



Global TraPs the 1st World Conference in Beijing from the Perspective of Dr. Fusuo Zhang of the China Agriculture University

It was with pleasure that I received the invitation for China to host the 1st Global TraPs World Conference. It was immediately clear to me that the Global TraPs objective to identify “what new knowledge, technologies and policy options are needed to ensure that future phosphorus (P) use is sustainable, improves food security and environmental quality and provides benefits for the poor” provided a great opportunity for Chinese academia, private sector, governments and NGOs to participate in a global dialogue designed to identify solutions to challenges facing phosphorus use in the agricultural and environmental sectors. It is for this reason that the China Agricultural University (CAU) and Chinese Phosphorus Fertilizer Industry Association (CPFIA) decided to co-host the 1st World Conference of Global TraPs. Specifically for China, there were also additional considerations including:

- China's increase in cereal production and its contribution to global food security

Over the last 60 years, cereal production in China has increased by 483 percent, from 113 million metric tons (mmt) in 1949 to 546 mmt in 2010. During this same period, increases in yields of major crops have ranged from 4,097 kilograms per hectare (kg/ha) to 4,365 kg/ha. Many factors have contributed to these increases including better seeds, mineral fertilizers, better crop management technologies, etc.

- China's consumption of mineral fertilizers and its impact on global resources and environmental quality

Between 1949 and 2010 China's consumption of mineral fertilizers increased 8290-fold – from 0.006 mmt to 49.74 mmt. Total fertilizer consumption included 32.57 mmt of nitrogen (N), 11.97 mmt of phosphate (as P_2O_5) and 5.20 mmt of potassium (as K_2O). All phosphate fertilizer is produced from domestic phosphate rock, and China's phosphate industry is one of the largest in the world. Given the finite nature of phosphate rock and the need to ensure its availability for future generations,

improvements in mining, processing/conversion and use efficiencies are required.

CAU and its national partners in academia and the industrial sector look forward to dialogues that contribute to mutual learning. A number of key Chinese actors will share first-hand experience on the prevailing issues faced by phosphate producers and users in China, in order to reach a better understanding of how sustainable transitions may be efficiently achieved. Like many in the Global TraPs community, CAU recognizes that in order to meet the growing demand for food and phosphate resources, a transdisciplinary understanding of phosphorus use, management and sustainability from a supply chain perspective is required. In this context, CAU looks forward to this conference and the sharing of information with international colleagues in a transdisciplinary dialogue as a means to support China's important role in addressing global food security, resource conservation and environmental concerns.



Sales at the scene of New Yangfeng fertilizer.

The 1st Global TraPs World Conference will be held in conjunction with the 5th UNEP-GPNM Conference

Amit Roy and Roland Scholz

While the International Nitrogen Initiative (INI) was launched in 1998 and formally announced in 2003, sustainable phosphorus (P) management did not have a comparable initiative. Against this background, the Global TraPs project was initiated in 2010 and was formally started as a transdisciplinary project with co-leadership on February 6, 2011 (see Table 1, p. 5).

One of the ultimate goals of the Global TraPs project is to provide socio-technological robust orientations for sustainable P use for policymakers and other stakeholders by the 2nd Global TraPs World Conference in 2015. Naturally, robust orientations require consideration and interaction with other nutrient initiatives such as the INI (<http://www.initrogen.net>). While phosphorus has specificities such as the finite amount of phosphorus reserves which is not a constraint associated with nitrogen, Global TraPs did not hesitate when Anjan Datta of the United Nations Environmental Programme (UNEP) – who joined Global TraPs

in 2011 – offered to link the 1st Global TraPs World Conference with the 5th UNEP Global Partnership on Nutrient Management (GPNM). It is possible that GPNM may become an umbrella for Global TraPs, and other initiatives on sustainable nutrient flows.

This means that the first day of the 2013 Beijing Conference will highlight a “comprehensive picture on phosphorus from a nutrient-system perspective” and the third day, featuring the “political perspective,” will be conducted in conjunction with the 5th GPNM Conference. However, the second day of the conference is set aside so that Global TraPs members can engage in Mutual Learning Sessions and Dialogue Sessions focused on transdisciplinary dialogues, including in-depth exchange of the knowledge of scientists and practitioners. We look forward to the 1st World Conference and important interventions from the Global TraPs community.

1st European Sustainable Phosphorus Conference in Brussels



On March 6th and 7th 2013, the 1st European Sustainable Phosphorus Conference will take place in Brussels. Representatives from several European Member States have joined forces to raise awareness about the necessity for more sustainable phosphorus management. Their ambition is to create a clear and coherent legislative framework for eco-innovation, a sustainable European market for secondary phosphorus and more efficient phosphorus use. We hereby invite you to take part in the conference. An official invitation will follow shortly.

Currently, a market for sustainable nutrient management is still absent and only slowly developing. We believe there is a need for increased awareness and more speed, hence awareness. That is why various stakeholders (knowledge institutes, businesses, NGO's and governments) from several European Member States have decided to join forces with each other and the European Commission in organizing the 1st European Sustainable Phosphorus Conference. This conference aims to:

1. Raise awareness about the necessity for more sustainable phosphorus management within the context of a Resource Efficient Europe.
2. Create support for a clear and coherent legislative framework, to create an enabling environment for eco-innovation, a sustainable European market for secondary phosphorus and more efficient phosphorus use.
3. The further development of sustainable nutrient chains within Europe. Connecting different nutrient waste flows and market possibilities between stakeholders (private sector throughout different sectors, knowledge institutes, government and NGO's) within the EU.

