

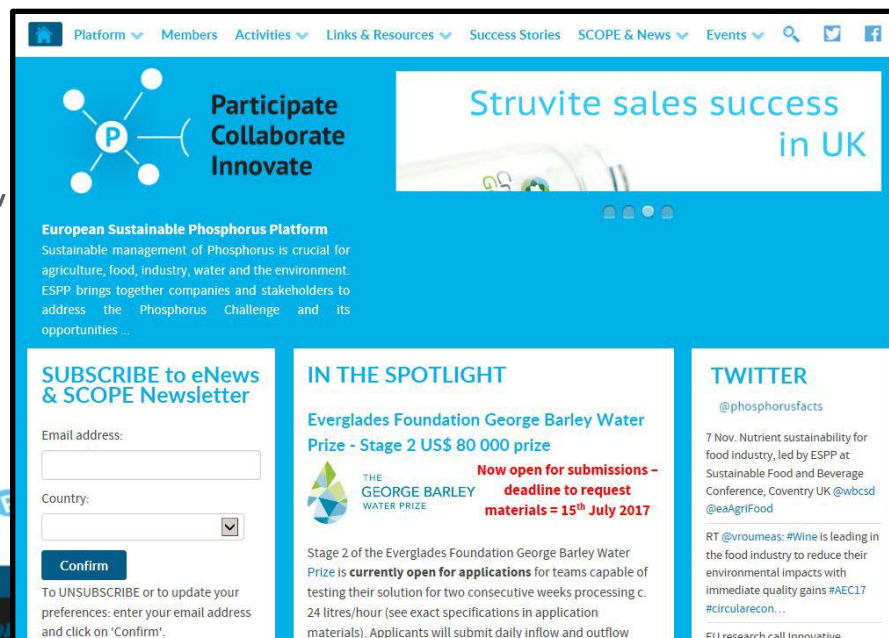
Chris Thornton, European Sustainable Phosphorus Platform

European context - meeting objectives



ESPP: a coalition for action

- Sustainable phosphorus use & phosphorus recycling:
 - global food security
 - circular economy
 - environmental protection
 - healthy diet and food safety
- Actions:
 - vision & awareness
 - stakeholders & networking
 - dissemination
 - policy and regulation dialogue
- Member funded:
 - water & waste industries,
 - mineral and organic fertilisers, chemicals,
 - P-recycling technology suppliers,
 - national & regional governments,
 - knowledge institutes ...



The screenshot shows the homepage of the European Sustainable Phosphorus Platform. The header includes navigation links: Platform, Members, Activities, Links & Resources, Success Stories, SCOPE & News, Events, and social media icons. A main banner features the ESPP logo and the text 'Participate Collaborate Innovate'. Below this, a section titled 'Struvite sales success in UK' is visible. The main content area includes a 'SUBSCRIBE to eNews & SCOPE Newsletter' form with fields for email address and country, and a 'Confirm' button. To the right, there is a 'IN THE SPOTLIGHT' section featuring the 'Everglades Foundation George Barley Water Prize - Stage 2 US\$ 80 000 prize', which is 'Now open for submissions - deadline to request materials = 15th July 2017'. A 'TWITTER' section on the far right shows a tweet from @phosphorusfacts dated 7 Nov, discussing nutrient sustainability for the food industry.



European policies driving nutrient recycling

Nutrient abatement policies

- *Urban Waste Water Treatment Directive 1991/271*
- *Nitrates Directive 1991/676*
- *Water Framework Directive 2000/2000*
- *Groundwater Directive 2006/118: phosphorus on monitoring list 2014*
- *National Emissions Ceilings Directive*
2016 revision → 19% ammonia emissions reduction by 2030



*Phosphorus is first cause of EU Water Framework
Directive quality status failure (other than morphology)
55% of UK rivers and 74% of lakes
exceed P level for good ecological status*



