



**BALTIC
COMPASS**

Part-financed by the European Union (European Regional Development Fund and European Neighbourhood and Partnership Instrument)



Governance Innovations for Improved Phosphorus Management and Reuse - Voices from the Baltic Sea Region

Synthesis from 'Pre-consultation' for EU Green Paper on Sustainable Phosphorus



Paper to be included in the European Commission consultation process on the EU Green Paper on Sustainable Phosphorus and to inform HELCOM and relevant national platforms



Coordinating lead institution

Stockholm Environment Institute (SEI)

Collaborating institutions in the survey, interviews and focus groups

The Institute of Technology and Natural Sciences (ITP), Falenty, Poland

Swedish Institute of Agricultural and Environmental Engineering (JTI), Uppsala, Sweden

Stockholm Environment Institute – Tallinn Centre, Estonia

MJ-Prosessit Ltd., Finland

Swedish Board of Agriculture (SJV), Sweden

Institute of Agroecology, Aarhus University, Denmark

Latvian Farmer's Parliament, Latvia

Swedish University of Agricultural Sciences (SLU), Uppsala, Sweden

Central Research Institute for Complex Use of Water Resources (CRICUWR), Belarus

Baltic2020 Foundation, Stockholm, Sweden

*The EU-funded project **Baltic COMPASS** aims to find ways how the agricultural sector in the Baltic Sea Region can produce the daily food required by the region's 90 million inhabitants and at the same time preserve the Baltic Sea. To learn more, visit www.balticcompass.org.*

For further information about this paper

Please contact Rasmus K. Larsen, Research Fellow. Email: rasmus.klocker.larsen@sei-international.org; Mob: +46 (0)73 707 8564.

Disclaimer

The views expressed in this document are those of the author(s) and do not necessarily reflect the views of the contributing institutions. The designations employed and the presentation of the material in this document do not imply the expression of any opinion whatsoever on the part of the contributing institutions.

Copyright © Stockholm Environment Institute, 2012.

Cover photo: ©Flickr/nbpetersen.

Contents

LIST OF ACRONYMS	4
INTRODUCTION	5
TOWARDS A NEW APPROACH ON PHOSPHORUS?	5
INNOVATIONS FACING SYSTEMIC CONSTRAINTS	6
OBJECTIVE & METHODOLOGY: PRE-CONSULTATION FOR EUROPEAN GREEN PAPER	6
SYNTHESIS OF KEY INSIGHTS FROM SURVEY AND CONSULTATIONS	9
1. DESIRABLE TECHNOLOGIES HIGHLIGHTED BY CONTRIBUTORS	9
2. RECOMMENDED 'INTERVENTION POINTS' IN EXISTING EU POLICY	11
3. IS THERE AN INTEREST IN A COMMON REGULATORY APPROACH?	13
4. BENEFITS FROM ADOPTING A MARKET-BASED APPROACH	14
5. A DIVERSE REGION: RECOGNISING BOTH SHARED AND DIVERGING STAKES	15
6. CRITIQUE OF A CENTRALISED POLICY AND/OR MARKET BASED APPROACH	16
SUMMARY AND CONCLUDING REMARKS	18
REFERENCES	21

List of acronyms

BSAP	Baltic Sea Action Plan (of HELCOM)
BSR	Baltic Sea Region
CAP	Common Agricultural Policy (of the EU)
EU	European Union
HELCOM	The Helsinki Commission
P	Phosphorus
RDP	Rural Development Program (under the CAP)
UAA	Utilised Agricultural Area
WFD	Water Framework Directive of the European Union

Introduction

Towards a new approach on phosphorus?

In recent years, there has been mounting awareness that phosphorus is not only essential for agriculture/food production, but that it is also a limited resource, and that new governance measures are required to ensure its use is sustainable. Large, commercially viable phosphorus rock reserves are found in only a few countries, mainly outside the EU. In the absence of an international governance framework to facilitate trade, EU member states remain import-dependent, with a great degree of unpredictability in the pricing of phosphorus rock and fertiliser. For instance, in 2008, the price of phosphate rock rose by 800% due to a spike in oil price and speculation. This situation creates vulnerabilities for the agricultural-food system and makes phosphorus an important policy question for food security and improved governance¹.

At the same time, from an environmental standpoint, phosphorus from agricultural runoff and point sources leaches into water bodies and contributes to eutrophication, 'dead sea bottoms', and the disappearance of fish species and aquatic animals. These impacts, in turn, have negative effects on the agricultural-food industry, livelihoods and tourism. There are, however, no regulatory targets for phosphorus management within the EU. While HELCOM's Baltic Sea Action Plan sets targets for phosphorus leaching for BSR countries, these remain voluntary (i.e. no coercive instruments are in place to ensure implementation) and concern exists that the HELCOM platform has not yet inspired a significant commitment from the agricultural sector².

The physical separation of food production, food processing and food consumption in modern societies has resulted in a linear flow of nutrients from 'field' to 'fork'. Continuous application of new phosphorus via imported fertiliser allows an 'end of pipe' loss both during food production and consumption. Current market instruments generally encourage overdosing rather than cautious application and effective reuse, for example, through manure handling technologies to optimize nutrient recycling. This problem is exacerbated by the fact that the implementation of existing European regulatory frameworks, such as the Nitrates Directive and the Water Framework Directive (WFD), tend to focus on combating the loss of nitrogen, not phosphorus. Further, the majority of agro-environmental measures under the Common Agricultural Policy (CAP) are designed around a definition of nutrients as a 'pollution' problem, rather than from a resource management and reuse perspective³.

Altogether, more effective reuse of fertiliser nutrients could potentially save agricultural communities significant sums of money, reduce the dependence of the Baltic Sea Region on fertiliser imports and lessen vulnerability to price shocks, and benefit the overall environment and citizens' well-being. To realise these benefits, countries in the Baltic Region will need to learn from one another about technical, institutional and policy innovations.