The 1st European Sustainable Phosphorus Conference 2013 is an initiative of joint European partners throughout the phosphorus value chain. Global TraPs is actively involved in the organization, since the conference is an important step towards the World Conference and marks a crucial milestone towards global phosphorus security.

You are cordially invited to join on 6 and 7 March in Brussels, Belgium!





Global TraPs 1st World Conference
18-20 June 2013
Beijing, People's Republic of China

Dear Colleague:

We invite you to attend the Global TraPs 1st World Conference, which will be held in Beijing, People's Republic of China, June 18-20, 2013.

Phosphorus, an element found in minerals and rocks in the form of phosphate, is essential to the existence of plants, animals and humans. In recent years phosphorus has been at the center of four widely discussed issues:

1. Phosphorus is essential to current and future food security; however, the supply of phosphate rock is finite.
2. Excess phosphorus can cause negative environmental impacts, particularly in freshwater and coastal marine ecosystems.
3. Smallholder farmers' limited access to phosphorus has a detrimental impact on the soil resource base, food production and food security.
4. More effective and efficient technologies for use in the phosphate mining-processing-use-recycling chain must be developed.

The Global **T**ransdisciplinary **P**rocesses for **S**ustainable Phosphorus Management (Global TraPs) Project is studying phosphorus use, management and sustainability from a supply chain perspective through a transdisciplinary process (science-practice) involving experts from academia, industry, governments, non-governmental organizations (NGOs) and other concerned parties. Global TraPs was officially launched in February 2011. Amit H. Roy (IFDC) and Roland W. Scholz (ETH) agreed to co-lead the project in a five-year learning process between practice and science.

Four workshops – each attended by as many as 100 key agents from industry, business, farmer organizations, NGOs and top universities – were held in 2011 and 2012. The Global TraPs 1st World Conference is the next step in the five-year process. The Conference will be co-hosted by China Agricultural University, Ministry of Agriculture, the Chinese Ministry of Education, Phosphorus Fertilizer Industry of China, the National Science Foundation of China, IFDC, the Fraunhofer Institute and other Institutes.

The World Conference theme is "Learning from Case Studies – Exploring Policy Options." A key goal of the Conference is to have phosphorus experts and policymakers discuss specific areas for policy intervention to ensure sustainable phosphorus use in the future. The 1st Global TraPs World Conference will include special types of discourses that promote the transition of current practices, foster mutual learning and support decision processes.

The Conference will coincide with the 5th International UNEP Global Platform Nutrient Management Symposium to take advantage of overlapping issues while allowing for project-specific discussions and exchanges.

We hope that you will accept this invitation and be an active participant at the Conference. Additional information about the Conference, including the agenda, will be provided at a later date.

Sincerely,

Prof. Roland Scholz
Co-Leader, Global TraPs
Co-Chair, Conference
Organizing Committee
Full professor ETH-Zürich

Dr. Amit Roy
Co-Leader, Global TraPs
Co-Chair, Conference
Organizing Committee
President and CEO of IFDC

Prof. Fusuo Zhang
Co-Chair, Conference
Organizing Committee
Dean of the College of
Resources and Environmental
Sciences, China Agricultural
University, Beijing



Global TraPs: A Perspective from an Industry Participant

Michael Mew, director of FERTECON Research Centre Ltd. and Global TraPs industry participant, was recently interviewed by the publication *Fertilizer International*. A consultant in the phosphates sector for more than 30 years, Mew explains the concept behind Global TraPs and the project's importance to the fertilizer industry. Mew begins by clarifying one of the fundamental concepts of the Global TraPs project – transdisciplinarity. Transdisciplinarity takes interdisciplinarity one step further by not only involving participants from different fields, but by including perspectives from outside the scientific domain altogether. Based on academic and industry participation, Global TraPs integrates experience-based, real-world knowledge and academic rigor. "One of the most amazing things I have found so far from my participation in two TraPs Workshops is the amount of knowledge that both academia and industry can bring to the table and how much each learns from the other," said Mew.



Global TraPs' work is guided by the question: "What new knowledge, technologies and policy options are needed to ensure that future phosphorus use is sustainable, improves food security and

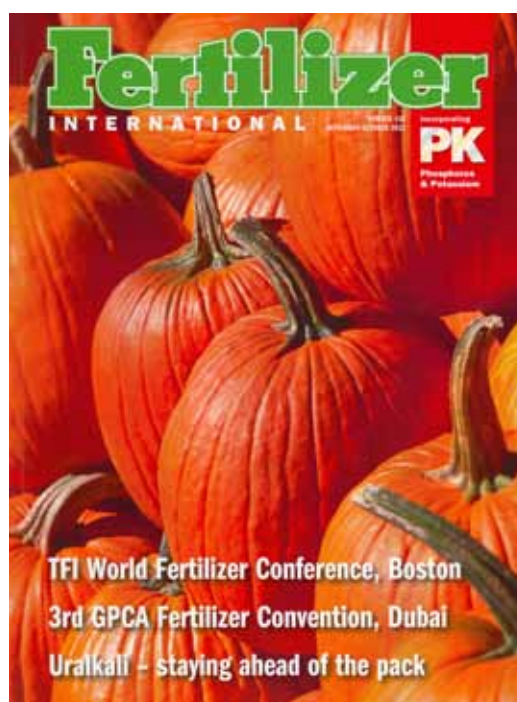
environmental quality and provides benefits for the poor?" According to Mew, "The analysis of knowledge, technology and policy options is the means by which Global TraPs will achieve its project goals of increasing sustainability of phosphorus use, improving the environmental impact of phosphorus use and implementing benefits to the poor, in terms of food security and access to affordable phosphate fertilizers."

