

Proposed action: **DONUTSS**

Data on Nutrients to Support Stewardship



Adequate, up-to-date data, in a useable form, is essential to define nutrient stewardship objectives, targets and actions, and to monitor their effectiveness. Quality data can be used for the analysis of nutrient flows and stocks, circular economy development and critical raw material policies by policy makers, business and scientists. **This targets phosphorus (P), potassium (K), possibly other nutrients.** Existing work is already underway on nitrogen, e.g. INI <http://www.initrogen.org/europe> - there are links and experience transfer, but duplication should be avoided.

To date, around 20 phosphorus flow studies have been published in different countries and regions of Europe (see below). However, the methodologies used, sectors covered (agriculture, industry, households etc.), spatial scales and time-horizons are very variable so that results cannot be compared. Many regions have no useable phosphorus flow data. Data for other nutrients is even more scarce and disjointed. Where data is available, it is not readily accessible to stakeholders and is **not orientated towards identifying points of possible effective action.** Data is rarely updated, so following results of system changes or of impacts of nutrient management actions is not possible.

The need for improved knowledge of phosphorus flows was the first **conclusion of the European Commission Consultative Communication on the Sustainable Use of Phosphorus** (Staff Working Document SWD(2014)263final): *"In terms of ascertaining the extent of phosphorus supply and demand, while the Communication represented a good starting point, the replies pointed to a need to increase the knowledge base. Information on flows and reserves should be more transparent and reliable and should cover more sources and geographical areas."* Whilst the reserves information requires international action, the flows data can and should already be addressed in Europe.

Phosphate rock is on the EU list of **Critical Raw Materials** and an **MFA (materials flow analysis)** is currently underway. The stakeholders meeting already confirmed the considerable insufficiencies of information currently available to input to this MFA. Now is therefore the time to start to complete the information base in preparation for the next MFA exercise planned in three years' time (2017).

The **2nd European Sustainable Phosphorus Conference, Berlin, March 2015**, also confirmed the inadequacy of current nutrient flow data (see below), and the corresponding need for better data to support policy decisions and actions. Representatives of Eurostat, JRC and EEA underline the need for better data quality in the light of monitoring nutrient flow in society.

Proposed action

To try to address the absence of such a data system today, **ESPP proposes to organize a workshop to bring together data flow researchers, data holders, stakeholders and competent institutions** (EC, EEA, JRC, Eurostat, and national organizations). Objectives would be to propose a shared overview of the current data situation and to define proposals for what is needed to support nutrient stewardship as well as to define possible steps to move towards establishing such a flow monitoring system. Results from earlier Scientific European Phosphorus Workshops in Bordeaux (2011) and Wageningen (2013) (www.wageningenur.nl/sepw2013) will be incorporated.

This should be the **first step towards taking this forward to implementation** of coherent and action-targeted nutrient flow data collection, monitoring and publishing. Important in this is to define which organisations can take this on and how to fund it.

A lack of data quality is a worldwide problem. Therefore, if EU succeeds in setting up first a coherent system, this will generate the possibility of **exporting know-how to other parts of the world** that also face great challenges related to nutrients stewardship.

ESPC2 proposals

The question of phosphorus flows data was discussed at the working table at the 2nd European Sustainable Phosphorus Conference, March 2015 and as a result the European Sustainable Phosphorus Platform suggests that:

- **Adequate, reliable, coherent and targeted data on nutrient flows is important to support improved nutrient management decisions in Europe**, and so to address issues of food quality, agricultural efficiency, nutrient losses to surface and ground water, and nutrient supply security;
- Data should be available at the **regional, national and European levels**, with coherent methods and presentation;
- Specific data systems are useful for certain **specific stakeholders and sectors**, e.g. municipal wastewater, agricultural biosolids use, etc.;
- Data should cover both quantities of **flows and quality** (nutrient concentration and form, in particular plant availability, feasibility or recovery);
- Data should be designed to **target identification of key management points** for possible actions for reducing losses, improving efficiency, recovery and recycling.

Context: existing studies

In economy-wide accounting and analysis, multi-year schemes are already widespread to the extent that several countries have incorporated them into their statistical information systems. Several schemes have thus already been introduced at national scale to monitor material flows (e.g. wood, bulk materials, etc.). At the substance level, on the contrary, there is almost a complete lack of structured monitoring, despite the high relevance that several chemical elements have, either as potentially harmful for the environment or as resource for economic production.

The monitoring of phosphorus in agriculture has been implemented in European countries in the past two decades due to the concerns related to the surplus accumulated in soils and to its negative consequences for water ecology and quality. But even in this field there are still many challenges related to data transparency and consistency and to the comparability among Member States.

The relevance of phosphorus for European countries has however another important dimension, since it is a crucial resource with potential insecure supply in the future and it was recently added to the list of Critical Raw Materials by the European Commission. It is therefore necessary to track the flows, stocks, losses and concentrations of phosphorus throughout its whole life cycle, by improving and extending its assessment and monitoring beyond the agricultural sector.