¹ Cordell et al., 2009; Rosemarin et al., 2011; UNEP, 2011

² Powell et al., forthcoming

³ E.g. Schröder et al., 2010

Innovations facing systemic constraints

Recent years have seen many innovations in several BSR countries and sectors towards phosphorus reuse, including waste handling, sanitation and manure processing in agriculture. Some countries have introduced phosphorus taxes, launched voluntary phosphorus indices to guide soil application, and even regulated phosphorus fertilisation through soil maps (see more in the synthesis of insights below). There is also ongoing research, examining, among other options, the prospects of applying flexible fees and feed-in tariffs to encourage reuse⁴. However, there is no common institutional 'home' for efforts to promote reuse and closing of loops between sectors, so they often depend on one sector taking additional responsibility. Urban-rural recycling of human excreta is often problematic due to infrastructural lock-ins and legislative constraints. It has proven difficult to adequately monetise/value manure recycling technologies, which deliver multiple benefits. Further, recovery of phosphorus from lake and coastal sediments remains a wild card in terms of cost-effectiveness and bio-security risks owing to accumulation of hazardous substances⁵.

On top of this, as with all complex issues, the uncertainties remain high. What is the exact lifetime of low-cost phosphorus rock globally, and how urgently should we respond? How do we manage phosphorus application in the absence of adequate soil maps or even basic monitoring data in some countries? How can we price phosphorus transfers through manure when the phosphorus content varies? While some countries have sludge regulations with compulsory requirements for recycling a fraction of the sludge to arable land, uncertainties regarding bio-security make it difficult to scale-up and to generate acceptance among consumers and farmers.

Objective & Methodology: Pre-consultation for European Green Paper

With the September 2011 Roadmap to a Resource Efficient Europe, the European Commission received approval to explore future governance alternatives for promoting effective recycling across sectors in society. A European Green Paper on Phosphorus is being prepared by the European Commission and will be published in July 2012⁶. Immediately after publication, the Commission will host an online stakeholder consultation, followed by decisions in the European Council and European Parliament. If negotiations go well, there are many opportunities to strike novel 'win-win' solutions for a range of sectors and societal interests.

In recognition of the opportunity to contribute to new European policy developments in the area of phosphorus management and reuse, the Baltic COMPASS project (through Work Package 6: Governance and Policy Adaptation, led by SEI) decided to convene stakeholders in the Baltic Sea Region to provide a collective set of messages from a regional perspective. The work was organised with the primary aim to enable exchange of lessons and joint reflection between the BSR countries. It was also framed as an informal pre-consultation leading up to the launch of the Commission's Green Paper, thus stimulating awareness about possible upcoming policy developments at EU level and the existence of both common and differentiated interest in the region.

⁴ See for instance <http://tssef.se/?p=270>

⁵ Bomans et al., 2005

⁶ European Commission, 2011a. Information on the work of the European Commission pertaining to phosphorus is available at <http://www.ec.europa.eu/environment/natres/phosphorus.htm>.

The Baltic Sea Region is heralded as a flagship region within the EU for piloting sustainable solutions, reconciling economic growth and environmental conservation in the agro-environmental and food sectors. It is assumed that the Baltic Sea Region Strategy represents ‘an ideal case’ for the application of the European territorial cohesion approach⁷. This should provide an opportunity to learn from BSR lessons to date regarding how enable a holistic approach to improved phosphorus management, recognising the regional diversity within the EU and its macro-regions. Indeed, this diversity is characterized by the presence of eight European Union member states and their neighbours Belarus and Russia, complex economic, environmental and social problems, which transcend administrative and political borders, and transnational agro-environmental interdependencies, with ill-defined and intractable resource issues, such as concerning phosphorus management.



Fig. 1: Riparian states in the Baltic Sea Region. The notion of ‘riparian’ is used, in accordance with the tradition of international law, to refer to a nation state or other political territorial entity sharing a common water body.⁸

The following **questions** were explored:

1. What are the most significant sources of phosphorus loss from the agricultural-food system in your country?
2. What are the most promising technical, institutional and legal innovations for phosphorus reuse already in place in your country to address these losses?
3. What further enabling governance measures (e.g. monitoring systems, regulations, market incentives, etc.) are required to promote these innovations; and which national initiatives are currently being taken in this regard?
4. Is there a need for a common European governance framework, and if so, how could it best stimulate desirable national actions?

⁷ European Commission, 2009

⁸ For further information on this definition, see Aguilar and Iza, 2011

In the framing of these questions, "governance" is defined as a process of mediating between diverse and sometimes competing claims on resource issues such as phosphorus management. "Innovation" is seen not just as a technical process of 'discovery' but equally as a process of individual and institutional learning, including the building of strategic coalitions to pursue common goals (possibly at expense of other priorities)⁹.

Inputs were requested from parliamentarians, government officials, agricultural and environmental groups, individual farmers, and other interested parties. The request, which took place via email lists and the launch of a Discussion Brief to stimulate interest¹⁰, was for brief statements accompanied by relevant reference materials and citations (documents, web links, etc.). Replies to the online survey were submitted online by visiting an online survey form (<http://bit.ly/Baltic-Survey>), or through email replies directly to SEI. All replies were guaranteed to remain confidential, unless explicitly agreed otherwise in follow-up correspondence. In total, close to 80 responses were received on the online survey. These contributions exhibit a response bias towards Sweden (19), Finland (19), Denmark (9), and with fewer inputs from Germany (7), Estonia (6), Lithuania (7) and Latvia (5), and fewest from Poland (1), Belarus (2) and Russia (1). Second, Baltic COMPASS partners conducted 22 key informant interviews with professionals with particular expertise on phosphorus issues, in ministries, environmental NGOs, farmer federations, and research institutes around the Baltic Sea. These people were identified by the national COMPASS partner, based on the principle of consulting one person from an environmental NGO, one person from a national ministry or agency, and one person from an agricultural interest organisation. This enabled receiving inputs from countries, such as Belarus, Poland, and Latvia, which were underrepresented in the survey. Thirdly, evidence is drawn from over ten focus groups with regional participation held during the implementation of the project Baltic COMPASS to date. These included national workshops held as part of a review of implementability challenges in the region as well as National Roundtables convened by Baltic COMPASS¹¹.

