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European Phosphorus Conference, Workshop and Platform

European Conference Outcomes



High level initiative

European Sustainable Phosphorus Conference

Speakers at the first European Sustainable Phosphorus Conference (ESPC) included the EU Environment Commissioner and representatives of several Member States governments.

Joint declaration

European Phosphorus Platform launched

Over 150 organisations signed up to create a 'European Phosphorus Platform' to take forward the joint regulator – industry – science initiative.



EU Environment Commissioner, Janez Potocnik

Conclusions

Key messages from the conference

- *Business development*
- *Cooperation*
- *Incentives*
- *Awareness raising*
- *Knowledge, benchmarking, dissemination*
- *Harmonisation of existing legislation & policies*
- *Developing EU policy*

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- Ø Ilkka Herlin, Baltic Sea Action Group
- Ø Bas Eickhout, Member of the European Parliament
- Ø Magnus Gislev, European Commission DG Enterprise
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- Ø Kris Peeters, Minister-President of the Government of Flanders

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- Ø Roland Scholz, Global TraPs
- Ø Christian Kabbe, P-REX
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Scientific Workshop conclusions

2nd European Sustainable P Workshop

Industry Conferences

Phosphates 2013 Monte Carlo, 25-27 March

SYMPHOS Agadir, 6 – 10 May 2013

Summary

European Phosphorus Platform launched

Speakers at the first “*European Sustainable Phosphorus Conference*” (Brussels, 6-7th March) included the EU Commissioner for Environment, Mr Potocnik, two Members of the European Parliament (greens, liberals), representatives of Ministers from Germany, Netherlands and Flanders, Fertilisers Europe, EurEau, OCP ...

<http://www.phosphorusplatform.org/esp2013.html>

YouTube: conference film:

<http://www.youtube.com/watch?v=2AuSj3CCqAM>

The Phosphorus Challenge clip:

<http://www.youtube.com/watch?v=Y17HqUsaoj8&feature=youtu.be>



Over 300 participants included representatives of the EU Commission DG environment, enterprise and foreign affairs, a dozen EU governments, media, industry and stakeholders. The conference was organised with funding from the EU Commission (DG Environment) and governments of Netherlands, Sweden, Germany, Denmark and Flanders.

Key objectives were identified as making Europe a frontrunner for innovation in P-management and P-recycling, coherent with the EU critical raw materials 20/20 roadmap and with bio-resources policies, so reducing dependency on phosphate imports, and **developing business opportunities and green jobs, and improving Europe's competitiveness.**

European Phosphorus Platform established

150 organisations have already signed the declaration proposed at the Conference, establishing a European Phosphorus Platform to promote, develop and implement better stewardship of phosphorus, recycle more and **create green jobs in the circular economy.**

The European Phosphorus Platform will integrate the European Innovation Partnerships on Raw Materials,

Water and Sustainable Agriculture and the EU research and innovation agendas of Horizon 2020.

The new Platform has fixed the following objectives:

- **Bring together** knowledge and experience
- Contribute to formulating a **knowledge agenda**
- **Disseminate** information
- **Promote** sustainable phosphorus management and related job creation
- **Cooperate** in the precompetitive phase of innovation

Other initiatives worldwide

The European Phosphorus Platform is one of a number of initiatives underway addressing sustainable phosphorus management across the world:

- **Japan:** has since 2008 a ‘Phosphorus Recycling Promotion Council’ with 150 company members.
- **USA:** National Science Foundation Research Coordination Network (RCN) “Coordinating Phosphorus Research to Create a Sustainable Food System”, launch Washington DC, 13-17 May 2013
<http://sustainability.asu.edu/research/project.php?id=704>
If interested, contact: helen.rowe@asu.edu
- **Canada:** first meeting of a Canadian Council of Ministers of the Environment initiative “Framework for Management of Phosphorus as a Resource”, 18th March 2013
- **National Nutrient Platforms:** *Netherlands* (2011), *Flanders* (part of Belgium, 2012), *Germany* (project) ... bringing together regulators, industry, stakeholders (ONGs, farmers)
- **Other:** the above are additional to the already ongoing global initiatives on or related to phosphorus management, such as: *P-REX* (EU funded P-recycling R&D Europe), *Global TraPs* (UNEP and FAO involvement), *Bio-Refine*, *Global Phosphorus Network* / GPRI, *Global P Summit* ...



