zinc in fertilizers

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Zinc Nutrient Initiative

in this issue:

China MoA National Recommendation for Zinc Fertilizers extended for Summer Crops

Early in 2012, China's Ministry of Agriculture (MoA) added zinc to their national fertilizer recommendation for the first time. The recommendation has recently been extended for summer crops, specifically rice and corn, at a rate of 15 to 30 kg $ZnSO_4$/ha.

Rice and corn are the largest grain crops in China. In 2011 China produced 192 million tons of rice, and 166 million tons of corn. Both crops are highly susceptible to zinc deficiency and have high demand for zinc fertilizer, especially corn, which is grown mostly in zinc-deficient upland soils.

The Chinese national fertilizer recommendations are distributed to 400,000 extension workers. It is estimated that if 50% of the corn-growing areas are zinc-deficient, the full implementation of the recommendation in corn production will add over 100,000 tonnes of zinc metal to the fertilizer market in China. For more information on the recommendation or the ZNI program in China, please contact Dr. Ming Xian Fan.

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Zinc fertilizer market highlighted in a CICC Report

The China International Capital Corporation Limited (CICC), an influential investment banking firm, published an extensive report on the zinc fertilizer market in China and globally. Estimates for zinc market potential in Chinese fertilizers range from a base of 350kt to an optimum of 500kt. Estimates for the Global zinc market potential in fertilizers range from a base of 590kt to an optimum of 920kt.

The report also notes "The overlap of soil and human zinc deficiency in developing countries and increased global awareness of the issue mean developing national usage could be approaching a step-change."

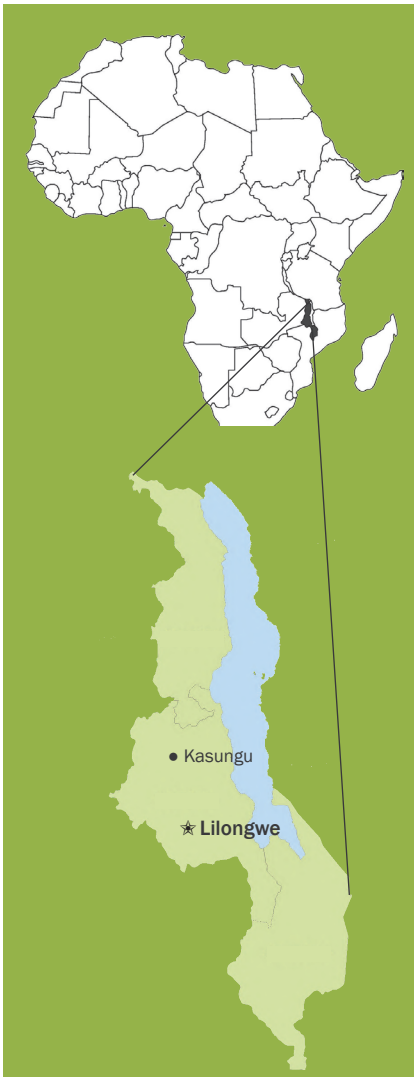
For more information on the CICC's report, please contact Dr. Andrew Green or Dr. Ming Fan.

Zinc Fertilizers Project in Malawi

Project Background

A long-term zinc fertilizer project is underway in Malawi with the main objectives of increasing yield and improving human health through increased consumption of zinc fortified crops. The status of zinc-deficiency in soils in Malawi is an excellent example of the link between crop nutrition and human nutrition. A soil survey across the country showed that over 33% of the samples were zinc deficient. A separate study found that 34% of Malawi's population is zinc deficient. Stunting—highly linked to zinc deficiency—is prevalent in 48% of the population. Further, the National Nutrition Policy and Strategic Plan states that zinc supplementation in Malawi would promote optimal complementary feeding by 17% and reduce stunting in humans by 15%.

The Malawi Zinc in Fertilizers Project is a collaborative effort by IZA, the International Lead Zinc Study Group (ILZSG), the Directorate of Agricultural Research Services (DARS), Africa Institute of Corporate Citizenship (AICC), and Chitedze Agricultural Research Station (CARS), with funding from the United Nations Common Funds for Commodities (UNCFC). For more information about this project, contact Rob White, General Manager, IZA South Africa.



Results from the first year

A project update meeting in July revealed that after the first season zinc fertilization resulted in significant increase in maize yield and in zinc concentration in the maize grain. For example, in Mtunthama Kasungu, yields increased by 58% per hectare when 2% zinc was applied. Overall, year one results were very positive and trials will be run again in the coming growing season to confirm the data collected in the first year.

Malawi Zinc Awareness Day

Malawi Zinc Awareness Day began with visits to farms that had been treated with varying amounts of zinc. The farmers described how their crops reacted, although the appearances of the plants illustrated the results quite clearly.