In the submission of information, little specific data was provided pertaining to question 1, regarding nutrient losses, and respondents generally referred to existing scientific review and monitoring data from authorities. With regards to question 2, respondents provided many recommendations as to what they found to be the most important technical and technological advances. However, a detailed review and critique of these advances were not within the scope of the present consultation. Below, we list the advances highlighted by respondents, but refer to other sources for more detailed technical information. Indeed, the envisioned added value of the present paper is with regards to governance innovations (questions 3 and 4). The synthesis of key insights below has thus been structured to best communicate lessons from contributors on these questions.

A first synthesis of lessons was presented as an invited paper at the Conference on the Nitrates Directive and Phosphorus held by the Danish Government May 2012 under the rotating Presidency of

⁹ For more background information on these definitions see e.g. Leeuwis and van den Ban, 2004.

¹⁰ SEI, 2012

¹¹ For elaboration on the methodology of the review of implementability challenges in the region please see Powell et al., forthcoming

the European Council. The second day of this conference focused on phosphorus management and reuse, with participation from 25 European Member States and the European Commission¹².

Below, we summarise the key insights from the survey, interviews and focus groups, organised under headings that emerged to best capture the lessons and interests of contributors in relation to the questions posed. When relevant, we provide brief commentaries from the point of view of the authors of this paper, serving as our reflections on the lessons. The purpose of this paper is to communicate the voices from stakeholders in the region, and – to the extent possible – synthesise a collective ‘regional perspective’. While we provide references to background studies and scientific literature throughout this paper, the emphasis is on the views and interests of the contributors. When possible we therefore refer to examples provided by the contributors, including concrete projects or documentation.

Synthesis of key insights from survey and consultations

1. Desirable technologies highlighted by contributors

Contributors highlighted a large number of technical developments for improved phosphorus management. This included notably

- 1) Agro-environmental measures for nutrient capture (such as improved wetlands, sedimentation ponds, ditch filters, drainage technologies, biomass harvesting from catch crops, and reduced soil manipulation in the autumn)¹³,
- 2) Manure technologies¹⁴ (such as manure separation, biogas treatment, pyrolysis etc.),
- 3) Sludge reuse technologies (such as sewage treatment technologies, small scale sanitation systems), and
- 4) Improved management of soil phosphorus content and targeted fertilisation based on phosphorous requirements (through precision fertilizing, phosphorus norms and indices etc.)¹⁵.

Contributors centred around the view that most of these innovations remain voluntary and/or not even incorporated as ‘measures’ under relevant legislative initiatives, such as the CAP. It was widely acknowledged that many of these measures, technologies and innovations are not receiving adequate support. Few phosphorus targeted technologies are included under the Rural Development Programs (RDPs) in the riparian states. At present most measures are selected based on effects on reducing nitrogen leaching. In fact, recent reviews of most popular agro-environmental measures in the BSR have shown that nutrient capture measures are largely selected based on their effect on nitrogen leaching and implemented as ‘end of pipe’ solutions focusing on leaching and not on a

¹² See conference information at <http://eu2012.dk/en/Meetings/Conferences/Maj/Foerste-til-femtende/Konference-om-nitratdirektivet>

¹³ Reference was made to lessons from a number of projects, incl. Active Wetlands (http://www2.wwf.fi/english/finland/active_wetlands_reducing/) regarding the use of ferric sulphate and gypsum to treat ditch waters and bring nutrients back to fields; the VELHO project (<http://www.ymparisto.fi/default.asp?node=26333&lan=en>) harvesting and using the common reed on coastal areas to remove nutrients.

¹⁴ For more technical information see for instance <http://www.balticmanure.eu/>

¹⁵ On phosphorus indices, please see BalticSea2020, 2011

holistic ‘closing the loop’ principle related to reuse targets. For instance, only one of the surveyed BSR countries reported an emphasis on "precision feeding" as a measure, indicating a low awareness regarding how one part of the animal production chain influences subsequent steps¹⁶.

The limited emphasis on phosphorus targeted agro-environmental measures was partly explained by the concern from some country respondents (e.g. Latvia, Lithuania, Poland, Belarus) that soils are phosphorus deficient and that continuous application is required. However, informed decisions in this regard are made difficult owing to very scarce availability of consolidated data pertaining to soil phosphorus content, linked to weak or absent national monitoring systems. For instance, whereas phosphorus indices have been developed in several countries, they remain at early trial stage and have not been taken up by authorities. This is also partly explained by the uncertainty in data, including absence of detailed topography and soil maps.

Some quotes from the interviews may serve to qualify this point about these data uncertainties that provide obstacles to upscaling of new measures and technologies:

“Due to finance limitations, the monitoring system for phosphorus in Latvia is not fully developed. While there are several water quality monitoring actions going on in the country, it would be rather essential to develop a complex system, which would describe the real situation”.

“There is no overall picture of the situation [in Finland], since the field phosphorus values, which are measured as required in the agri-environment payment scheme, are not collected. This information is scattered, and researchers and projects have to buy it from the soil fertility service organizations”.

“The issue of soil phosphorus status seems really crucial [for the BSR]. But the problem is that the data is not available, not on sufficiently small scale, not comparable between countries or even within countries, or not reliable (hints of manipulation). There are no common EU guidelines on soil phosphorus sampling”.

The lack of soil phosphorus data is linked to wider uncertainties surrounding the flows of phosphorus in the agricultural-food system and society at large. From a regional perspective, this is associated with limited compatibility between country datasets¹⁷. This is also one of the reasons why countries such as Finland, Denmark and Sweden now are undertaking national level assessments to quantify the phosphorus flows, as part of larger national action plans¹⁸.