The structure of the working groups (called 'nodes') within the project is organized to represent the points along the phosphate supply chain: exploration, mining, processing, use, dissipation or recycling and trade and finance. During the third

and fourth Global TraPs workshops, Mew's working group – the Exploration Node – reviewed the level of knowledge that exists about phosphate resources, assessed the validity and relevance of the peak phosphate theory and identified potential case studies that will generate new knowledge. The node found that the peak phosphate theory "does not represent the true phosphate resource depletion picture."

When Mew wrote "Peak or plateau – which way for phosphate rock products," he experienced the knowledge divide that often exists between academic and non-academic communities. "When grappling with my arguments using only industry experience and simple diagrams, I later discovered that the scientific community, including eminent mathematicians, was coming to similar conclusions by more rigorous means," said Mew. "Being published in academic journals, these papers remained behind the divide and were effectively unavailable to those in industry who might have benefited from their conclusions."

According to Mew, the fertilizer industry can benefit from being involved in Global TraPs in three ways. First, increasing sustainability and improving food security are noble objectives that both individuals and companies should aim toward. Second, participating companies will have access to the largest body of academic and industry knowledge on the phosphate sector. Third, companies will eventually have to operate in a policy landscape influenced by the Global TraPs project.



The complete interview can be found in the September-October 2012 issue of *Fertilizer International*.

Learning from Cases – Exploring Policy Options

Role and Status of the Global TraPs Case Studies

Amit Roy and Roland Scholz

The Global TraPs Initiative is planned as a five year project that will provide robust solutions for sustainable phosphorus (P) management recognizing judicious use of P is crucial for food security, environmental conservation and economic growth. In order to reach the solutions, existing knowledge gaps are being defined for funding and for in-depth analysis. The resulting information will be crucial in designing solutions based on stakeholders' consensus and representative of viable policy options. Therefore, in preparing for the 1st Global TraPs World Conference, it is important to reflect on what can be expected from this important intermediate, mid-term meeting.

Table 1 provides the timeline and the subject focus for past and future Global TraPs meetings. Following the formation of the partnership between science and practice and under the guidance of the co-leaders, colleagues in academia and industry began to develop the Global TraPs framework. The first workshop concentrated on developing the "Guiding Question," whereas the second workshop provided the opportunity to identify the overall critical questions for each node within the P Supply-Demand Chain. Questions targeted the dynamics of reserves and resources, innovations in mining and fertilizer production, improved efficiencies in mining and use, improvements in smallholder farmers' access, recycling options and ways to cope with unwanted side effects of price volatility.

Guiding Question of the Global TraPs Project

"What new knowledge, technologies and policy options are needed to ensure that future phosphorus use is sustainable, improves food security and environmental quality and provides benefits for the poor?"

Based on the critical questions and interactive discussions, each Node group developed a draft chapter on the current state of knowledge for their respective area (e.g. mining, processing, use, etc.). These chapters will be published in 2013 as part of a Springer book – Sustainable Phosphorus Use: A Transdisciplinary Roadmap. All chapters of the book were written by teams

composed of representatives from science and practice who used the transdisciplinary process in their efforts.

Finally, the critical questions were used to define real-world case studies, which will help those involved to better understand the challenges and options to be faced in dealing with sustainable transitions. Utilizing case studies instead of topics has advantages. In a case study, the complexity, contextualization and the multi-dimensionality of the problem is maintained. Scientists, for instance, are forced to start from the case and then to reflect on what scientific discipline, theory or model is required in order to achieve sustainable transition. Thus, learning from cases is a well-proven and accepted tool in the emerging field of sustainability learning. The challenge of dealing with case studies is to understand the relationship between the specific and the generic. Looking at a case, one must ask: "This is a case for what?" When answering the question, one determines for which type of situations the mechanisms and rules which have been identified may be transferred.

Global TraPs Transdisciplinary Case Studies

After the fourth workshop several transdisciplinary case studies on use – assessing and avoiding phosphorus overuse in urban agriculture in Vietnam, providing access to P fertilizers to smallholder farmers in Vietnam and Kenya and improving the efficiency of P use in Malaysian palm oil production – were identified and/or initiated. With each case, the benefits of a science-practice partnership should help to better understand, analyze and to sustainably transfer the problem(s) inherent to each case. As co-leaders of Global TraPs, we expect that five to seven cases will be the subject of in- depth discussion in the Mutual Learning Session in the Beijing meeting (see next article).

The Global TraPs management team is currently exploring funding options. If you have a suggestion for a case study please contact Debbie Hellums, Amit Roy, Roland Scholz or one of the Node leaders.

Table 1: Timeline of key events of the Global TraPs Project

| Event | Date | Location | Focus-Guiding Theme |
|----------------------|----------------------|-----------------------------------|--|
| 1st Workshop | February 5-6, 2011 | Muscle Shoals, AL/Phoenix, AZ/USA | Building Partnership and Co-Leadership |
| 2nd Workshop | April 31-May 1, 2011 | Zurich, Switzerland | Consenting the Guiding Question |
| 3rd Workshop | August 29-30, 2011 | Zurich, Switzerland | Identifying Critical Questions |
| 4th Workshop | May 12-16, 2012 | El Jadida, Morocco | Defining Case Studies – Setting Priorities |
| 1st World Conference | June 18-21, 2012 | Beijing, China | Learning from Case Studies – Exploring Policy Options |
| 5th Workshop | April 2014 | TBD ¹ | Looking for New Paradigms – Understanding the Soil and Agrotechnology System (tentative title) |
| 2nd World Conference | June 2015 | TBD | Orientations for Policy, Industry and Research (tentative title) |

¹ To be determined (TBD)

What are Mutual Learning Sessions and Dialogue Sessions?