0% zinc

2% zinc

4% zinc

Men, women, and school children attended the event in Kasungu, a farming community north of the capital city of Lilongwe, to learn about the importance of zinc in soils, crops, and human nutrition. One student said they were "encouraged by their head teacher so that they can learn about zinc."

Among the +165 participants were representatives from the Agriculture Development Division, the District Council, The District Agriculture Development Office, the Traditional Authority (TA) and a nutritionist from the Kasungu District Hospital. A report on Zinc Awareness Day was aired across the country which spread the beneficial news on zinc beyond the immediate participants.

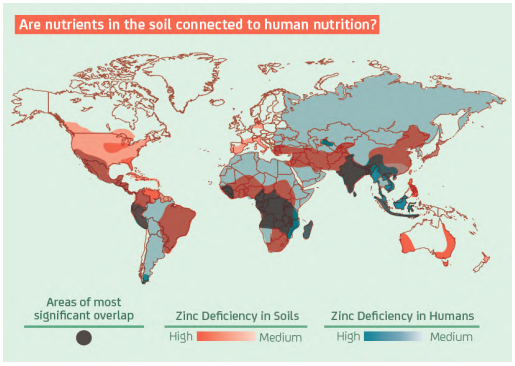
Global Fertilizer Industry Campaign on the Key Role of Fertilizers in Sustainable Agriculture

By Claudine Aholou, International Fertilizer Industry Association (IFA)

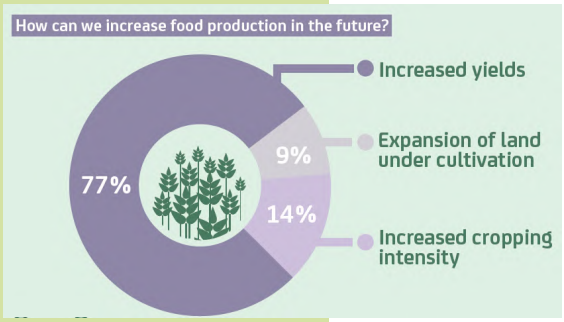
"Roots for Growth" is a campaign by the world's leading fertilizer associations highlighting the important role fertilizers play in addressing global food security in a responsible, efficient and sustainable way. The campaign seeks to raise awareness and share knowledge about the fertilizer industry's contribution to sustainable agriculture and food security.

The launch of the campaign preceded the United Nations Conference on Sustainable Development, dubbed Rio +20, where the green economy was a central theme. Food security, one of the key issues, is now formally recognized in the document "The Future We Want," that came out of the conference and was endorsed by 193 member states of the United Nations.

Several media tools are used with the aim of informing policy debates and encouraging dialogue. These include: an introductory "Roots for Growth" video that provides an overview of the challenges and proposed solutions; interactive infographics on food/nutrition security, soil health, environmental stewardship and sustainable agriculture; and links to key industry news, external policy papers, multimedia and key industry spokespeople.



Fertilizers are responsible for about 50% of the food grown around the world, nourishing billions of people and helping improve their diets every year. As the human population continues to grow, the world's farmers will need to become even more productive.



Fertilizers of various types help farmers to maintain healthy and fertile soils, giving them the exact nutrients they need in a cost-effective manner. But it is also important to minimize farming's environmental impact, which means using the right source of fertilizer at the right rate, at the right time and in the right place, as well as considering a range of other practices such as crop rotation, reduced tillage and effective water management.

The "Roots for Growth" initiative is led by a coalition of the world's leading fertilizer associations, namely the Brazilian industry association (called Associação Nacional para Difusão de Adubos, or ANDA), Canadian Fertilizer Institute (CFI), Fertilizers Europe, International Fertilizer Industry Association (IFA), and The Fertilizer Institute (TFI). Visit "Roots For Growth" at www.rootsforgrowth.org.

IZA Raises Awareness of Zinc Deficiency in Crops in Karnataka State in India

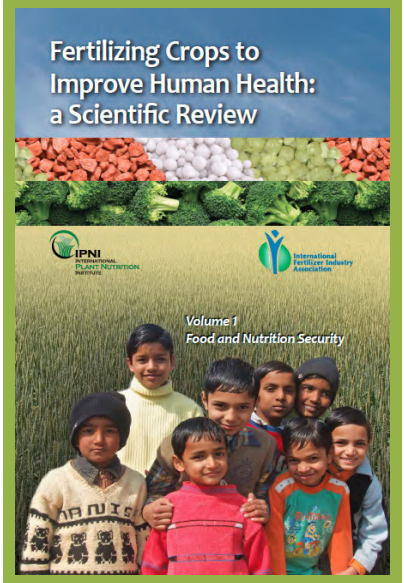
"The awareness level of the farmers in the state was very low," said Dr. Soumitra Das, Director, ZNI-India, referring to the collective knowledge about zinc deficiency in crops in Karnataka State prior to a conference organized by IZA and Fertilizer Association of India (FAI) in July. The objective of the conference was to demonstrate the importance of zinc fertilizers to address the issue of zinc deficiency in soils, crops and humans. Attendees left with both knowledge and a plan. The Principal Secretary of Agriculture said he hoped to be able to formulate an effective strategy specific to Karnataka in addressing zinc deficiency. Over 50% of the soils in Karnataka State are zinc-deficient, second only to Maharashtra.