Moreover, great differences in the region regarding progress in these technologies were highlighted. This included in waste and sewage treatment, with some countries encountering decreasing cost effectiveness with respect to investments (e.g. Sweden, Finland) while others lack technology and finances to invest in such treatment systems (Belarus etc.).

¹⁶ See Salomon and Sundberg, 2012.

¹⁷ See for instance Heckrath et al., 2008

¹⁸ In Sweden, the Ministry of Environmental commissioned in February 2012 the Environmental Protection Agency to assess phosphorus resources and opportunities for improved reuse (Government of Sweden, 2012). The Danish Ministry of Environment is currently drafting the national Waste Management Plans under the Waste Framework Directive. Finland is working to step up its implementation of the national Road Map for nutrient recycling and has allocated 3 million Euros for this work for 2012.

In terms of the sources for phosphorus recycling to cultivated land, contributors commented that the relative reliance on sludge and manure differed between countries. For instance, it was mentioned that countries such as Sweden have a higher extent of recycled phosphorus from sludge than other countries, while riparians with intensive livestock production, such as Denmark, Germany and parts of Poland, obtain higher loads of recycled phosphorus through manure application. These differences seem important to keep in mind when considering opportunities for regional or even European level concerted action.

2. Recommended 'intervention points' in existing EU policy

Regarding the challenges to upscaling and applying new technologies and measures for improved phosphorus management and reuse, the contributors highlighted a number of propositions regarding concrete opportunities to revise existing policy frameworks to enable better use of the technical innovations mentioned above. Proposals included (in random order):

- Many comments were made about the need to address the sense of uncertainty regarding **bio-security risks** and hazardous substances when recycling phosphorus residues. This included the creation of common protocols and procedures for ensuring bio-security in sludge reuse. This could be linked to standardised bio-tests to ensure the safety of bio-waste and sludge based on fertilizer products. It was requested that such regional/European wide standards could serve as basis for insurance for farmers using sludge on fields. A more widely recognized and centrally sanctioned guarantee systems was hoped to also address the lack of acceptance from society when recycling residues. Some suggested that inspiration could be drawn from existing bio-security certification schemes such as the Swedish REWAQ certification¹⁹.
- Inclusion of phosphorus reuse measures in EU's **Rural Development Regulation** for the period 2013 onwards (such as referring to Art. 29 (environment-climate measures) and Art. 30 (organic farming))²⁰. This could include measures highlighted above (section 1), such as payment schemes for manure technologies and more targeted fertiliser planning via soil phosphorus monitoring and fertiliser recommendations and use of phosphorus indices. There was also interest in specific support schemes for facilitating local nutrient reuse and/or farmer collaboration on sub-national manure distribution²¹.
- Inclusion of phosphorus risk assessment requirements for the issuance of livestock permits under a revised **Nitrates Directive**. This was motivated by the recognition of distribution problems within countries in terms of manure phosphorus, and that environmental permits for new or enlargement of animal production units could take into account the balance between livestock density and UAA (Utilised Agricultural Area) from the perspective of phosphorus application, and not only nitrogen.

¹⁹ See for instance <http://www.lrf.se/Miljo/Avloppsslam/REVAQ-certifiering/>

²⁰ European Commission, 2011b

²¹ Examples of such sub-national manure exchange were highlighted from Finland (see e.g. <http://www.farmit.net/manurebank>).

- Wider application of **taxation** on mineral phosphorus in chemical fertilisers (such as currently practiced in Denmark)²²
- Design of common European / regional quality **standards for manure processing equipment**
- Drafting of **common guidelines** on soil phosphorus sampling and analysis of soil phosphorus.

3. Is there an interest in a common regulatory approach?

Contributors were uncertain about the actual implications of a ‘common EU take’ on phosphorus. They expressed diverse views both for and against, but **mainly against a regulatory approach**. This was due to one or several of the following interlinked reasons:

- 1) Low confidence in the value of further administration,
- 2) A view that phosphorus is already indirectly addressed through several regulations. In this regards, contributors showed a preference for a more holistic reuse and plant nutrient emphasis under an updated Nitrates Directive, and that it in general would be more appropriate to develop existing legislative initiatives than launching new,
- 3) Experiences of ineffective national implementation of directives to date,
- 4) Perceptions of unequal and non-transparent national interpretation of EU legislation leading to concerns that new regulation on phosphorus would not have fair distribution of responsibilities among the riparians.

As expressed by one ministry representative:

“There is no place for common restrictions for all countries, without evaluation of the real production conditions, intensity, soil characteristics and other related factors. [We] will strongly oppose such a framework, since with low animal production and our soils’ historic condition our farmers are faced with a high risk to be placed in uncompetitive position, if compared to other EU countries”.

This view reflects an anxiety that an interest in ‘phosphorus reuse’ could spill over into subsequent mandatory requirements to reduce the input from fertilisers. This view was expressed by several representatives of riparian states with a dominance of crop production and abundance of phosphorus deficient soils. It contrasted significantly with the perspective of some country representatives in territories with high soil phosphorus content and surplus of manure and waste residues, such as Denmark and Germany. In livestock intensive countries/areas, there was great interest in enabling a regional or European exchange of manure-phosphorus, for instance facilitated through tighter regulation on mineral phosphorus application (see also section 5 below for elaboration on these differences in ‘stakes’ between the BSR riparians).