Members of the conference organising committee

Joint declaration launching the European Phosphorus Platform, March 2013

The signatories are committed to develop a **European Phosphorus Platform** to continue dialogues, raise awareness and trigger actions to address the Phosphorus Challenge that have implications for ensuring food security, geopolitical stability and environmental sustainability, with the following goals:

- **Bring together knowledge and experience** necessary to strengthen innovation and knowledge through the EU for better stewardship of phosphorus, to recycle more and to create green jobs within the framework of a circular economy;
- **Contribute to formulating a knowledge agenda** which can be connected to the research and innovation agendas of Horizon 2020 and the EIPs on Raw Materials, Water and Sustainable Agriculture;
- **Circulate information and promote sustainable phosphorus management and related job creation;**
- **Work together closely** in the precompetitive phase of innovation, to exchange experience, best practice and benchmarking

The platform will operate according to the following principles:

- Bring together **public and private organisations and individuals** concerned with “The Phosphorus Challenge”
- **Work and learn together for innovation** in the sustainable use and management of phosphorus between industry, science, governments and non-governmental organisations to develop cross-sectoral alliances between the water, food, agricultural, waste and energy sectors;
- **Be open to new members** who want to invest actively in sharing technologies, knowledge and experiences, and act together in building a strong and vibrant network.

We declare that for the start of the European Phosphorus Platform it will be necessary to:

- Define and agree on efficient ways of **networking**, including meetings, virtual meetings, e-networks;
- Develop a common **governance structure** which is suitable for all (not too formal, not too institutionalized) and make financial and communication arrangements in the first meeting of the platform in September 2013;
- **Use smartly the existing networks** of industry, science and governments like currently existing platforms, associations and collaboration programmes within the EU;
- Industry (including agriculture, water and waste, fertilizer companies and other phosphorus producers and users) has the **lead to invest** in cross-sectoral innovations in the value chain;
- Through innovation, we take steps in closing the phosphorus cycle, i.e. we use less, recycle more and improve processes to meet the demands of end-users for the right quality, quantity and price of phosphorus;
- **Knowledge institutions and governmental organisations** at the regional, national and European levels will create an enabling environment;
- All parties **collaborate** with each other to achieve sustainable solutions;
- All parties are committed to **create more awareness** about the Phosphorus Challenge and propose solutions;
- The platform keeps a **strong link to global networks**, realizing that the Phosphorus Challenge has an international reach.

The following are proposed as **actions for the European Phosphorus Platform**:

- **Networking and exchange** to monitor, share information, develop input, feedback and representation on:
- **Phosphorus data collection**: phosphorus flows, resources, recovery potential, uses, including information on contaminants, regulations, new technologies, interferences, impact assessments, monitoring of P-recycling and P-stewardship policies and international benchmarks of processes, cost models, product norms
- **Business models and experience**, business cases and viable routes of P-recovery and treatment in the context of a developing market;
- **Economics and jobs**: identify policies to develop jobs and industries involved
- Proposals for **project funding**, eg. in the context of Horizon 2020 and the EIPs on Raw Materials, Water and Sustainable Agriculture;
- **Circulate information** on the Phosphorus Challenge by newsletters, website www.phosphorusplatform.eu and a project and experience data base

Conclusions

Key messages from the 1st European Sustainable Phosphorus Conference

The 300 participants at the Conference took part in 2x20 interactive sessions on topics including farm phosphorus efficiency, manure and organic waste P management, P-recycling, business cases, international experience and policy.



Journalists' conclusions

Dave Keating (European Voice) and **Gareth Simkins** (ENDS) drew conclusions from the conference debate.

They underlined the impetus of this conference, with active participation from the EU Commission, Members of the European Parliament, national and regional governments, industry, scientists and NGOs.

The publication of the **EU Green Paper on Phosphorus** is now expected by both industry and other stakeholders, in order to launch a formal consultation on how to bring phosphorus stewardship and recycling into EU policies, and to avoid the debate developing without EU Commission coordination.

Phosphorus stewardship and recycling has a strong place in the EU's raw materials policies and in the development of the bio-economy, impossible without P-recovery and P-recycling.

Figures and data are needed on the **competitive impacts, economics and job creation** resulting from phosphorus use efficiency and recycling



Key messages

The conclusions of the interactive sessions were drawn together by the organising committee and discussed in plenary, resulting in **seven key messages**:

1: Business development

- pilot projects
- sound financial engineering: eg. innovation loans, guaranteed funds, venture capital, bank financing
- integrating P management into other value created, eg. cost reduction

2: Cooperation

- dissemination of knowledge and experience
- connecting demand and supply, different waste streams, markets, logistics
- creating trust
- local value chains
- national nutrient platforms
- European Phosphorus Platform