European policies driving nutrient recycling

2014 EU Consultative Communication on Sustainable Use of Phosphorus

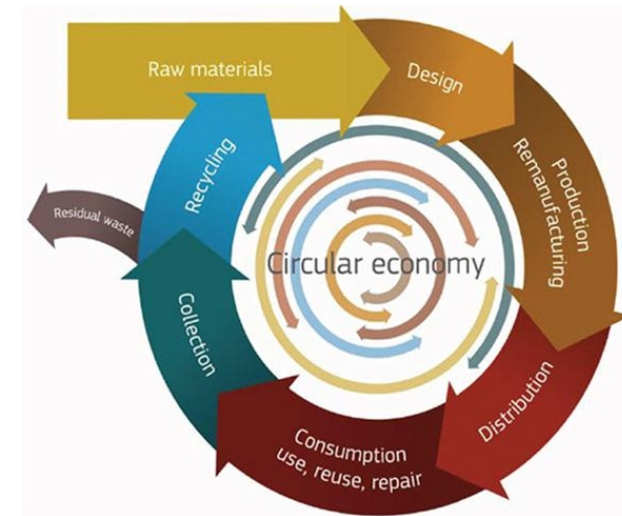
- *Proposals include: increasing knowledge and research, P-recycling, risk of soil contamination by mineral or recycled fertilisers*

see www.phosphorusplatform.eu/scope107

2015: EU Circular Economy Package

- *In responses to public consultation:*
- *30% of respondents identified bio-nutrients as “materials the EU should target first” (Q5, Q3)*
- *Overall, 54% cited bio-nutrients or phosphorus (all questions)*