Further, it emerged that many perceive **regulations for phosphorus management to already be in place** in several riparian states, or at least that further steps should be built on these existing frameworks. For instance, delegates from Estonia highlighted legislative bases for limitations on phosphorus use, regulated through the Water Act, which permits spreading of up to 25kg manure

²² A tariff of 4 DKK / kg mineral P is levied on chemical fertiliser since the introduction of Action Plan for the Aquatic Environment no 4. Similar tariffs have previously been applied in Sweden, but have now been abandoned.

bound phosphorus/year/ha arable land²³. Sweden has similarly targeted regulations, which over the last 25 years has limited phosphorus application through animal manure (max 22 kg P/ha & year over a 5-year period). In comparison, most other countries limits manure application through regulation of nitrogen applications (under the Nitrates directive). In these countries, such as Denmark, phosphorus is indirectly regulated through ‘harmony requirements’, stating the maximum spreading of manure/livestock holding per UAA²⁴. Further, several countries also regulate the amount of phosphorus to be spread from sewage sludge, often with a maximum limit²⁵. In contrast, in countries that experience greater problems in the financial resources and capacities of the public authorities, such as Belarus, there is no regulation of phosphorus use or discharges, nor control of phosphorus contents in laundry and detergents.

This tendency in the responses is not surprising given the ‘track record’ of regulatory EU directives to foster regional cohesion on agro-environment. Most environmental directives have encountered substantial implementability constraints. The institutional capacity to implement is in many countries low, with environmental infringement cases accounting for approximately one third of all open cases for non-communication, non-conformity or erroneous application of EU law in the EU 27²⁶. The enforcement of coercive environmental targets without sufficient mechanisms for transnational cooperation has led to a prioritisation of national targets at expense of transboundary collaboration around common water bodies. There is also a poor track record of stakeholder involvement and state-steered design of measures²⁷. For examples, agro-environmental measures under the CAP Pillar 2 are increasingly employed to meet mandatory EU targets (e.g. via WFD, Natura 2000 etc.). Further, resistance to data sharing across catchments compounds transboundary cooperation on water pollution. For instance, it was highlighted by one contributor that

“the EU member states did not bring lists of their “agricultural hotspots” to the HELCOM meeting in 2010 as had been agreed earlier. Russia and Belarus had made very detailed lists, but they were not presented in the meeting”.

Other ministry representatives commented that when the government was encountering difficulty in progressing according to the BSAP targets then the responsible authority was instructed not to share data that would compromise the country’s position.

4. Benefits from adopting a market-based approach

As an alternative to a strictly regulatory approach, a large number of contributors converged towards an interest in benefits arising from commoditising phosphorus residues and creating improved national markets, or even functional regional or European markets for trade in sludge and manure. One key proposal in this regard, at European scale, is the Dutch Phosphate Value Chain Agreement,

²³ §26 (4);RT I, 21.12.2011, 19

²⁴ The Livestock statutory order (*Husdyrbekendtgørelsen*, BEK 1695) implements part of the Nitrates Directive and stipulates harmony demands on the relation between livestock units and area size. Harmony demands comprise the relationship between animal des units and area (livestock density maximum of 1 livestock unit per ha; one LU = one dairy cow)

²⁵ In Demark, this is regulated (30 Kg P/ha UAA/yr) through the Ordinance on Sludge, now being revised to the ordinance on waste and soils. For more information on Danish phosphorus management in agriculture see Poulsen and Rubæk, 2005.

²⁶ Coffey and Richartz, 2003

²⁷ Powell et al., forthcoming

which unites Dutch actors who “share the ambition of creating a sustainable market within two years, where as many reusable phosphate streams as possible will be returned to the cycle in an environment-friendly way and where the secondary (recycled) phosphate – as long as a surplus exists in the Dutch market – will be exported to the fullest extent possible”²⁸.

The perceived benefits from a market based approach, as expressed by BSR contributors, included:

- 1) It would form a response to the current ‘market failure’ where phosphorus residues are not valued and often considered as ‘waste’, thus helping the capturing of larger systemic benefits and impacts of nutrient reuse,
- 2) Creating a regional market could provide ‘economy of scale’ to concentrate investments in phosphorus capture technologies, which today are not cost-competitive,
- 3) It could provide alternative financing routes and incentivise agro-environmental actions, which are not viable today, such as under the RDPs and AE measure financing.

Compelling arguments were provided of how such commoditisation could complement existing CAP measures, which today struggle with insufficient economic incentives, namely that it could incentivise use of phosphorus removal technologies in sewage treatment, which are deemed too costly today. For some countries, such as Denmark, it could help to alleviate the challenges faced in providing sufficient economic incentives for operation of biogas plants for degassing manure, delivering also on renewable energy targets²⁹. A representative of the Swedish County Boards, which are responsible for implementing the RDP, highlighted how targeted agro-environmental measures for phosphorus capture (such as two-stage ditches, structural liming etc.) are piloted but require further incentivising, probably through finance instruments outside the RDP.

5. A diverse region: recognising both shared and diverging stakes

In the submission of views on possible regulatory and/or market based approaches to stimulate improved phosphorus reuse and management it became clear that countries have rather different stakes in these questions. To decide on the most desirable governance approaches, it is vital to understand these ‘stakes’ (roughly: interests) of riparians. Notably, a difference emerged between countries, with more intensive livestock production, which perceive a business opportunity as ‘producers’ of phosphorus residues and having large phosphorus reserves in soils, and countries specialised in crop production and with a larger proportion of smallholder farming (in particular Baltic states), which have exported crops over many years and have little intensive animal farming (“exporters” of phosphorus in crop products with generally low soil phosphorus reserves)³⁰.

Gradients in phosphorus conditions to large extent reflect differences in production legacies (histories) of farming systems established under the existing and past agro-environmental policy regime of the EU. Countries (and/or sub-national regions) that today are experiencing manure surplus because of large scale livestock production are also generally countries which have benefited from the promotion of industrial agriculture with enabling conditions provided by the EU’s Common

²⁸ Anonymous, 2012

²⁹ See also Larsen, 2012

³⁰ For more information on global variation in soil phosphorus content and agronomic imbalances, see MacDonald et al., 2011

Agricultural Policy through direct support, decoupled area based subsidies (in Pillar 1) and compensation for agro-environmental measures based on historical productive legacies (Pillar 2).