3: Incentives for efficient use and for recycling

- identifying recycling targets
- landfill P targets
- certification

4: Awareness raising

- at public, political and professional levels

5: Knowledge, benchmarking, dissemination

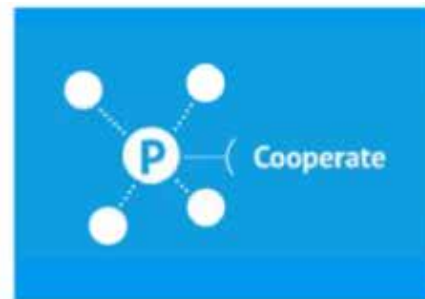
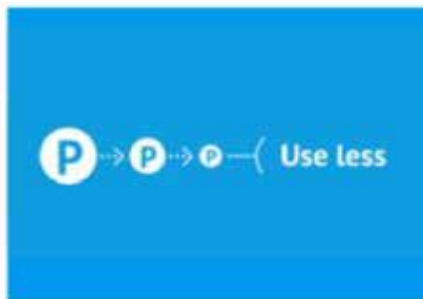
- monitoring P flows, P reserves
- risk assessments, LCAs, decision support systems, contaminants
- agronomy, soil P status, plant breeding

6: Harmonisation of existing legislation

- Waste Framework Directive (End of Wastes status)
- REACH
- Fertiliser Regulation
- Nitrates Directive
- ...

7: Developing EU policies

- EU as a front runner, competitive advantage
- inclusion of P in the list of strategic raw materials,
- EIPs (European Innovation Partnerships): eg. water, raw materials, agriculture
- Integrating P recovery into overseas development aid policies



The Phosphorus Challenge

Arno Rosemarin,
Stockholm Environment Institute
and Lars Jensen, University of Copenhagen

Global phosphorus demand will depend on population, diet (demand for meat and dairy products), bioenergy and biomaterials production, climate change (agricultural production may move to regions which do not have phosphorus enriched soils). Phosphate fertiliser demand is expected to increase in future years by >2%/year, and phosphate rock extraction at even higher rates. An important issue is **contamination** of phosphate rock used for mineral fertilisers (cadmium).

Only around 20-30% of P used in phosphate rock actually reaches human foods. **Use efficiency** is a key issue, along with processing and recycling manures in regions of intensive animal production.

Kimo van Dijk, Wageningen University

Summarised phosphorus use and flows in Europe. Around **70% of imports are used in fertilisers**, 20% in animal feed, and 10% in human foods and beverages, pharmaceuticals, chemical and other applications.

Around half of phosphorus input to Europe's agriculture is lost, and around half accumulates in soils. Only 25% of phosphorus used by man (foods and industrial products) in Europe is returned to agriculture, with **high regional variability** depending on phosphorus uses, losses and recycling. Several existing Life Cycle Analysis studies suggest that the environmentally optimum route for phosphorus recycling from sewage sludge is **agricultural reuse of appropriately treated sewage biosolids**.

Christian Nolte, FAO

In much of the world, farmers need to use more phosphorus to **improve food production**, in particular in Africa, India, Pakistan, Bangladesh and Central America.

Long-term efficiency of phosphate fertiliser is high in many soils (the P not taken up by the first crop to which it is applied is stored in soil and can be recovered by crops over following years), but this depends on the soil type (in tropical soils the P can be irreversibly bound to iron or aluminium compounds and not be recoverable by subsequent crops)

The 2008 price peak for phosphates was a temporary market crunch, linked to world food prices, but phosphate prices nonetheless remain today high enough to pose issues for poor farmers worldwide. FAO is concerned by this and is working to **improve fertiliser support, use and efficiency policies**, but it is not FAO's role to monitor phosphate rock supply or reserves.

Opportunities

Frank Rogalla,
International Water Association

The phosphorus in sewage has a **value of only 1 – 1.5 € / person / year**, that is negligible, whereas it is highly diluted and so difficult to recover. Wastewater treatment industries and scientists need to work with potential users of recovered phosphates, but many technologies are already available. In most circumstances **P-recycling from sewage is currently not economic**. In particular, P-recovery is not adapted to small sewage works.

The optimal solution for phosphorus recycling from sewage is **agricultural reuse of biosolids**. Sewage sludge ash incineration is very expensive and only adapted to big sewage works.

The **development of biofuels and biomaterials productions** will be a major opportunity for P-recycling, including through direct use of wastewater as a fertiliser. Phosphorus and water reuse will be essential to develop the bioeconomy.

Eric Smaling, Arnoud Passenier, Dutch Nutrient Platform

Smart cooperation is central to improving phosphorus use efficiency and developing P-recycling. Cooperation in the value chain involves collaboration between private companies, public and civil society structures, and building links between industries which are not usually in contact (sewage and waste, fertiliser, chemicals ...).

The Netherlands Nutrient Platform has fixed the objective to **develop a market for recovery and recycling of phosphates** by end-2013, based on what each company's and other actors' objectives.

Joint business cases can be developed through trust and mutual exchange, innovation, real demonstration cases. The result will be **new markets and jobs**, and resource efficient cities. The **European Phosphorus Platform** will be key to this.