Roland W. Scholz & Ulli Vilsmaier

Mutual Learning Sessions (MLS) and Dialogue Sessions (DS) denote two types of discourse which will take place on the second day of the first Global TraPs World Conference. The two types of sessions were first 'explored' in the Zurich 2000 Conference on "Transdisciplinarity: Joint problem solving among science, technology and society." Both MLS and DS should promote mutual leaning and authentic collaboration between different stakeholders. A brief characterization of these two types of session is found below.

The reader should be reminded that the three rules of the Global TraPs project also apply in MLS and DS

Protected discourses: An important issue is the establishment of a "protected discourse arena." Mutual learning must allow for making "mistakes," making preliminary remarks/critique, working with tentative assumptions or allowing for thought experiments. To support open and protected discourse, all participants agree to the rule that nothing said by anyone in a MLS or DS may be cited without explicit permission.

Pre-competitive topics: The development of new technologies is sometimes/often done by joint research by competing companies. Likewise, the identification and development of criteria, technologies and strategies of sustainable behavior asks for collaboration between competitors, given that there is a collective interest in contributing to social and environmental sustainability. In the preparation of some of the MLS and DS, one must make sure that the level of discussion respects the interests of single companies.

Authentic collaboration: Mutual learning requires that the "otherness of the other," discussions should be led with respect to their role, function, culture, personality, etc.

Mutual Learning Sessions

In general, a MLS deals with one (or a small set of) specific cases. Real-world cases are favorite subjects to understand options and barriers of sustainable transitions as they allow for in-depth understanding of the complexity and contextualization and thus the multi-layered natures which have to be understood for successful, sustainable transitions. Typical cases may be a certain phosphorus mine, a fertilizer production site or (regional) market, phosphorus use by farmers of a certain agro-system or region, phosphorus management, recycling schemes at a sewage treatment plant, etc.

For each real-world case there are case experts, (who have lived with or have first-hand experience with a case and who embody 'experiential knowledge', people from practice, who have knowledge of similar cases, scientists from different disciplines who may explain certain phenomena or dynamics, policymakers who are framing the case and other stakeholders interested in the case.

Most important is the selection of a case and the understanding of the specific context, interest and perspectives from which a case is viewed. Cases for MLS at the 2013 Beijing Conference should help to answer the critical questions which have been identified in the 3rd and 4th Global TraPs Workshops.

In order to learn from other cases, we have to extract the generic from a specific case. Thus, we have to define what a case stands for, or to express it in other terms, we have to identify the population of cases which are similar and from which we may learn about the mechanisms, barriers and options of sustainable transitions. Sometimes, more than one case is considered. Then we speak about "multiple case MLS." Given the uniqueness of each case, one must acknowledge that no direct comparisons are targeted/allowed, but that the understanding of each case is required before generic conclusions on sustainable transitions can be made.

To successfully run a MLS, the basic information about a case should be accessible to the participants (e.g. in the form of a booklet) before the MLS starts. Likewise, the questions of the case agents/experts to the 'other participants' of a MLS as well as the questions of the 'other members' to the case experts ideally should be formulated before the MLS starts.

If we think about the outcomes of a MLS, we may formulate the following goal: According to the guiding theme of the Beijing Conference "Learning from cases – exploring policy options" – both the strategies which case agents may take as well as policy options which may facilitate sustainable transitions should be formulated.

According to our experience, there should be at least 15 but not more than 20 participants in a MLS who all work through the entire session.

Dialogue Sessions

A dialogue session starts from a specific topic, theme, phenomenon or concern. Typical topics are the volatility of phosphorus prices, policy means which may foster phosphorus recycling, means for enhancing supply security or strategies for improving the relation between fertilizer and crops in highly weathered soils.

The basic idea of a DS is triangulation. The same topic should be considered from different perspectives which allows for a joint framing of the given topic/phenomenon as a basis for mutual understanding. Further, hypotheses on how to sustainably deal with a case (e.g. how to mitigate unwanted price peaks) should be formulated. Practically, inputs should be provided on the most salient (and controversial) perspectives.

There may be various formats used to successfully run a dialogue session. We think about 5-7 (written) inputs, which may be summarized and subsequently briefly discussed in the opening of a DS, is optimum. Then, the plenary may define tasks for small groups to structure and to deal with recognizing special aspects which must be better understood to identify meaningful options. All work of the group should be dedicated to defining options both for the key actors and their interactions, as well as for policy means which frame how a specific topic, theme or concern may be dealt with.

According to our experience, there should be at least 15 but not more than 25 participants in a DS who all work through the entire session.

The Knowledge Integration Unit (KIU)

Relating different types of knowledge from different stakeholders, disciplines, perspectives, systems or cultures is essential for sustainable action. This particularly holds true if phosphorus management is seen from a global perspective. Both, the work in the MLS and the DS and even more the integration of the knowledge between the different groups requires organization, prioritization and integration. The Knowledge Integration Group (J. van Breda [requested], D. Lang, T. McDaniels, R. Scholz, G. Steiner, U. Vilsmaier [leader]) is a group which wants to facilitate these processes. This means that this group is developing methods that may be applied to structure and coordinate the process and to integrate knowledge. Although the methods may affect the outcome, one must recognize that the orientations defined are not a matter of the KIU but rather of the Nodes, Node Leaders, MLS and DS groups and/or the Steering Board.