see www.phosphorusplatform.eu/scope118



European policies driving nutrient recycling

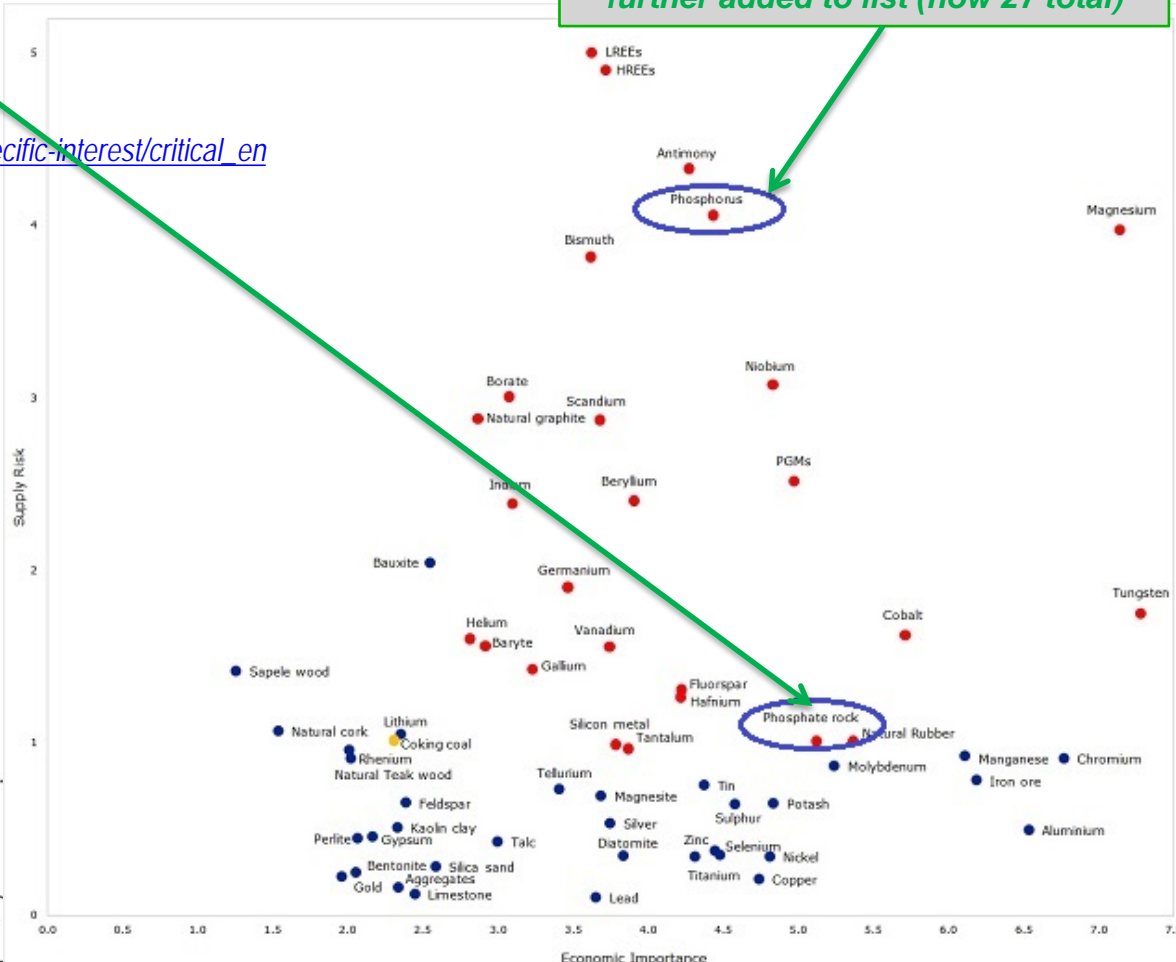
EU List of Critical Raw Materials

- 2014 Phosphate rock added to EU list of 20 CRMs

see https://ec.europa.eu/growth/sectors/raw-materials/specific-interest/critical_en

ESPP in action.

2017 White Phosphorus (P₄)
further added to list (now 27 total)



European policies driving nutrient recycling

2017 (ongoing) – Revision of EU Fertilisers Regulation

- Flagship initiative of Circular Economy Package
- Aims to open EU market for recycled nutrient products and also for nutrient recycling technologies
- Currently in Council - Parliament decision process
- Very many issues remaining

STRUBIAS (ongoing)

- Definition of criteria for EU Fertilisers Regulation for
 - struvite and phosphate salts
 - ashes used directly as fertilisers
 - ashes chemically processed to produce fertilisers
 - biochars and pyrolysis products

see www.phosphorusplatform.eu/regulatory

ESPP in action.

ESPP amendments adopted by IMCO

- accelerating inclusion of struvite, ash-based materials, biochars
- “low carbon” fertilisers category (with Fertilisers Europe, ECOFI)
- traceability
- widening input materials for food industry by-products, plant materials

<http://ec.europa.eu/DocsRoom/documents/15949>



EUROPEAN COMMISSION

European Commission > DocsRoom > Document detail

Proposal for a Regulation on the making available on the market of CE marked fertilising products and amending Regulations (EC) No 1069/2009 and (EC) No 1107/2009

Document date: 17/03/2016 - Created by GROW.A.5.DIR - Publication date: 17/03/2016



European policies driving nutrient recycling

Standards work underway

- 2017: CEN/SABE position on standards needs to support P-recovery
- CEN/CLC/BT/JWG 11 standards needs
for sustainable chemicals for the circular economy
- ISO 275 sludge recovery, recycling, treatment and disposal
- standards to accompany EU Fertiliser Regulation Revision

online at www.phosphorusplatform.eu/regulatory

ESPP in action.

2017: CEN/SABE position on
standards needs to support
phosphorus recovery



CEN/SABE ENV Team ENVironmental monitoring strategy Team

Phosphorus recycling from wastewater treatment processes: available
technologies, applicability and standardization needs –
Strategic Position Paper

Date: 2015-11-10

Reference: SABE ENV N 315

Action required: Final version

This Position Paper aims to provide a basis for recommendations to CEN/SABE for CEN/BT further to the conclusions of the CEN/SABE ENV Team (Environmental Monitoring Strategy Team) meeting of 25 March 2015 on “Phosphorus recycling¹ from wastewater treatment processes: available technologies, applicability and standardization needs”.