Eric Smaling and Kees Langeveld



Javier Branas Lasala, Fertiberia

In agriculture, P (phosphorus) short-term fertiliser efficiency (use by the crop on which it is applied) is lower than for N (nitrogen) or K (potassium). **Adjustment of P fertilization recommendation schemes** based on soil analysis is needed, putting the efforts into “apply what is needed, no more”. The fertilizer companies are responsible for doing so. Every year Fertiberia produces 10.000 fertilization recommendations to farmers based on soil and plant analysis and in reference tables specifically designed for each crop and region in particular.

More efficient fertiliser use is essential to respond to the world's need for increasing food production. In that sense, Fertiberia develops innovative technologies and products that can increase the plant P uptake from soils and a better use of the soil P reserves, combining the most suitable P-sources in the fertiliser with organic and biological compounds that solubilize inorganic P of soil.

Kees Langeveld, ICL Fertilisers

For ICL, **recycling of recovered phosphates is considered strategic for the fertiliser industry in Europe**, in particular in the Netherlands where industry can help manage the regional nutrient surplus, or where sewage sludge is incinerated producing ash which is a significant potential secondary phosphorus resource.

ICL's fertiliser plants can recycle phosphates recovered as struvite, calcium phosphate (in particular, meat and bone ash) or incineration ash. Administrative procedures and testing are underway for scale-up. **Regulations must not close the door** to recycled phosphates. The objective is to make ICL's factories **an integral part of the local value chain**.

Transparency is necessary between suppliers of recovered phosphates and user industries, concerning organic or heavy metal contaminants.

Greet De Gueldre, Aquafin

Phosphorus recovery in sewage works can offer **significant cost and operation advantages**, especially in synergy with energy recovery from sludge. Anaerobic digestion enables methane production (for energy), but results in nitrogen and phosphorus rich digester liquor. P-recovery from this liquor avoids returning these nutrients to the sewage works and can possibly reduce sludge processing costs. Further research is however needed to clarify the overall financial feasibility, as well as to collect figures on the quality of the recovered phosphorus.

Regulatory action is needed to clarify the ‘End of Waste’ status for ‘good’ sewage sludge and the authorisation of use of recovered products, as well as to reduce levels of certain contaminants in sewage at source.



Janez Potočnik, EU Commissioner for the Environment

Mr Potočnik emphasised his commitment to making phosphorus efficiency and recycling happen, in order to **improve resource efficiency, prevent environmental damage and ensure supply security**.

Long-term growth must ensure the quality of life, social equality, and avoid environmental or financial debt to the future. Phosphorus stewardship is an important long-term issue which requires to **start now to develop holistic management of resources**. An appropriate framework can ensure predictability and so enable business and markets to effectively address this challenge.

Zero landfilling of domestic waste is not possible today, but should be the objective. Biodegradable wastes should not be going to landfill, and standards are necessary to enable their reuse and recycling as fertiliser. Action is also necessary to protect soils from the accumulation of cadmium resulting from mineral phosphate fertiliser use.

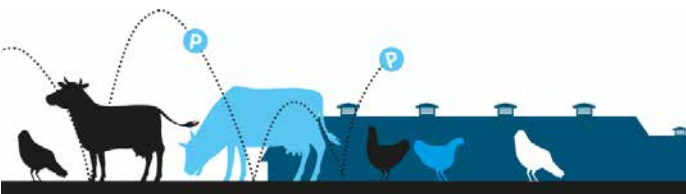
Agricultural efficiency of phosphorus use must be improved, through better knowledge of crop and animal requirements, and particularly through crop rotation, enhancing soil organic content and reducing soil erosion (which leads to loss of phosphorus).

Key areas for phosphorus reuse and recycling are **manure, wastewaters and biodegradable wastes**. Waste water treatment must move to be resource-based, not simply nutrient removal. The EU Water Blueprint and the Innovation Partnership for Water should facilitate this.

Mr Potočnik underlined the necessity of building the structures to **take onwards the impetus of this Conference** and to promote phosphorus stewardship, recovery and recycling as an integral part of sustainability and of economic development.

Mr Potočnik's speech online:

http://europa.eu/rapid/press-release_SPEECH-13-212_en.htm



Hugo von Meijenfeldt, Netherlands Ministry for the Environment

The Netherlands Government **official position is act now to close the phosphorus cycle**, to transform waste into a resource.

The Netherlands' action focuses on the full value chain, involving stakeholders, with industry as leader to **develop innovation and sell technology**.

Janez Potocnik and Arnoud Passenier



Pia Bucella, European Commission DG Environment

The European Union has a number of policies which can contribute to develop phosphorus stewardship and recycling. Within the 20/20 strategy and the resource efficient Europe roadmap, phosphorus management should be part of the green economy, **making waste a resource**.