Summary of thesis “The Possibility of Phosphorus Recovery from Municipal and Industrial Waste Waters”

Devon Wemyss, 13.10.12

To complete her Master’s degree at ETH, Devon Wemyss undertook a thesis topic aligning her interests in water and resource management: *The Possibility of Phosphorus Recovery from Municipal and Industrial Waste Water*. Set within the Global TraPs network, Ms. Wemyss’ worked specifically with the Swiss and Japanese members to critically examine and evaluate the state-of-the-art planning in each country. The work highlighted the most influential social and technical factors influencing the development of a recovered P market in Japan, and compared it to the developing phosphorus (P) recovery system in Zurich, Switzerland.

The losses of P along the food chain have been discussed and calculated by many authors in the field of sustainable P management. In highly developed countries such as Japan or Switzerland, the waste water treatment plant, as the last human intervention before environmental discharge and subsequent P loss through dissipation, removes 90 percent of the P in the effluent in order to reduce eutrophication of water bodies. While P-containing effluent often represents less than 5 percent of the total input of P into our food system, the capture and treatment capabilities and infrastructure already exist; thus the technical and social transitions to not just remove P but to recover it have fewer obstacles.

However, few countries have made this paradigm shift from removal to recovery. Therefore, important knowledge related to the socio-technical mechanisms that impact the system change have not been previously categorized from first-hand experience. The thesis work focuses on the exemplary case of Japan where P recovery and reuse has been underway for

over a decade. Evaluation of this experience can be helpful to developing the technical and social environment for P recovery in Zurich, Switzerland. The thesis analyzes five waste water treatment plants in Japan and one in Zurich, in order to complete a Material Flow Analysis and Structural Agent Analysis.

Through analyses of these two scenarios, some influential factors for the two country cases, with both negative and positive impacts, are documented. In particular, the interplay between the actors within the P recovery network and the economics of a recovered P market are discussed. In total, eight socio-technical mechanisms were identified in Japan, as well as an additional two that are uniquely relevant to the Zurich and broader European contexts. In addition, the work considers the historic cultural development of waste water treatment in each country. This information highlights the inherent differences between the two countries and questions the potential of the Japanese system to be replicated elsewhere. Even in light of the differences, important cultural, technical, economic and social perspectives are revealed in this work.

All the cases analyzed in Japan and Switzerland currently face social and/or technical challenges in truly closing the P loop through waste water recovery. Bringing these experiences to the wider sustainable P network can potentially initiate important discussions between actors in order to reach more efficient and practical solutions.

The thesis can be obtained by request from Roland W. Scholz. roland.scholz@env.ethz.ch

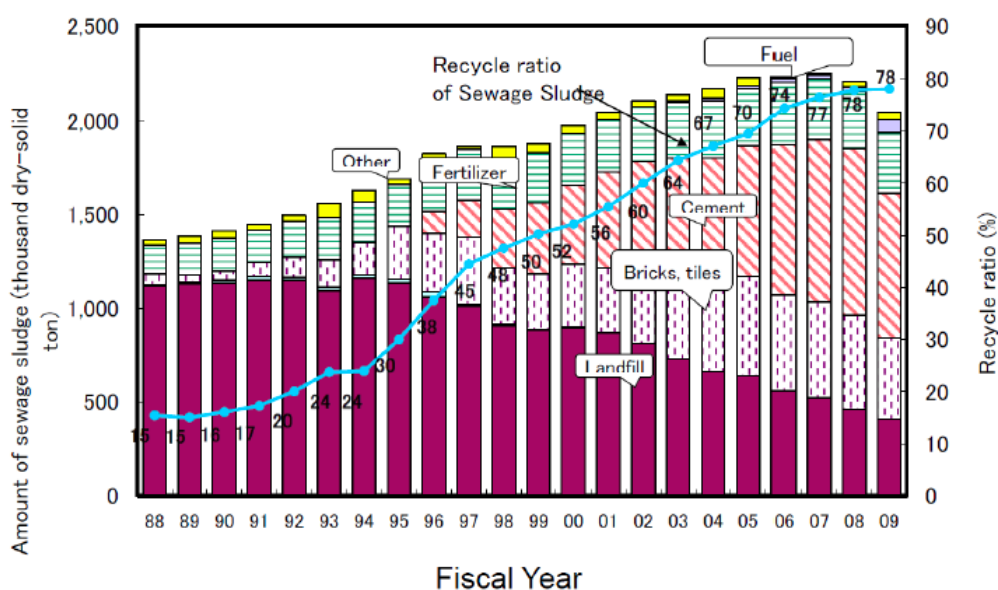


Figure 1-6 Sewage sludge endpoints and rate of recycling in Japan (Kawai, 2010). Please note that the ‘recycled ratio’ includes that portion which goes to cement works which has taken the largest increase.