These countries, primarily Denmark, Germany and parts of Sweden and Finland have experienced production leading to accumulation of surplus phosphorus. As expressed by a contributor from Latvia:

“Soil investigations for period 2005 to 2009 demonstrated that very low and low phosphorus concentration is detected for 34,5% of investigated soils. Besides, animal density in Latvia is at the lowest level in Europe, ~0,2 animal units/ha. In Nitrate vulnerable zone only 25% of agriculture utilized land is fertilized with manure applications. Economic activity/production in Latvia is noticeably lower than in 1990, while operating companies has invested in new and environmentally safe technologies”.

The differentiation in farming systems, and the historical legacies, has been significantly influenced by the European common policy with agriculture as a highly planned sector, leaving little room for national freedom of choice. This has meant that highly “productive” members continue to gain significantly more entitlements, even under the proposed regime post-2013. As such, payment levels are privileging already intensive and high-productive areas, whereas more extensive and low-productive areas are receiving smaller rewards for environmental actions³¹. Interestingly, as expressed by one contributor in the European Commission, one current policy discourse within the European Commission seem to deem such regional differentiation in farming systems desirable, with suggestions to promote specialisation between the BSR riparians. This includes a view that some countries (such as the Baltic states) may take a stronger role in producing ecosystem services, compensated through payments, while other countries (such as already highly productive areas of Denmark, Germany etc.), may serve as European ‘engines’ of food production.

Altogether, promotion of regional and/or European exchange of phosphorus residues does indeed provide opportunities for regional re-distribution of nutrient loads, with possible benefits for environment and human health. However, it appears to also further underwrite and elaborate on the established European model for upscaling and concentration of industrial agricultural production, sanctioning engrained ‘stereotypes’ of countries, without necessarily asking critical questions to this development and countries’ own priorities.

6. Critique of a centralised policy and/or market based approach

When taking into account the differences in stakes among the region’s riparians (section 5 above), it is easier to understand the concerns expressed by contributors with regards to the ambition of promoting a centralised (regional and/or European) policy regime and/or market for trade in phosphorus residues. These concerns can be broadly divided into variations of two key dilemmas, namely:

- 1) What would be the most desirable scale of intervention? Regional and European level actions will affect local initiatives for reuse of phosphorus residues.

³¹ See also Powell et al., forthcoming

- 2) Is it possible to ensure that further policy and market developments do not privilege farming systems of old European member states and/or large-scale industrial production at the expense of extensive farming systems and/or newer member states?

As regards the first question, contributors highlighted a large number of promising initiatives for local reuse and exchange of sludge and manure bound phosphorus that have emerged (or obtained recognition) in the BSR in recent years. Many of these examples are self-organised initiatives for local reuse and nutrient balancing undertaken by farmers, cooperatives, advisory services, civil society, and local governments. For instance, in Skåne (south Sweden), a web based platform for local trade in manure was launched during the 2008 peak in fertiliser prices. Similar examples were highlighted from Finland and Denmark, with contributors noting that

"[f]armers are showing that it is possible to create a functioning nutrient recycling system by using their own networks".

"There seems to be a risk that [a European market for trade in phosphorus] will undermine initiative in places which is in balance, and create waste problem there too... It is better to motivate local exchange and trade in residues".

Some contributors thus commented that there may be conflicts of interest between the ambition of BSR/European level governance regime on phosphorus residues and a) the promotion of organic farming as means of locally 'balanced' farming systems and b) the commitment of several riparian governments to their smallholder sectors (e.g. in Poland, Baltic states). Further, it was commented that even in riparian states with high livestock production intensity, there may be phosphorus balance in the medium term, if only the residues (manure) were to be adequately distributed domestically. A regional and/or European wide approach, for instance through creating a common market for trade in phosphorus residues, is based on the assumption that such a market will provide 'economy of scale' to incentivise investments in centralised manure and sludge installations and thus overcome the economic barriers to decentralised/local technologies, as seen today in most riparian states.

The second question pertaining to upscaling of industrial large-scale production and benefits between riparian states (owing to the distribution in farming systems, see Figs. 2 and 3 above) is somewhat linked to the first question regarding the desirable scale of intervention. It was suggested that reliance on technological solutions, such as for manure treatment, might more directly benefit already large-scale farming systems, where manure transport is more easily facilitated. Countries with larger concentration of livestock also typically have the most developed technologies, and/or resources to make such investments. Manure technologies are considered costly and part of a promotion of larger farming systems to obtain required economy of scale. This may have implications for riparians with a greater extent of extensive farming systems and smallholders.

Some contributors were worried that some countries and actors would have vested interests in creating a regional market for trade in phosphorus residues, to pave the way for transfers of technologies and thus creation of market opportunities for already privileged market actors. For instance, some contributors described how Belarus relies on waste water cleaning installations from abroad, which is leading to valuable improvements in water quality but also creating a dependency on foreign delivery and interests:

“...but we rely on substances from abroad... it’s like drugs, we get hooked, and it is expensive”.

Further, it emerged that some financing institutes and development banks that strategically invest in agricultural technologies for environmental sustainability lack investment guidelines (e.g. with so-called sustainability criteria) which may exacerbate non-transparent and ad hoc promotion of certain technologies and associated interests. Moreover, questions were asked pertaining to control of any common market in phosphorus residues, including capacity to respond to market fluctuations, based on oil and industrial fertiliser prices. Finally, some people questioned how stronger political and market emphasis on phosphorus will affect the ability of farming systems to deliver other benefits from agriculture, such as rural development, employment, biodiversity and recreational values etc.