EU regulations and policies which can impact phosphorus management include: Nitrates Directive, Waste Water Treatment Directive, Landfill Directive, Fertiliser Regulation, Waste Framework Directive, R&D funding ...

The current review of the **Waste Framework Directive** should promote reuse and recycling, including of biowastes, and reduce incineration.

The current **review of the Fertiliser Regulation** should bring in organic fertilisers and soil amendments, defining safety criteria and minimum quality (plant nutrition), and improving information of farmers. This is linked to work on 'End of Waste' criteria underway at JRC.

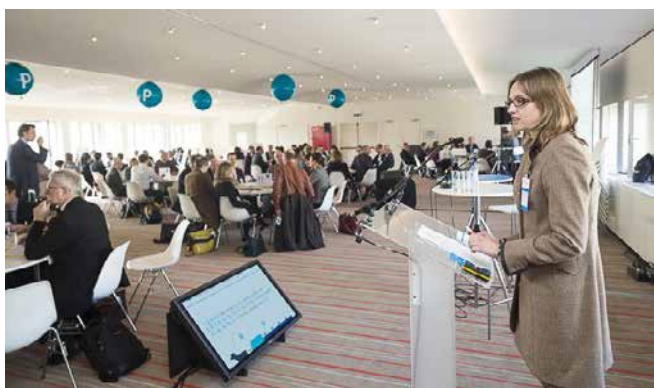
The EU Commission welcomes proposals to improve these regulations, for **recycling business operation and for phosphorus stewardship policy**.

**Helge Wendenburg,
German Federal Environment Ministry**

Phosphorus resource depletion is a long-term environmental issue, which must be addressed. It is now time to start to adapt the economy, to limit EU dependency on a limited number of supplier countries and regions.

In Germany, 50% of sewage phosphorus – potentially recyclable - is currently landfilled in incineration ash (co-incineration or separate sludge incineration ash). **An ordinance is currently being considered which would oblige recovery of phosphorus** wherever sewage biosolids are not reused in agriculture.

Issues which need attention include **contaminants** in recovered phosphates, but also the need to remove heavy metals from mineral phosphate fertilisers, and the plant availability of reused or recovered phosphates.



Ilkka Herlin, Baltic Sea Action Group

Any **phosphorus which is not being recycled is lost**, and in the Baltic catchment this means into the Baltic Sea, where it can contribute to eutrophication problems.

All bordering States have committed to reduce phosphorus inputs to the Baltic Sea. Companies which develop and implement phosphorus recycling now will be the **economic winners in the future**.

**Bas Eickhout,
Member of the European Parliament**

Phosphorus is **essential for every-day life** and we need to develop awareness. The EU Green Paper should now be published to launch consultation. Phosphorus management and recycling is an area where Europe can be competitive, and **develop economic advantage and employment**.

**Magnus Gislev,
European Commission DG Enterprise**

Raw materials are high on the EU's agenda with the objective of developing a comprehensive and integrated **raw materials strategy** including: fair and sustainable international supply, sustainable supply within Europe and resource efficiency and recycling.

A list of 14 **critical raw materials for the EU** was established in 2010 by the European Commission, but criticality is dynamic, and this list is undergoing a revision process in 2013, in which phosphorus will be considered. The review process uses specific criteria, including the economic importance of each raw material for EU industry.

EU policies to address raw materials strategy include R&D funding, innovation partnerships, integrating resource efficiency and recycling into existing legislation, and developing strategic partnerships with key raw materials producing or consuming countries.

**Guus Houttuin,
European External Action Service**

The chemical industry (Cefic) has indicated that **Europe is 95% dependent on imports for phosphorus**.

Actions are already underway with Morocco and Tunisia to develop **trade agreements and strategic partnerships**, including projects on decadmiation of fertiliser production.

**Kris Peeters, Minister-President of the
Government of Flanders**

The considerable, innovative experience of Flanders in developing partnerships for phosphorus management shows that there is no simple solution to phosphorus stewardship or recycling, but a **need for partnerships** to develop local actions, within a European framework.

It is important that the EU Commission develop **uniform rules across Europe and an EU market** for recovered and recycled phosphates.

The Phosphorus Challenge offers **opportunities to stimulate innovation and new business**. The European Phosphorus Platform is important to promote and foster this.

Michael Hamell, European Commission DG Environment

As EU Environment Commissioner Potocnik has recently stated: phosphorus stewardship “**would be good for resource efficiency, for the bio-economy, for agriculture, for energy use, for climate change and reduced water pollution**”.

Several Members States have already requested that the EU Commission now publish the **Green Paper on Phosphorus**. This document will enable a wide debate in society, and the elaboration of consensus proposals for policies and actions.

Jacob Hansen, Fertilisers Europe

Fertiliser management is central to resource efficiency: precision farming for phosphorus application should be developed.