Success story:

COOPERL / Brittany farmers' cooperatives

- 400 000 t/y manure processed to organic fertiliser product
 - 150 000 t composted poultry litter
 - 150 000 t dried poultry manure
 - 100 000 t pig manure (1 100 farms)
- Adapted to specific crops and exported to other regions of France
- Positive farmer acceptance
- TRAC Emeraude stabling system

Supported by EU Investment Plan

<http://www.cooperl.com/en/environmental-solutions>



Success story: Fibrophos UK

- Bioenergy and fertiliser (ash) from chicken litter
- Since the 1990's
- Phosphorus, potassium, sulphur, trace elements
- 800 000 t/y chicken litter processed annually
- P shows both immediate and durable crop effectiveness

<http://www.fibrophos.co.uk/phosphate-in-fibrophos-fertiliser/>



Success story: SARIA UK – Kalfos

- P-fertiliser and soil conditioner from combustion of animal by-products (MBM)
- Authorised for arable and grazing land
- 12 000 tonnes/year

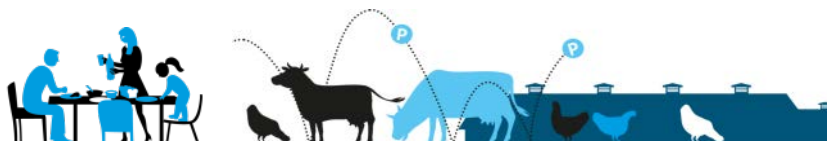
<http://www.kalfos.co.uk/>



Success story: *Fertikal, Antwerp*

- 180 000 t/y (wet weight) manure processed to organic fertilisers:
- Solid/liquid separation
dried, pelletised
- For agriculture, horticulture
- Distributed
to 25 countries worldwide

www.fertikal.be

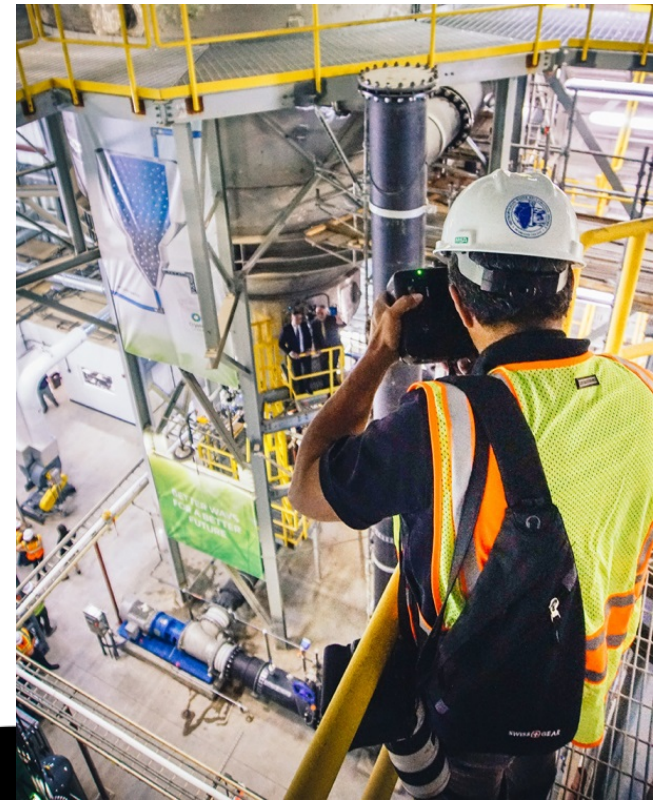


Success story:

Ostara Pearl® Chicago

- Stickney Water Reclamation Plant, Cicero (Chicago), Illinois
- Gulf of Mexico eutrophication sensitive zone
- World's largest struvite recovery facility
- Three Pearl® reactors
- Treating all digestate from 4,5 million inhabitants
- Nearly 10 000 tP/year recovered
- *WASSTRIP installation underway/
→ objective increase P recovery
to 50% of wwtp inflow*

www.ostara.com



Success story:

REVAQ sewage treatment Certification

- > 50% Sweden's sewage goes to REVAQ Certified sewage works
- Sludge digestate quality, monitoring, information transparency criteria
- 3000 t/year phosphorus recycled to agriculture

http://www.iea-biogas.net/case-studies.html?file=files/daten-redaktion/download/case-studies/REVAQ_Case_study_A4_1.pdf



Linking R&D and policy

Organic contaminants in sewage biosolids

- Priority challenge for ESPP:
 → more than half of EU sewage sludge is today recycled to land
- Need for data, research and risk assessment to support
 policy making and food industry acceptance
- Fate in water treatment and nutrient recycling processes

ESPP in action.