Source: Kawai, T. (2010). Wastewater Sludge Recycling/Reuse in Japan. *Workshop Presentations on Urban Fecal Sludge Management*. Retrieved July 9, 2012, from [http://www.jsanci.org/news/Workshop on Sludge Management Vietnam Feb%202012/Sludge Recycling-Reuse in Japan \(JSC\).pdf](http://www.jsanci.org/news/Workshop on Sludge Management Vietnam Feb%202012/Sludge Recycling-Reuse in Japan (JSC).pdf)

New Commitments and Additional Changes

Debbie Hellums and Roland Scholz

The theme of the 4th Global TraPs Workshop in El Jadida was “Defining Cases – Setting Priorities.” Attendees at the workshop also clarified how Global Traps will work in the remaining three years of the project when it will wrap up activities in 2015 at the 2nd Global TraPs World Conference. According to the “language of transdisciplinarity” Global TraPs and the second world conference should provide “orientations on socially robust solutions” for sustainable phosphorus management.¹ To reach this goal requires strong commitment from Global TraPs many diverse partners.

Global TraPs has also made important progress in identifying the remaining node leaders and transdisciplinarity (Td) coordinators (See below). Marek Holba (Asio) and Christian Kabbe (Wasser-Zentrum Berlin) have agreed to serve as practice co-leaders for the Dissipation and Recycling node. Tim McDaniels (University of British Columbia - Vancouver) and Gerald Steiner (University of Graz/Harvard University) have agreed to assume the roles of Transdisciplinarity (Td) Coordinators in the mining and fertilizer processing nodes, respectively. With these commitments, Global TraPs is much better positioned to reach its ultimate goal of identifying feasible options for sustainable phosphorus management.

While it is exciting to welcome new members and leaders, Global Traps witnessed the departure of some of the original Global TraPs science team at ETH as a result of the retirement of Roland Scholz in 2013. Former assistants Pius Krütli, Michael

¹ “Socially robust solutions” or orientations meet “state of the art science knowledge,” “attract consensus among key stakeholders” and “should acknowledge the uncertainties” which are involved in the process. See Scholz, R. W. (2011). Environmental Literacy. From Knowledge to Decisions. Cambridge University Press, Chapter 15 (free access under <http://www.interdisciplines.org/paper.php?paperID=408>)

Stauffacher and Andrea Ulrich left the Global TraPs project in mid-summer after being an integral part of the first phase of Global TraPs. Pius and Michael had served as Td coordinators, while Andrea had been the Science Manager for the first year and participated in building Global Traps before the project officially started under the co-leadership of Amit Roy (IFDC) and Roland Scholz (ETH Zurich). Finally, Desiree Ruppen, who was instrumental in organizing and participating at the very successful El Jadida workshop, left Global TraPs in July. We wish all of these former colleagues much success.

We also wish to express our gratitude to ETH for the excellent support provided to Global TraPs prior to Dr. Scholz’ retirement. Looking forward, we are pleased that the Fraunhofer Society (Germany), the largest European Institute of applied research, is stepping forward to provide assistance to the science leadership beyond 2012. Fraunhofer has been already involved by Prof. Armin Reller (Fraunhofer IWKS, see Global TraPs Newsletter 6, p. 3; http://www.globaltraps.ch/tl_files/pdf/newsletters/GT_Newsletter_6.pdf), who works as Science Leader of the Processing Node. With the retirement of Prof. Scholz at ETH, Fraunhofer will take stronger commitment to Global TraPs and will, e.g., co-cohost, together with IFDC and CAU the 1st Global TraPs World Conference.

Below, the new Node leaders, Td Coordinators and Dr. Haigang Li of the China Agricultural University (recently named manager of the 1st Global TraPs World Conference) are introduced and present their visions on Global TraPs.

The New Commitments

Dr. Gerald Steiner (Harvard University and University of Graz): New Transdisciplinarity Coordinator of the Fertilizer Processing Node



For more than 10 years, Gerald Steiner has worked in the field of sustainable innovation, transdisciplinarity and entrepreneurship. Previously having been a Harvard Schumpeter Professor, he is currently a visiting scholar at Harvard’s Weatherhead Center for International Affairs (WCFA) and a tenured Associate Professor of Systemic and Sustainability Management at the Institute of Systems Sciences, Innovation & Sustainability

Research (ISIS), University of Graz, Austria. He earned his undergraduate degree in mechanical engineering (BSc), with a MBA and PhD in Business Administration. Additionally, Dr. Steiner conducted habilitation post-graduate studies on “Systemic and Sustainability Management,” which contributed to his sound knowledge and experience with transdisciplinary projects in many fields.

Dr. Steiner’s recent scientific interests are centered around designing and managing innovation and creativity, with a particular emphasis on competence development, as well as crisis-related innovation and problem solving processes in international affairs.

When asked why he is interested in Global TraPs, he stated: “GlobalTraPs addresses one of society’s major future challenges – how to sustainably manage phosphorus (P), a finite resource and pollutant. My core research intersects with GlobalTraPs in innovation and real-world challenges (e.g., sustainable development, crises) and the design of inter- and transdisciplinary problem-solving processes within organizational

and political systems. I am scientific member of the 'Trade and Finance Node' and feel very motivated to facilitate the multi-stakeholder transdisciplinarity discourse as a coordinator of the 'Processing Node' of GlobalTraPs."

Describing his vision about Global TraPs, Dr. Steiner said, "For me, GlobalTraPs is the first transdisciplinary project with a true global focus, representing an unprecedented landmark in the marriage of science and practice. In my view, GlobalTraPs will not only improve society's grasp of the global phosphorus supply chain and its management, but, perhaps even more importantly, will lay the groundwork for new, pioneering forms of collaboration between science and various agents of society."