The fertiliser industry supports the recycling of phosphates. However, **the quality and safety of recovered phosphates used as fertiliser is essential**, full information must be provided on contaminants, and the Fertiliser Regulation update must ensure that all fertilizer products are pure and safe.

The food industry and farming must **remain competitive on a global market**. Not all fertiliser factories can use recovered phosphates, and it is necessary to better define industry's requirements. Recovered phosphate products must be competitively priced.

Hisao Ohtake, Japan Phosphorus Recycling Promotion Council

The Japan P-Recycling Promotion Council was established in 2008 and now has 150 members, including **local fertiliser companies interested in using recovered phosphates**. The economic driver is principally the cost of sewage sludge disposal, as this currently goes to the cement industry at a significant cost to wastewater treatment operators.

The Council is helping **move forward policies in Japan** to ensure phosphorus recycling and raise public awareness, and is interested in working with a European Phosphorus Platform and global cooperation.

Gerben-Jan Gerbrandy, Member of the European Parliament

In today's world, facing global population pressure, **sustainability is not an option but a necessity**. The resource efficiency roadmap is central to Europe's economic agenda.

Phosphorus should be a pilot substance, because of its criticality to food and life, for the start of a green industrial revolution and the development of 100% recycling.

Environmental legislation needs to move rapidly to **enable innovation for clean technologies and for jobs for the future**.

Roland Scholz, Global TraPs

It is time to take action on phosphorus stewardship. The **potential is considerable**, as only around 10% of mined phosphorus finally reaches human foods.

Key points to act to improve phosphorus management should be identified, with **high potential for reducing phosphorus consumption**, including for Europe “hidden” phosphorus in imported food and animal feedstuffs

Conference moderator Sonja van Renssen and the final panel



Christian Kabbe, P-REX

Innovation is central to developing phosphorus stewardship and recycling. **The European Phosphorus Platform will take this forward.**

After the launch of the European Phosphorus Platform through this Conference, **a working programme and actions for this Platform will be defined in coming weeks**, based on the joint declaration (see above).

A milestone for the Platform's action could be a **second European Sustainable Phosphorus Conference, proposed for Berlin 2015.**

Mhamed Ibnabdeljalil, Vice CEO of OCP

OCP has been **entrusted with responsibility for Morocco's phosphate resources**, which belong to the country's people of today and tomorrow, and which are critical to humanity. OCP is also **responsible to its customers and partners worldwide**, to provide phosphorus in the right form.

Ensuring efficient use of phosphorus is central to these responsibilities.

OCP is investing US\$ 15 billion over 10 years to **double mine production capacity, triple fertiliser capacity, reduce environmental impact of operations**. Innovation in fertiliser efficiency and in P-recycling is part of this strategy. OCP is investing considerably in recovering more phosphorus from mined rock and in recycling P from gypsum wastes produced from processing.

OCP is working on **decadmiation of phosphate fertilisers**, but the technology available today only exists at pilot scale. The costs when scaled-up to full scale, and the capacity of farmers to pay for this additional cost, are not clear to date. What is certain, is that the additional cost and technology will eliminate certain producers from the market, thus reducing supply offer and driving up prices.

Discussion points

In discussion, it was emphasised that phosphorus is in a different situation to the 14 critical raw materials currently on the EU list, with **not the same issues of urgency and scarcity**, but on the other hand an irreplaceable role in food production.

It was also emphasised that trade agreements and partnerships exist and are being further developed with **Morocco as a specific, reliable, long-term trade partner** and key phosphorus supplier to Europe.

Several participants emphasised the importance of **reducing chemical contamination of municipal sewage**, in order to reduce the contaminant risks in recovered phosphates and in biosolids recycling. As a priority, participants asked for an acceleration of risk assessment of chemicals under the REACH "candidate list" to ensure phase-out of chemicals posing problems in the environment.

Participants proposed a number of **possible specific policies proposed to encourage phosphorus recycling** including:

- setting targets in the Waste Framework Directive for solid organic wastes
- fixing national P-recycling targets
- clarifying the 'End of Waste' status for manures,
- developing full-scale P-recycling demonstration plants
- recycling P in bio-fuels and bio-plastics production
- developing synergies between P-stewardship and recycling and other environmental policies such as pollution reduction, energy recovery
- job creation in P recovery and P management



This workshop was a follow-up of the 1st Scientific European Phosphorus Workshop (SEPW), Bordeaux, France, 2011. Since then, more national and European phosphorus (P) flow analyses studies have been undertaken and an EU COST Action research (<http://www.cost.eu>) proposal has been developed.