Joint input to EU research FP9
 programme definition by ESPP -
 European Environment Bureau –
 water industry – organic fertilisers
 and growing media industries



Joint position for the attention of Member State representatives on the R&D programming committee
 for the preparation of EU 9th Framework Programme:

- European Sustainable Phosphorus Platform
- Eureau – Europe's drinking water and waste water service operators
- EBA – European Biogas Association
- ECN European Compost Network
- European Environment Bureau
- Growing Media Europe

The need for research into organic contaminants in sewage biosolids and in manure,
 to support the bio- and nutrient circular economy

Recycling of organic wastes (treated sewage biosolids, manures, non-avoidable food wastes, green wastes, food processing by-products ...) back to agricultural soil is under pressure because of real or perceived concerns about organic contaminants (pharmaceuticals, organic chemicals ...) and their



Linking R&D and policy

Input to EU consultations

- Urban Waste Water Treatment Directive
- open to 9th November

<http://ec.europa.eu/info/law/better-regulation/initiatives/ares-2017-4989291>

- CAP
- Pharmaceuticals strategy
- Microplastics
- ...

Input to preparation of “FP9”

- R&D programme after H2020

ESPP in action.

Proposed input to FP9 – identifying priorities and knowledge gaps for nutrient-related research
Draft circulated today for YOUR input and comment to
info@phosphorusplatform.eu



Draft v5 – Proposal v15/10/17

ESPP ideas for R&D needs to support nutrient stewardship in EU R&D funding FP9

The EU is starting the process of defining objectives and outline of the R&D framework programme (FP9) which should follow Horizon 2020. Please comment on ESPP's proposed initial input below, by email to info@phosphorusplatform.eu