Summary and concluding remarks

Many of the opportunities and risks identified by the contributors, as discussed above, are not unique to the issue of phosphorus management and reuse. In fact, they are reflective of a wider critique of the agricultural and agro-environmental developments in the BSR at large. In further governance developments it remains important to consider how an emphasis on phosphorus as but one essential nutrient will be positioned in a wider integrated context of farming and ecosystems, thus avoiding suboptimal adaptation of farming practices, technologies and policy instruments. However, from the perspective of most people who contributed to this paper through survey, interviews and/or focus groups, given the little prioritisation so far, specific emphasis and action on phosphorus management and reuse appears highly opportune.

The above synthesis of information from survey, consultations and focus groups has highlighted a number of technical innovations as well as opportunities for policy revision, which may hopefully be followed up on by appropriate actors. Nonetheless, there appears equally to be a need to better acknowledge the regional diversity in farming systems and inequalities in financial and technical resources, in order to ensure that institutional changes take into account both shared and divergent stakes of riparians. This relates in particular to the divergence between livestock intensive countries/areas and industrial modes of production vis-à-vis countries with larger extent of crop production and smallholders.

In order to enable enhanced collective action on phosphorus management and reuse there is a need for significant institutional and inter-sectoral learning. The intrinsic uncertainties and lack of consolidated data on phosphorus flows, both nationally and in the region, call into question the sufficiency of traditional scientific and centrally designed actions – whether through public regulation or through the market. In this regard, targeted support to ‘institutional measures’ that would enable national and sub-national stakeholder negotiation on legislative revisions and commoditising of phosphorus residues may be an exciting opportunity (so-called ‘stakeholder platforms’). It is worthwhile recalling that EU policy has recently moved towards prioritising such stakeholder-based ‘institutional measures’ to propel collective action. However, such innovations have so far been without required funding allocation and human resources for facilitation³². There may now be an opportunity for the EU and its member states to provide targeted payment schemes to launch such

³² See also Larsen and Powell, forthcoming

stakeholder negotiation platforms, for instance through the RDPs post-2013. Such platforms could support mediation between multiple desired benefits and ecosystem services arising from agriculture and serve to leverage funds from businesses and sub-national administrations for investments in phosphorus reuse.

In sum, the synthesis of contributions to the present consultation highlights the following emerging arguments, which ought to inspire further Baltic and European deliberations on improved governance of phosphorus reuse:

1. Target promotion of existing technologies for phosphorus reuse

A large number of technical developments for improved phosphorus management exist, including for improved agro-environmental measures for nutrient capture, manure technologies, sludge reuse technologies and improved management of soil phosphorus content. However, most of these innovations are still only voluntary and/or are not even incorporated as 'measures' under relevant legislative initiatives.

2. Consider the full range of 'intervention points' in existing EU policy

A number of concrete opportunities exist to revise existing policy frameworks to enable better use of the technical innovations mentioned above. Proposals include the preparing of common protocols for ensuring bio-security in sludge reuse, the inclusion of phosphorus reuse measures in EU's Regulation for the RDPs post-2013, inclusion of phosphorus risk assessment requirements for the issuance of livestock permits under a revised Nitrates Directive, wider application of taxation on mineral phosphorus, design of common quality standards for manure processing equipment, drafting of common guidelines on soil phosphorus sampling and analysis of soil phosphorus.

3. Observe the limited support for a strengthened central EU regulatory approach

While there were diverse views, contributors were mainly *against* a central European regulatory approach. This was due to one or several of interlinked reasons, including a low confidence in the value of further administration, a view that phosphorus is already indirectly addressed through several EU regulations, experiences of ineffective national implementation of environmental directives to date (mainly Nitrates Directive and the WFD), concerns that new regulation on phosphorus would not have fair distribution of responsibilities among the riparians, linked to perceptions of unequal and non-transparent national interpretation of EU legislation leading.

4. Embrace the benefits from adopting a market-based approach

As an alternative to a strictly regulatory approach, a large number of contributors expressed interest in benefits arising from commoditising phosphorus residues and creating improved national markets, or even functional regional or European markets for trade in sludge and manure. The perceived benefits from a market based approach included that it would form a response to the current 'market failure' where phosphorus residues are not valued and often considered as 'waste', create a regional market that could provide 'economy of scale' to concentrate investments in phosphorus capture technologies, which today are not cost-

competitive, provide alternative financing routes and incentivise agro-environmental actions, which are not viable today, such as under the RDPs and AE measure financing.

5. Recognise both shared and diverging stakes

As regards the relative interest in new governance initiatives, a difference emerged between countries with more intensive livestock production ('producers' of phosphorus residues having large phosphorus reserves in soils) and countries specialised in crop production and with a larger proportion of smallholder farming ('exporters' of phosphorus in crop products over many years with generally low soil phosphorus reserves). This differentiation in farming systems has been significantly influenced by the European common policy with agriculture as a highly planned sector, where some members continue to gain significantly more entitlements, even under the proposed regime post-2013. Promotion of particular policy initiatives and/or regional and/or European exchange of phosphorus residues do indeed provide opportunities for regional re-distribution of nutrient loads. However, it may also further elaborate on the established European model for upscaling and concentration of industrial agricultural production. This may promote engrained 'stereotypes' of countries, without necessarily asking critical questions to this development and countries' own priorities.

6. Address remaining dilemmas associated with possible centralised policy and/or market based approaches

When taking into account the differences in stakes among the region's countries, a number of concerns were expressed with regards to the ambition of promoting a regional and/or European regulatory framework and/or market for trade in phosphorus residues. These concerns can be broadly divided into two key dilemmas, namely: A) What would be the most desirable scale of intervention? Regional and European level actions will invariably affect local initiatives for reuse of phosphorus residues and there may be conflicts of interest between the ambition of BSR/European level exchange in phosphorus residues and the promotion of organic farming as means of locally 'balanced' farming systems, and the commitment of some riparian governments to their smallholder sectors. B) Is it possible to ensure that further policy and market developments do not privilege farming systems of old European member states and large-scale industrial production at the expense of extensive farming systems in newer member states? Reliance on technological solutions, such as manure processing, might more directly benefit already large-scale farming systems. Countries with larger concentration of livestock also typically have the most well-developed technologies, and/or resources to make such investments.