Dr. Christian Kabbe (Berlin Centre of Competence for Water):Co-Practice Leader of the Recycling and Dissipation Node



Before becoming primarily engaged in the topic of P recycling, Dr. Christian Kabbe studied analytical and environmental chemistry, completing his Ph.D. in 2003. Following graduation, he worked in the plastics industry for nearly five years.

In 2008, he joined the German Federal Environment Agency (UBA) and his interest pivoted to phosphorus losses to the environment and the need for recycling. In attempts to

foster the implementation of novel P recovery and recycling technologies, Dr. Kabbe became aware of the political, economic and social issues surrounding phosphorus, as well as some of the barriers in this field. Although focusing his activities on P recovery from wastewater/sewage sludge and animal residues like manure and meat and bone meal, he was cognizant of the whole picture. His close contact with practitioners and authorities allowed him to identify significant gaps that would have to be addressed in order to close the P cycle and to contribute to the preparation of a national strategy for the sustainable use of P in Germany.

In 2011, with a new position at the Berlin Centre of Competence for Water (KWB), Dr. Kabbe's activities became much more practice oriented. Together, with a consortium of 15 partners from seven European countries representing the academic and practice sectors, he organized the EU FP7 project "P-REX – Sustainable Sewage Sludge Management Fostering Phosphorus Recovery and Energy Efficiency." The main objectives of the project include:

- Demonstration and systematic validation of technical processes at full-scale facilities.
- Systematic assessment and validation of the ability of recycled products to provide plant- available P.
- Analysis of market barriers and market potential for novel recycling technologies and recycled products.
- Development of strategies and recommendations for efficient and wide-spread P recovery and market penetration from the wastewater stream with regards to specific regional conditions.

While focused on Europe, the results will be an excellent input for Global TraPs and will help identify transferable technologies

required to complete the global picture of the Recycling and Dissipation Node.

Dr. Kabbe is driven by the motto '*...doing the possible instead of discussing the unproven impossible. There is always need for the ones, who dare to make the first step forward.*'

This approach corresponds well with Global TraPs goal to substantially increase the "possible" on a global basis. Areas where the P-REX project will contribute to Global TraPs knowledge include:

- Wastewater and sludge management (legislative and operational perspective, from traditional to high-tech).
- P recovery and recycling from wastewater/sewage sludge and animal residues(wet chemical and thermal processes).
- Linkages with the P recovery/recycling and governmental scene.
- Experience in policy briefing and ISO, CEN and DIN standards.
- Identification of barriers for implementation (society, policy, market).
- Holistic view (not only in terms of Life Cycle Assessment, LCA).

Dr. Marek Holba (ASIO, spol. s r.o.): Co-Practice Leader Recycling and Dissipation Node



Dr. Holba studied at the Institute of Chemical Technology in Prague, Czech Republic, where he successfully defended his Ph.D. thesis "Mathematical Modeling of Municipal Wastewater Treatment Plants." He was the recipient of several fellowships and conducted research at the Division of Environmental Technology, Engineering and Services, Section of Wastewater Treatment and Water Cycle in Bologna, Italy; Wageningen University Agrotechnology and Food Sciences, Sub-department of Environmental Technology

in Wageningen, Netherlands; and Universidade Catolica Portuguesa, Escola Superior De Biotecnologia in Porto, Portugal. He conducted post-doctoral studies at the Oceanographic Institute of Saga University in Imari, Japan, where he worked to develop a technology for selective recovery of lithium from seawater. He returned to the Czech Republic in 2007 and became Research and Development Division Leader in the Asio, spol. s r.o. He also continues his scientific work at the Institute of Botany, Department of Experimental Phycology and Ecotoxicology, where he assumed responsibility for phosphorus management in the water environment beginning in 2010.

Dr. Holba focuses on an interdisciplinary and holistic approach to water and wastewater treatment issues. He is currently coordinating and/or participating in numerous national projects that deal with nanotechnology applications, advanced oxidation processes, industrial wastewater treatment, greywater management, energy conservation measures and one European project dealing with phosphorus management known as P-REX (see introduction to Dr. Christian Kabbe).

The necessary global approach to the challenges in the phosphorus environment is very important for Dr. Holba. His recent work includes the communication between the two areas of wastewater treatment and lake and pond management in the phosphorus context as there are very different requirements for the phosphorus cycle, at least in Eastern Europe. His employers were recognized for this holistic approach to phosphorus management by International Water Association (IWA) with its Honour Award in 2012.

Dr. Tim McDaniels (UBC) – Td-coordinator of the MLS or DS on Sustainable Mining (Beijing)



Tim McDaniels is a specialist in decision sciences and policy analysis, particularly in managing environmental and technology-related societal risks. His current research focuses on climate change adaptation in linked human/ecological systems. He also has ongoing research projects concerned with building regional resilience in infrastructure systems.

Dr. McDaniels is a professor appointed in three graduate interdisciplinary programs at the University of British

Columbia, with his primary appointment now in the Faculty of Applied Sciences. He formerly served as the Director of the Institute for Resources, Environment and Sustainability, as the Associate Director of the School of Community and Regional Planning and also as the Acting Principal of the College for Interdisciplinary Studies. He also served as acting Director of the Bridge program, an interdisciplinary research-training program linking public health, engineering and public policy, funded by the Canadian Institute of Health Research.

Dr. McDaniels' research addresses issues of risk management based on societal values and expert understanding. His previous work addressed issues of values, value elicitation, risk perception, eliciting judgments from experts and characterizing more effective approaches for managing issues of global change that cross multiple scales of governance and impact. He has worked extensively on citizen involvement in complex policy decisions, and has designed and led successful stakeholder decision processes involving scientists, agency representatives and civil society groups. He has published articles and conducted practical research in forestry, fisheries, renewable energy, aquaculture, water management and infrastructure systems.