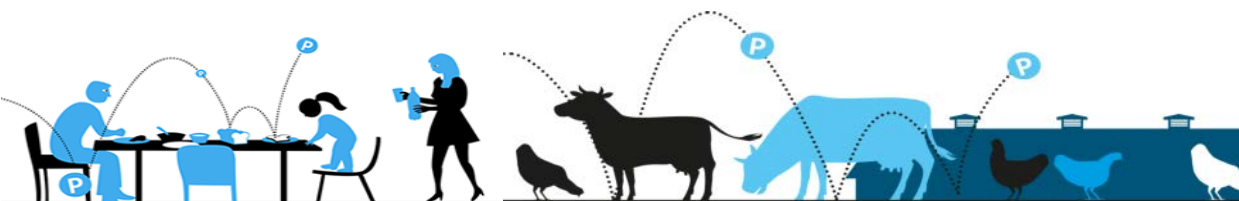
Theme / priority	Content
Phosphorus and nutrient flows	Quantitative data on nutrient flows, including within wastewater treatment flows, trends over recent years, nutrient needs to “feed” food production and the bioeconomy. Modelling impacts of policies. Spatial, material and economic feasibility of recycling of different flows. Use of big data to support nutrient stewardship.
Recycling organic carbon and nutrients	Development of specific regional strategies for nutrient recycling, energy, heat, waste valorisation. Contaminants * 5 in organic secondary materials (e.g. pharmaceuticals in sewage sludge, manures, ..., microplastics, hydrocarbons) - data base, risk assessment** - impacts on microbiomes - mitigation/removal in treatment-recycling (composts, digestates, ...) - evidence base for appropriate & safe use. Interactions between nutrient recycling and organic carbon recycling to soil (4/1000 Paris commitment), soil carbon-water and soil nutrient-carbon interactions.
Social acceptance of nutrient recycling and the food industry	Social and food industry acceptance* of secondary raw materials from bio-wastes – creating market demand – drivers and barriers to nutrient and organic carbon recycling, including regulation – insurance of “contaminant risk” Phosphorus footprint – dietary choices – phosphorus in food – including nutrient stewardship into food industry sustainability criteria
Nutrient delivery to agriculture	New fertilisers / fertiliser delivery which improve agronomic efficacy, plant uptake and reduce losses – new business models for delivering crop productivity (service rather than product, holistic approach soil – nutrients – crop) Technologies to produce bespoke recycled nutrient products, tailored to specific regional farmer / crop needs* or with specific organic carbon – nutrient balances – soil nutrient balances of P with Ca, Mg, micronutrients Life cycle analysis* of nutrient recycling compared to primary mineral fertiliser production
Agricultural practices for nutrient efficiency and reducing nutrient losses	Agronomy “feed the plant not the soil” – nutrient leaching – soil carbon* - catchment management of legacy P stores – influence of soil type and climate Agricultural BMP for phosphorus management – updating of knowledge base and information for farmers and policy makers – social science around farmer engagement in best management practices. Precision farming application of recycled nutrient materials* - remote sensing, translation to yield and crop N content, combination with other monitoring tools - on-farm tools for nutrient content determination of manures and organic secondary materials* Nutrient stewardship in aquaculture
Industrial applications, processes, value chains	Phosphate rock and phosphorus (P4) as a Critical Raw Material – innovation in recycling of secondary phosphorus sources into industrial applications to replace mineral P inputs, in production of white phosphorus (P4)** Including P-recovery from mine wastes (iron ore tailings) and processing residues (phosphogypsum) Decadation technologies, technologies for removing contaminants from sewage sludge incineration ash Development & demonstration of routes from secondary materials to EU-label Fertiliser products, including upstream separation of cleaner materials (e.g. biomass), reduction at source of contaminants New phosphorus recycling technologies Support for quality and standards of recycled nutrient products***, including characteristics of organic carbon in secondary fertiliser products Wastewater treatment: Implementation of very low P discharge limits in sewage treatment, including in small sewage works – interactions with energy consumption, biosolids generation, contaminants, organics; combination of new energy efficiency approaches in wastewater treatment with nutrient and carbon recycling
Eutrophication remediation	Eutrophication remediation, in particular of lakes and enclosed seas (esp. Baltic) - nutrient removal and recovery from lake and marine waters, inflows and sediments – assessing quantities and understanding behaviour of internal P storages, interactions with different forms of P loadings and impacts on eutrophication. Impacts of climate change. Holistic catchment nutrient management through e.g. emissions trading or catchment permitting – linking biological and landscape parameters (Water Framework Directive) to chemical nutrient parameters in water and soil

\$ = Joint position already agreed with Eureau, EBA, ECN, ECOFI, Growing Media Europe, EEB

* = Included in EIP-AGRI Focus Group 19 recommendations for R&D needs

** = P4 (white phosphorus) added to EU Critical Raw Materials List 13th September 2017

*** = cf. CEN/CLC/BT/LWG 11 (2017-2018 underway) Sustainable chemicals (DG GROW mandate: Identification of potential needs of standardisation for sustainable chemicals from primary and secondary raw materials related to the circular economy action plan)



Linking R&D and policy

EU project funding under

- Horizon 2020
 - in particular: calls on water, waste, circular economy
 - BBI (Bio Based Industries)
 - SME instrument
 - FTI (Fast Track to Innovation)
- LIFE
- InterReg
- Rural Development funding

ESPP in action.

In 2015, with 60 other organisations,
ESPP proposed the theme of
“recycled nutrients” to EIP-AGRI

EIP-AGRI Focus Group n° 19 on Recycled Nutrients, conclusions 2017:

The Focus Group's two meetings identified the following seven areas as possible **priorities where knowledge is currently lacking and research is needed**.