References

- Aguilar, G. and Iza, A. (2011): Governance of Shared Waters. Legal and Institutional Issues. IUCN Environmental Law and Policy Paper No. 58 rev. Retrieved from: <http://data.iucn.org/dbtw-wpd/edocs/EPLP-058-rev-En.pdf>.
- Anonymous (2012): Phosphate Value Chain Agreement. Retrieved from: <http://www.nutrientplatform.org>.
- BalticSea2020 (2011): Phosphorus indices. Status, relevance and requirements for a wider use as efficient phosphorus management measures in the Baltic Sea Region. Retrieved from: <http://www.balticsea2020.org/>.
- Bomans E., Fransen K., Gobin A., Mertens J., Michiels P., Vandendriessche H., Vogels N. (2005): Addressing phosphorus related problems in farm practice. Final report to the European Commission. Retrieved from: <http://ec.europa.eu/environment/natres/pdf/phosphorus/AgriPhosphorusReport%20final.pdf>.
- Cordell, D., Drangert, J-O, White, S. (2009): The story of phosphorus: Global food security and food for thought. *Global Environmental Change* 19: 292–305.
- Coffey, C., and Richartz, S. (2003), *The EU Habitats Directive: Generating strong responses*. Project deliverable No. D 17, Institute for European Environmental Policy.
- European Commission (2009): Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions concerning the European Union Strategy for the Baltic Sea Region. COM(2009) 248 final. Retrieved from <http://ec.europa.eu/>.
- European Commission 2011b. COM(2011) 627 final/2 - Proposal for a Regulation of the European Parliament and the Council on support for rural development by the European Agricultural Fund for Rural Development (EAFRD). European Commission: Brussels, 12 October 2011.
- European Commission (2011a): Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. Roadmap to a Resource Efficient Europe. COM(2011) 571 final. Retrieved from: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2011:0571:FIN:EN:PDF>.
- Government of Sweden (2012): Uppdrag om hållbar återföring av fosfor. Government Decision I:9, 2012-02-12, Ministry of Environment.
- Heckrath, G., Bechmann, M., Ekholm P., Ule´n, B., Djodjic, F., Andersen, H.E. (2008): Review of indexing tools for identifying high risk areas of phosphorus loss in Nordic catchments. *Journal of Hydrology* 349: 68– 87.
- Larsen, R. K. (2012): Implementability of biogas as agro-environmental measure. Assessment of stakeholder views on benefits and risks in Danish biogas development - with case study from Bornholm. Baltic COMPASS project report, 35 pp. Available at: www.balticcompass.org.

Larsen, R.K. & Powell, N. (forthcoming): Making sense of accountability in Baltic agro-environmental governance: The case of Denmark's Green Growth Strategy. *Social and Environmental Accountability Journal*.

Leeuwis, C. and Van den Ban (2004): *Communication for Rural Innovation: Rethinking Agricultural Extension*, 3rd Edition. Wiley-Blackwell Publishing.

MacDonald, G. K., Bennett, E. M., Potter, P. A., Ramankutty, N. (2012): Agronomic phosphorus imbalances across the world's croplands. *PNAS* 108 (7): 3086-3091.

Poulsen, H.D. and Rubæk, G.H. (eds.) (2005): Fosfor i dansk landbrug. Omsætning, tab og virkemidler mod tab. Danmarks JordbrugsForskning, DJF-rapport - Husdyrbrug 68, 211 pp. Retrieved from: <http://web.agrsci.dk/djfpublikation/djfpdf/djfhu68.pdf>.

Powell et al., (forthcoming): *The Common Agricultural Policy post-2013 as a pathway to regional cohesion? Lessons learned in implementing agri-environmental measures in the Baltic Sea Region*. Baltic COMPASS Project Report.

Rosemarin, A., Schröder, J., Dagerskov, L., Cordell, D., mit, B. (2011): Future supply of phosphorus in agriculture and the need to efficiency in use and reuse. Proceedings of the International Fertiliser Society, Cambridge, 10th December 2010. Retrieved from: <http://library.wur.nl/WebQuery/wurpubs/409217>.

Salomon, E. and Sundberg, M. (2012): *Implementation and status of priority measures to reduce nitrogen and phosphorus leakage – Summary of country reports*, April 2012. Retrieved from: www.balticcompass.org.

Schröder, J. J., Cordell, D., A. L. Smit, Rosemarin, A. (2010): Wageningen University: Netherlands. Retrieved from: http://ec.europa.eu/environment/natres/pdf/sustainable_use_phosphorus.pdf.

SEI (2012): *Pre-consultation for EU Green Paper on sustainable phosphorus use: Exploring governance innovations in the Baltic Sea Region agricultural-food system*. Discussion Brief. Available at: <http://www.sei-international.org/publications?pid=2045>.

UNEP (2011): UNEP Year Book 2011. Emerging issues in our global environment. Retrieved from: <http://www.unep.org/yearbook/2011/>.

Baltic Compass

Baltic COMPASS promotes sustainable agriculture in the Baltic Sea region. The region's 90 million inhabitants anticipate both high quality food produced in the region and a healthy environment, including a cleaner Baltic Sea. Baltic Compass looks for innovative solutions needed for the future of the region and its agriculture, environment and business.

Baltic Compass has a wide approach to the agri-environmental challenges, covering agricultural best practices, investment support and technologies, water assessment and scenarios, and policy and governance issues.

Baltic Compass is financed by the European Union as a strategic project for its support to investments and policy adaptation. The 22 partners represent national authorities, interest organizations, scientific institutes and innovation centres from the Baltic Sea Region countries. Baltic Compass is a three year project running until December 2012.



Part-financed by the European Union (European Regional Development Fund and European Neighbourhood and Partnership Instrument)

www.balticcompass.org