This was the 3rd such conference and was attended by about 100 people, including representatives from the Department of Agriculture, ICAR, agricultural universities, and IZA's ZNI member companies such as IFFCO, Nagarjuna Fertilizers, and Coromandel International. For more information, contact Dr. Soumitra Das, Director, ZNI-India.

Fertilizing Crops to Improve Human Health: A Scientific Review

By Dr. Patrick Heffer, IFA

Fertilizer used in the right way, from the right source, at the right rate, and at the right time contributes immensely to the quantity and quality of the food produced, impacting the health and well-being of humanity. The International Fertilizer Industry Association (IFA) and the International Plant Nutrition Institute (IPNI) developed *Fertilizing Crops to Improve Human Health (FCHH)*, an up-to-date scientific review on the global impacts of fertilizer on human health.



FCHH has three volumes; the first is on Food and Nutrition Security, covering micronutrient malnutrition, enhancing nutritional quality of foods with trace elements, and the agronomic biofortification of food crops with micronutrients. This volume shows that a large proportion of soils worldwide are zinc deficient with zinc malnutrition in varying degrees in the different regions and that agronomic fortification can increase zinc contents of cereals. Volume 1 is available now online.

Volume 2 is on Functional Foods and Volume 3 will focus on fertilizer impacts on selected health risks associated with plant production systems. Volume 2 and 3 are underway and will be published by September 2012. A book containing all volumes will be published by the end of 2012. For more information about FCHH or IFA, please contact Dr. Patrick Heffer at IFA.

Table 1. Grain yield and grain zinc concentration of rice and wheat as affected by zinc-enriched urea applications at the research farm of IARI, New Delhi. Data show average values of 2-year field trials.[1]

Treatments	Rice		Wheat	
	Grain yield, t/ha	Grain zinc concentration, mg/kg DW	Grain yield, t/ha	Grain zinc concentration, mg/kg DW
Prilled Urea	3.99	30	3.72	40
Zinc-Enriched Ureas				
1% zinc as ZnO	4.46	36	4.14	46
1% zinc as $ZnSO_4$	4.67	39	4.25	49
2% zinc as ZnO	4.95	43	4.39	49
2% zinc as $ZnSO_4$	5.15	48	4.53	51

1. Shivay, Y.S., D. Kumar, and R. Prasad. Effect of zinc-enriched urea on productivity, zinc uptake and efficiency of an aromatic rice–wheat cropping system. Nutr. Cycl. Agroeco.

4th Symposium of Micronutrients and Mg—ESALQ-USP

The integration of agriculture, nutrition and health was the main focus of the 4th Symposium of Micronutrients and Magnesium held in Piracicaba in July. Presentations focused on the huge role that agriculture plays in nutrition and health, and in particular, the necessity of including zinc and other micronutrients into agricultural practices for plant nutrition. The link between zinc and human health was underscored by the airing of a Zinc Saves Kids video between sessions. 280 participants attended the event, with representatives from the fertilizer industry and the agricultural sector including IZA's ZNI members Produquimica, Agrichem, and Mosaic. For more information on this symposium, contact Joao Moraes, Director, ZNI-Brazil.

Zinc Fertilizer in Corn Production demonstration in Ninxia

National Workshop on Zinc Fertilizer and Demonstration Site Tour Shows Great Improvements from Zinc Fertilizers

"Zinc is an essential nutrient and zinc fertilizer increases crop yield, zinc concentration in grain, fertilizer efficiency and economic returns in crop productions"--the resounding message from a national workshop in China.

IZA and NATESC organized "Zinc Fertilizer Technology and Use in Crop Production" in Shijiazhuan, China in May, which included field visits to sites of crop trials. The results collected from the field trials and demonstration sites showed the effects of zinc fertilizer:

- Increased crop yields by an average of 8.5% in 14 provinces
- Increased production, from 6.5% of corn to 34% of potato, in 2011
- Increased zinc concentrations in grains from 10% to 40%, varied with crops and zinc fertilizer application rates and methods
- Increased economic returns in all tested crops with average value benefit (RMB) per Yuan of zinc fertilizer cost ranging from 4 to 24 Yuan for grain crops to the highest of 41 Yuan for cotton.
- Increased Nitrogen uptake and protein contents in grain
- Highest yield increase obtained with zinc fertilizer application by fertigation method

Delegates visited the demonstration sites in Gaocheng, Hebei to see first hand the effects of zinc fertilizer on wheat and vegetable production through soil and fertigation applications. The event was covered by several media agencies which helped further broadcast the importance of zinc fertilizer in Chinese agriculture.

