights from the JRC's scientific achievements, policy support, contributions to events and other news.

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As the Commission's in-house science service, the Joint Research Centre's mission is to provide EU policies with independent, evidence-based scientific and technical support throughout the whole policy cycle. Working in close cooperation with policy Directorates-General, the JRC addresses key societal challenges while stimulating innovation through developing new methods, tools and standards, and sharing its know-how with the Member States, the scientific community and international partners. Key policy areas include: environment and climate change; energy and transport; agriculture and food security; health and consumer protection; information society and digital agenda; safety and security, including nuclear; all supported through a cross-cutting and multidisciplinary approach.