1st SEPW, 'Designing phosphorus cycle at country scale':
http://www7.bordeaux-aquitaine.inra.fr/tcem/layout/set/print/seminaires_et_colloques/collques/designing_phosphorus_cycle_at_country_scale

The goal of this workshop was to enhance the proposal, present studies, share knowledge and strengthen the network and collaboration. Furthermore the results of this two-day workshop were presented at the 1st European Sustainable Phosphorus Conference (ESPC) on 6 & 7 March in Brussels (see this SCOPE Newsletter, www.espc2013.org).

Perspectives on P have changed in the scientific and policy community. In previous decades, P has been considered initially as a fertilising product, and then subsequently as a potential pollutant triggering eutrophication. More recently, a new **societal and scientific concern** has emerged over the depletion of finite rock phosphate reserves from which fertilisers are derived and the need to reduce European dependency on primary P imports.

Economic and environmental benefits

As well as protecting this vital resource, there are economic and environmental benefits from reducing EU dependency on P by **increasing P use efficiency and recycling** to ensure a competitive agriculture and safeguard food security. Thus, P may be considered as a paradigm for other non-renewable essential resources. This view was also highlighted by European Commissioner Potočnik (Environment) during the ESPC Conference in Brussels.

P enters Europe as mineral fertilisers (70 % of total net import), animal feed & inorganic additives (20%), and food and non-food products (10%). It circulates among different sectors: agriculture, industry, households and waste. Therefore, P management is influenced by a **variety of factors and stakeholders**.

Drivers of P flows and budgets vary across Europe due to regional contexts (e.g. agricultural systems, food habits, waste and wastewater management policies). Identifying opportunities and constraints for better P (re)use requires a clear view of the whole P cycle and its drivers.

Phosphorus flow studies

Presently for the EU there are 11 national P mass flow analysis (MFA) studies, published for Austria, Finland, France, Germany, Netherlands, Sweden, Switzerland, in review for the United Kingdom, and others are under development for Belgium, Denmark and Norway.

These studies show that besides P losses in the waste sector via wastewater and biodegradable solid waste, **large amounts of unutilized P and/or losses originate in the agricultural sector** by accumulation in soils, leaching/runoff/erosion, incineration of slaughter waste and/or ineffective use of manure. The studies also show that there are large differences between countries and between regions within countries.

Phosphorus in Europe

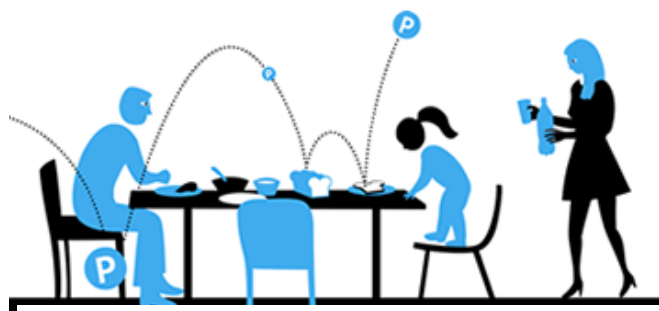
A P cycle study for the EU-15 has recently been published and one for the EU-27 is in preparation. Generally speaking the European P cycle can be characterised by:

- **Large P imports:** creating a dependency;
- **Long-term P accumulation in agricultural soils,** especially in West European countries with high national and local P surpluses;
- **Little recycling** throughout the P use chain, on average 40 % of sewage sludge and 15 % of compost is reused on land (part of that in agriculture), though livestock manure is largely recycled;
- **Significant P losses from all sectors,** largest in the food chain (e.g. food processing and waste management sectors), but also from animal production (slaughter waste), soils (leaching and run-off) and the mining industry (unused P in rock);
- **Low P use efficiencies** as a consequence of all the above, which provides ample opportunity for improvement.

Improving use efficiency

There is a need for more efficient and effective use of P. **Making Europe less dependent on P imports, using P in a sustainable way and having less impact on the environment** requires options from the 4R strategies:

- Reduce P demand and input;
- Re-use P rich organic materials, such as food residues, slaughter by-products and compost;
- Recycle P from 'wastes', by recovery and processing;
- Redefine the food system, processes, human choices and networks.



Phosphorus Challenge video
<http://vimeo.com/59415565>

Research actions to support 4R goals

Several research groups in Europe have initiated activities addressing these 4R goals.

Ø Firstly, **Material Flow Analysis (MFA)** and **industrial ecology** concepts are used to assess the P flows and stocks at regional, national and European scales, helping to rank the flows and to identify best options for action.

However, there is a need for a common modelling framework, associated datasets and common indicators to make comparisons among studies possible.

Ø Secondly, a wide range of **innovations for better resource efficiency and recycling** are under study in Europe (e.g. direct use of P-rich by-products as fertilisers, techniques for P-recovery in waste-water, reducing P content in feed, etc.).

Assessing their relevance and economic viability across the variety of European contexts is likely to contribute to sustainable P use and create business opportunities.