In the past 10 years, European researchers have performed several studies to assess P flows through the entire society. As summarized by van Dijk et al. (under review), P Flow Analysis (PFA) studies have been conducted for the EU-15 (Ott and Rechberger, 2012), and at the national level for several European countries including Austria (Egle et al., 2014; Seyhan, 2006), Belgium (Flanders) (Coppens et al., 2013), Denmark (submitted, personal communication Manfred Klinglmair, DTU), Finland (Antikainen et al., 2008; Antikainen et al., 2005; Saikku et al., 2007), France (Senthilkumar et al., 2012a; Senthilkumar et al., 2012b), Germany (Gethke, 2012), Netherlands (de Buck et al., 2012; Smit et al., 2010), Norway (submitted, personal communication Helen Hamilton, NTNU), Sweden (Linderholm et al., 2012), Switzerland (Binder et al., 2009; Lamprecht et al., 2011), Turkey (Seyhan, 2006; Seyhan, 2009), and United Kingdom (Cooper and Carliell-Marquet, 2013). Compared to more traditional agricultural P balance assessments, PFA studies show how P is used, reused and lost through different societal compartments. In most cases these analyses are static, i.e. they depict a snapshot of the situation during a defined or average base year. Consequently, these studies fail to

capture spatial and temporal changes, as well as feedbacks and dynamic mechanisms within society. Furthermore, often they do not address thoroughly the quality of their input data and the consequences on the robustness of their results. Lastly, most of these studies in the last years have most exclusively focused on P, whereas it would be probably more appropriate to also consider simultaneously the other relevant macro and micro nutrients (e.g. potassium, copper and zinc) as well as the contaminants associated with different management strategies.

In parallel to the academic and scientific interest, several regulators and stakeholders from different industrial sectors have recognized the importance of better quantifying, understanding and monitoring specific P flows, and have implemented highly valuable data collection schemes. These initiatives are however still highly fragmented and a shared, common strategy may help identifying synergies, optimizing efforts and ensuring broader distribution, use and impact of the information.

Proposed workshop outline

Targeted participants

- **stakeholders from the private sector** (fertilizers companies, farmers associations, waste and wastewater management, etc.), which often do already hold very valuable data and whose perspective is therefore crucial, since the modification and extension of current monitoring schemes strongly relies on their involvement and active participations;
- **representatives of institutions** involved in statistics and environmental indicators, which can provide insights of actual possibilities and limitations for implementing monitoring schemes;
- **representatives of national nutrient platforms**, given that nutrient flow data is the basis of defining actions
- **researchers** who have carried out nutrient flow analyses studies and who have experience with the data necessary to quantify flows and stocks (with respect to data availability, quality, relevance at different scales and for different purposes);

Themes to be discussed

The first goal of the workshop is to identify major data gaps and problems and to discuss which specific strategies can solve these challenges, for example:

- monitoring is already in place but it is the lack of harmonization of the methodologies that hinders any international comparison (e.g. nutrient flows in feed, manure and waste);
- data on material flows exists, but without enough detail, clear definitions and information about nutrient concentration, the latter does however change in time because of changes in management (e.g. organic wastes);
- data are mainly available for the generation of a flow, but not for its management/disposal routes (e.g. management and endpoint of P in sewage sludge).

After identifying the priorities, for each of the proposed modifications or extensions of the current monitoring, the benefits will be discussed together with the obstacles and costs to understand their feasibility.

Since experts and participants of different nationalities will be present, an important aspect of the workshop will be the possibility of sharing specificities, weaknesses and strengths of the approaches implemented in different countries and to identify models that could be easily applicable elsewhere.

One last point to be discussed is the scale at which the initiative for such monitoring schemes should be launched. The data eventually need to be collected locally. But shall the initiative for their implementation be pushed by each Member State independently or would it be possible/worth having a common European strategy? Moreover, who should be in charge of coordinating, processing and publishing the data (national statistics, Eurostat, EEA)?

Outcomes of the workshop and further steps

The expected outcomes of the workshop are proposals for data system, in particular recommendations on what to collect, who will collect it, how to ensure harmonization, and how to fund it. It is important that the system should be lasting, but an initial 2-3 year “project” structure may be appropriate for the definition and establishment phase. Although it might be ambitious to expect detailed answers to these questions from a workshop, this shall at least concretely define priorities on what we want to achieve and which processes shall be set off in that direction.

Proposed planning objectives

- Workshop: 3-4 September 2015
- Finalisation of initial project and funding proposals: end 2015
- Initial project: defining data, collection, monitoring, etc. and initialling data collection where missing: 2016
- Presentation / global workshop major nutrient conferences in 2016, e.g. IPW8 (Rostock), SPS China 2016
- Proposal to EU institutions for permanent flows monitoring system: end 2016
- Implementation 2017 onwards

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