- Life Cycle Analysis methodologies, risk assessments
- Environmental impacts: e.g. on nutrient leaching, soil carbon
- Organic contaminants: data, impacts, effects of processing
- Acceptance of organic fertilisers, by farmers, food industry, public consumers
- Precision farming application of recycled nutrient materials: remote sensing, translation to yield and crop N content, combination with other monitoring tools
- On-farm tools for nutrient content determination and soil carbon balance assessment
- Technologies to produce bespoke recycled nutrient products, tailored to specific local farmer / crop needs

From www.phosphorusplatform.eu/scope124



Linking R&D and policy

1st European Nutrient Recycling Projects workshop Berlin 2015

- co-organised by P-REX (FP7 project), ESPP, DG RTD Eco-Innovation
- 28 nutrient recycling projects present
- conclusions published by the European Commission

“Circular approaches to phosphorus: from research to deployment”,
<http://bookshop.europa.eu/en/circular-approaches-to-phosphorus-pbKI0115204/>



The screenshot shows the EU Bookshop website interface. At the top, there's a navigation bar with the EU flag and the text 'EU Bookshop All EU publications YOU are looking for!'. Below this is a breadcrumb trail: 'EUROPA > EU Bookshop > EU Bookshop - Home > Enterprise - Services > Chemical industry > Circular approaches to phosphorus'. The main content area is divided into two columns. The left column has a sidebar with categories: 'Industry - Enterprise - Services (3 900)', 'Industrial policy (1 187)', 'Processing industries (524)', 'Chemical industry (272)', 'Pharmaceutical and cosmetics industry (139)', 'Enterprise (1 282)', 'Services (451)', 'Freedom of establishment and freedom to provide services (22)', and 'Public procurement (64)'. The right column features the title 'Circular approaches to phosphorus' with the subtitle 'From research to deployment'. Below the title is a small image of the book cover. The text describes the report as a summary of presentations and discussions from a workshop held in Berlin on 4 March 2015, organized by the European Commission (DG Research & Innovation), the European Sustainable Phosphorus Platform (ESPP), and the P-REX project. It mentions the workshop's aim to bring together research and demonstration projects on phosphorus recovery and recycling from across Europe, with industry practitioners and experts, to enable contact between the different projects in order to exchange information, transfer experience and build synergies, take stock of research and demonstration projects and related networks dealing with phosphorus recovery and recycling, identify further research and demonstration needs to support development of the circular economy for nutrients, discuss implementation, identify obstacles and opportunities for moving from research to market rollout and societal uptake, including adapting to different local contexts.



Meeting objectives



University of Applied Sciences and Arts Northwestern Switzerland
 School of Life Sciences

2nd European Nutrient Recycling Projects workshop

Phos4You

SYSTEMIC

ALGAECAN

INCOVER

Water2Return

Resource Container

ASHES

AgroCycle

QUB P from wastewater

Run4Life

DOP

Newfert

Phorwärts

Bonus Promise

DECISIVE

SABANA

SMART-Plant

3R2020+

ENRICH

RichWater

RAVITA

IMPROVE-P

Nurec4org

BioRefine Cluster



Meeting objectives

Get to know – each other, the projects

- one-slide project presentations 11h-12h30
- posters

Networking between projects

- thematic sessions 14h – 15h15

Discuss possible coordination

- exchange of knowledge and experience
- share literature reviews ?
- avoid duplications?
- synergy of dissemination tools?
- timing of events or joint inter-project meetings ?

Proposals for actions and for future research needs

- Panel 16h15-17h30



Some ideas to get started

SCOPE Newsletter

- 45 000 emailing list
- recognised reputation
- dissemination tool for projects ?
- relaunch as forum for leading R&D centres in nutrient sustainability ?

SCOPE NEWSLETTER

Network of projects and researchers

- avoid 'stop and go' – beyond 3 year project horizon
- what resources for coordination ?

Possible joint events

- IFAT Munich May 2018 ?
- SFS Amsterdam June 2018 ?
- Finland June 2018 ?



... and now: over to you!



Chris Thornton, European Sustainable Phosphorus Platform
info@phosphorusplatform.eu