Ø Finally, some groups are developing **dynamic modelling of P resource and scenario-based approaches**: designing and assessing integrated scenarios reducing primary P use and increasing P recycling and efficiency in Europe are needed for future governmental policies.

All these research groups met during the SEPW workshops held 1st in Bordeaux 2011 (13 countries) and 2nd in Wageningen February 2013 (21 countries).

Innovation in resource management: the case of phosphorus

In general there is a clear **need for sharing, exchanging and coordinating these activities** as well as for strong cooperation between disciplines, sectors and countries.

The COST preliminary proposal "Phosphorus accounting: tackling the threat to food security in Europe" is now under revision under the working title "**Innovation in resource management: the case of phosphorus**", based on the new insights and with large changes in the focus. It will be submitted soon.

Partners are invited to join the project

Both scientific and business partners in the various sectors are welcome to join the project, especially in the food, feed, non-food and waste industry. For various EU countries we still would like to have representatives, especially from Eastern, Central and Southern Europe.

Contact: Kimo van Dijk (Wageningen University, kimo.vandijk@wur.nl). Also if data could be provided, at the process, sector, national and European level.

Workshop outcomes:

<http://www.wageningenur.nl/sepw2013>

Meetings and conferences

Vancouver, 28-31 July 2013

International Nutrient Removal and Recovery Conference

<http://www.wef.org/nutrients/>

Combined WEF and IWA-NRR conference: **Nutrient removal and recovery 2013 – trends in resource recovery and use:**

- nutrient recovery processes
- nutrient recovery from source-separated urine and agricultural effluents
- nutrient management of biosolids

Conference organised by WEF (Water Environment Federation), IWA (International Water Association), WERF (Water Environment Research Foundation) and British Columbia Water & Waste Association.



International
Water Association



Nutrient Platforms

Monte Carlo, 25-27 March 2013

Phosphates 2013

<http://www.crugroup.com/events/phosphates/>

The CRU Phosphates conferences are the only global meeting for the worldwide phosphate industry (rock production, fertiliser, animal feeds, food, detergents, other industrial uses).



These conferences bring together over 500 delegates from tens of countries worldwide, including senior industry executives and organisations that define phosphate supply and demand. Phosphates 2013 will provide a macro view of historical and current markets, supply, demand and prices to better understand the context for future trends.

Agadir, 6 – 10 May 2013

SYMPHOS

www.symphos.com

OCP is organizing the **2nd International Symposium on Innovation and Technology in the Phosphate Industry**. This symposium aims at becoming a leading event for the industry, manufacturers and equipment suppliers, technology and services, and R&D in areas related to the transformation of phosphates and derivatives.:

- Share information and ideas,
- Review new techniques and technologies that can improve production,
- Discuss best practices with an emphasis on sustainable development and environmental preservation,
- Envision the future of the phosphate industry in the context of a sustainable development approach and clean technologies.



The topics covered during the Symposium are as follows: phosphate extraction, enrichment and handling, sulphuric and phosphoric acid processing, fertiliser and phosphate chemical technologies, environment and sustainable development, water and energy consumption, management and use of by-products (sludge, phosphogypsum) ...

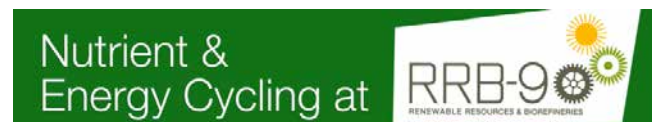
Call for abstracts

Antwerp, 6th June 2013

Nutrient and Recycling RRB-9

<http://www.rrbconference.com/call-abstracts-nutrient-energy-cycling>

In light of success of topics relating to resources recovery in submissions to date, two further sessions are opened on “Nutrient & Energy Cycling”:
Call for abstracts deadline 20th April 2013



Beijing, 18-20 June 2013

Global TraPs world conference



www.globaltraps.ch

The **Global Transdisciplinary Processes for Sustainable Phosphorus Management** (Global TraPs) project is studying phosphorus use, management and sustainability from a supply chain perspective involving academia, industry, governments, NGOs and other concerned parties.

The conference theme is “**Learning from Case Studies – Exploring Policy Options.**” with the objective of assessing specific areas for policy intervention to ensure sustainable phosphorus use.

The conference will be co-hosted by China Agricultural University, Ministry of Agriculture, Chinese Ministry of Education, Phosphorus Fertilizer Industry of China, National Science Foundation of China, IFDC, Fraunhofer Institute and other Institutes and will coincide with the **5th International UNEP Global Platform Nutrient Management Symposium**

Nutrient Platforms

Europe: www.phosphorusplatform.org

Netherlands: www.nutrientplatform.org

Flanders: dh@vlakwa.be