Dr. McDaniels has published over 70 articles in leading interdisciplinary science journals, along with three books and over 50 technical reports. He has served on expert panels for the U.S. National Academy of Sciences, NOAA, the U.S. EPA, Health Canada and other organizations, and has participated in advisory roles for several Canadian inquiries and panels regarding risk issues. He is a co-investigator in the Climate Decision-making Center at Carnegie Mellon University in Pittsburgh, which is supported by the U.S. National Science Foundation. In 2008, he was appointed to the U.S. National Academy of Science (NAS) Committee on the Human Dimensions of Global Change. In 2004, he was a co-author for a NAS panel report on Research Priorities for Improving Environmental Decision-making. He served as the Decision Sciences area editor of the journal *Risk Analysis* for five years, and is a fellow of the Society for Risk Analysis.

Dr. McDaniels indicated his desire to support the Global TraPs World Conference by leading the MLS or DS on sustainable mining because of "my deep interest in and commitment to the concepts and fundamental issues addressed in the Global Traps project. I have served as the convener, or facilitator/analyst, for a number of large scale projects that have involved cooperative knowledge-building with stakeholders, regulators and industry partners. The issues of linkages in governance and shared knowledge in issues with multiple regulatory and geographic scales is relevant and important for me."

He further explained that his visions for this work would be: "a successful meeting, and a successful Global Traps project, in which all objectives are achieved and insights achieved for more sustainable phosphorus flows globally and locally."

Dr. Haigang Li (China Agricultural University-CAU) 1st Global TraPs Conference Manager



Dr. Li is an associate professor of plant nutrition at China Agricultural University (CAU). He obtained a joint Ph.D. degree from CAU and INRA Montpellier (France) in 2008. Dr. Li has conducted research at several universities including Adelaide University in Australia, University of Delaware in the USA and Wageningen University in the Netherlands. On completion of his post-doctoral studies in 2010, he was appointed to a lecturership at CAU. Beginning in 2012, he was promoted to an associate professor position.

For his Ph.D. thesis (2004-2008), Dr. Li conducted research on the P uptake efficiency of various plants. During his Ph.D. study, he worked on improving the plants' ability to utilize available P by modifying and stimulating rhizosphere processes under conditions of low soil P levels. He also studied the interaction between different plant species and their associated root systems on P use. His post-doctoral research evaluated the soil P dynamics in different soils and cropping systems based on 21 long-term fertilizer experiments in China. Currently, his research interests are focused on soil phosphorus management at the local and regional level and interactions between soil nutrients and water.

In regard to Global TraPs, he stated, "The management and research approaches are innovative and efficient, and help address knowledge gaps between different aspects associated with phosphorus use. Additionally, the transdisciplinary approach should result in widespread cooperation between the various stakeholders to improve P use efficiency and reduce water pollution associated with excess P use, erosion and surface water run-off. It is a pleasure to be a conference manager for the 1st Global TraPs World Conference."

Dr. Li stated his vision for Global TraPs as "The Global TraPs project focuses on the global phosphorus supply chain and engages expert participants from science and practice to discuss and solve the problems faced in the production and use of P. This conference will greatly facilitate knowledge and technical innovation. As a member of the host conference committee, we also anticipate that this conference will promote and invigorate Chinese researchers to consider these important issues."

Ph.D. scholarship

Transdisciplinary sustainability research – transdisciplinary research in an intercultural perspective

Application deadline: **30.11.2012**

Leuphana University of Lüneburg is offering one Ph.D. scholarship in the field of transdisciplinary sustainability research with the focus on transdisciplinary research in an intercultural perspective at the Faculty of Sustainability, starting as soon as possible.

The Ph.D. project aims at analyzing societal conditions for transdisciplinary research in the field of sustainable resource management and the appropriateness of methodological approaches in diverse socio-cultural and political-economic contexts. This will be achieved by comparing transdisciplinary case studies which form part of an international project on sustainable management of phosphorus (Global TraPs). Several assignments outside of the University are expected during the Ph.D. project.

For further information see: <http://www.leuphana.de/en/zentren/center-for-methods.html>. Applicants are welcome to contact Ms. Prof. Dr. Vilsmaier (vilsmaier@uni.leuphana.de) or Mr. Prof. Dr. Lang (daniel.lang@leuphana.de).

Further information on studying for a PhD at the Leuphana University of Lüneburg can be found under: <http://www.leuphana.de/en/graduate-school/doctorate.html>



GLOBAL TraPs

TRANSDISCIPLINARY PROCESSES FOR SUSTAINABLE PHOSPHORUS MANAGEMENT

Contacts

To inquire about involvement in Global TraPs, please contact the Global TraPs management team:

- | | | |
|--|--|--|
| • Science leader | • Practice leader | • Practice manager |
| Roland W. Scholz, Tel. +41 44 632 58 91 | Amit Roy, Tel. +1 256 381 6600 | Debbie Hellums, Tel. +1 256 381 6600 |
| E-mail: roland.scholz@env.ethz.ch | E-mail: aroy@ifdc.org | E-mail: dhellums@ifdc.org |

<http://www.globaltraps.ch>

ETH

Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich



Designed by: Victoria L. Antoine • Edited by Scott Mall

© 2012 Roy (IFDC) & Scholz (ETH)