

Sustainable Phosphorus Summit calls for a 'new alchemy' around phosphorus and food

February 11 2011

The problem with phosphorus, a critical element in fertilizers and food, is, as comedian Rodney Dangerfield would say, that it "can't get no respect."

Increasingly scarce, yet commonly overused in [agricultural fields](#), polluting streams and lakes, this essential component of our bones, our DNA, the periodic table and the dinner table may soon join oil on the [endangered species list](#) – without change in attitudes of policy-makers, research ingenuity and sustainable strategies.

"Phosphorus sustainability is a 'wicked' problem, but it is not a rarified problem," says Stuart White, director of the Institute for Sustainable Futures in Sydney, Australia. "We need to learn from other resource areas, address things in a cost-effective way. Food affects everyone. There is strong economic and social advantage to create a 'soft landing'."

White was one of the more than 100 scientists, engineers, farmers, entrepreneurs, policy-makers, educators, artists, students and others who met Feb. 3-5 at Arizona State University to create awareness and change around global phosphorus use at the Sustainable Phosphorus (P) Summit.

"The P Summit was an important milestone in the emerging global dialogue around phosphorus scarcity and sustainability," says summit speaker Dana Cordell, a researcher with the University of Technology in Sydney, Australia, and co-founder of the Global Phosphorus Research Initiative in 2008.

"The summit was distinguished by its participatory, interdisciplinary and creative approach that allowed participants from diverse backgrounds to share their different knowledge and perspectives on the global phosphorus challenge," states Cordell. "It was very solution-focused and came up with strategies for how we might move together toward a more sustainable situation."

The 3-day summit was the first international gathering on U.S. soil around this growing global sustainability challenge. Developed by ASU doctoral and postdoctoral students as part of the School of Life Sciences' Frontiers in Life Sciences conference series, the gathering has spurred a diverse series of new collaborations: the development of a collective consensus statement, the launch of a global resource network, an art show and a book project.

The consensus statement, released Feb. 10, reflects the optimism coming out of the summit around solution-building. It states that "by closing the human phosphorus cycle and transforming wastes into resources and uncertainty into security, humanity can implement a 'new alchemy' in which people become more secure and enjoy greater well-being in a healthy environment."

Among the points highlighted in the consensus statement are:

<http://sols.asu.edu/frontiers/2011/consensus.php>

- Call for education, efficient use of P on the farm and protection of water quality and fisheries
- Couple P sustainability solutions to those for other global challenges, such as water, energy and other elements
- Reclaim P from food waste, livestock production, and human

wastewater in cities

- Develop affordable access to [fertilizers](#) for farmers in the developing world

The workshops, poster sessions and panels held at the ASU summit will also fuel a P-book. Book chapters will define the scale and scope of P sustainability problem, develop and communicate possible solutions for achieving sustainable P use. Contributors hope it help raise public awareness about the issue in an accessible way, locally and globally.

The project will be led by summit organizers Karl Wyant and Jessica Corman, life sciences doctoral students in ASU's College of Liberal Arts and Sciences, and James Elser, Regents' Professor and expert in biogeochemical cycling of phosphorus.

"Citizens don't have to look far to see that the negative consequences of unsustainable P use are already around us," say Wyant and Corman.

Events like the current unrest in Egypt and the linkage to food security issues illustrate the fragility and interconnectedness of the world food supply. Corman and Wyant point out that more than 40 countries experienced food riots in 2008 due to rising food prices, due in part to a 700 percent spike in phosphorus fertilizer costs. Moreover, phosphorus resources are limited to five countries in the world, with the bulk of the world's resources held by Morocco.

Despite the United States being amongst the highest consumers of P, the depletion of phosphorus supplies and the potential opportunities to close the human P cycle have largely gone unnoticed, says Corman. However, positive change can be found, for example, in Sweden, where the environmental protection agency has set a goal to recycle 60 percent of P from sewage sludge by 2015.

"We are at a juncture in the issue of P sustainability where positive solutions are still attainable," says Wyant.

"The global scale and importance of P sustainability make it essential to address this issue with international and transdisciplinary collaborations," Corman says. "Better measures are needed to conserve, recover, and recycle P. The time has come to close the human phosphorus cycle."

To aid in building a platform for dialogue now that the summit has passed, Cordell and White have launched the Global Phosphorus Network (<http://globalpnetwork.net/>), a resource to connect those interested in issues surrounding [phosphorus](#) sustainability and foster the new transdisciplinary research and solutions identified during the summit.

"This problem is multidimensional and requires insights and perspectives from all areas of human endeavor," says Arizona State's Elser.

"If you use a disciplinary hammer, everything looks like a nail," notes White, who delivered the summit's closing plenary talk.

Provided by Arizona State University

Citation: Sustainable Phosphorus Summit calls for a 'new alchemy' around phosphorus and food (2011, February 11) retrieved 18 April 2024 from <https://phys.org/news/2011-02-p-summit-alchemy-phosphorus-food.html>

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