More than 140 agricultural researchers, extension agents and fertilizer industry leaders attended the workshop. Dr. Li Tiesheng, Vice Director General, NATESC addressed the importance of zinc fertilizer in Chinese agriculture and balanced fertilization. Prof. Jiang Rongfeng, Vice Dean of Natural Resources and Environmental Sciences, CAU presented the role of zinc as an essential nutrient in human and plant nutrition. Dr. Fan Mingxian, Director, ZNI-China, and Dr. Du Seng, Deputy Director of Water Conservation Agri-Tech Department reported on results from field trials. For more information about this event or IZA's China program, please contact Dr. Ming Fan.

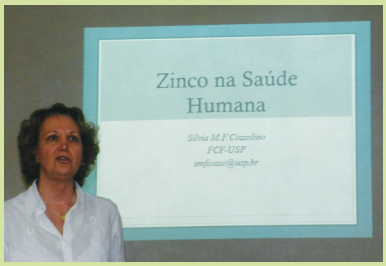
Permanent Forum on the Importance of Zinc

IZA, Campinas Agronomical Institute (IAC), and the Rede FertBrasil created the "Permanent Forum on the Importance of Zinc," which brings together researchers, universities, government, private sector and associations that represent the fertilizer industry. The first meeting in August focused on subjects related to zinc in agriculture, grouping together different sectors including: geology, mining, soils science, crop production, biofortification, fertilizers, nutrition and human health in Brazil.

The key outcomes of the first meeting were:

- Mobilization of key participants to assist in developing a map of zinc deficiency in Brazilian soils, reviewing the critical level numbers for zinc and creating regional and/or crop recommendations;
- Proposal of an agronomical recommendation to include zinc and encouraging fertilizer companies to support the Biofort Project;
- Support of a project for the evaluation of zinc deficiency in the Brazilian population;
- Proposal for additional treatments in HarvestZinc Project in Brazil (tropical agriculture) to address special needs including doses and application time;
- Development of fact sheets illustrating the zinc impact in the main Brazilian crops, and proposing good practices in the use of zinc fertilizers;
- Review of Brazilian law for the methodology used in the evaluation of zinc content and availability in sources for zinc fertilizers.

To access presentations and pictures of the 1st meeting of the Forum, please access: http://www.gape-esalq.com.br/.



ZINCO: Núcleo Online de Discussão, an online discussion group, was launched as a social and professional inclusion tool of the Permanent Forum. The group currently connects more than 100 professionals from different areas such as mining, fertilizer industry, crop production and protection, nutrition and health. The group provides access to information about the importance of zinc, news about the different sectors of the zinc market, and discussions and activities underway at the Permanent Zinc Forum. Interested parties are welcome to join the discussion group by clicking this link: ZINCO: Núcleo Online de Discussão.

Micronutrient Intervention Again Tops the List of Investments in Copenhagen Consensus 2012 ...a Repeat of 2008 findings.

Every four years a panel of economic experts comprising some of the world's most distinguished economists gather to review the ten greatest global challenges with the goal of setting priorities for integrating solutions to these challenges. In 2008, the number one challenge that could be addressed in the most economically efficient way was Vitamin A and zinc deficiencies—in 2012, hunger and nutrition remain the top priorities.

The most economically beneficial intervention to address hunger and to improve nutrition was bundling micronutrients. The logic is that once hunger and nutrition are addressed, children's enrollment in school and retention of knowledge will increase greatly, as will the likelihood of being able to earn a better living—which is where the economic benefits factor in.

Another solution lauded by the laureates to address the hunger challenge is investment into research and development to increase crop yields. Again, increasing crop yields could reduce hunger but also improve farmers' incomes, which would improve economies in farming communities. To view the full results of the Copenhagen Consensus, click here.

ZNI Joins Foliar Fertilizers Directive Group

Organized by Abisolo (the Brazilian Association of Industries for Vegetable Nutrition Technology) the Foliar Fertilizers Directive Group addresses current issues in the foliar fertilizer sector. With the objective of preserving the foliar fertilizer market, technical groups are created to evaluate laws, market situations, and economic barriers such as taxation in response to new regulations or projects from the Ministry of Agriculture. Abisolo invited Joao Moraes, Director, ZNI-Brazil to join this group in March.

2nd Brazilian Conference on Fertilizers

On August 27, ANDA organized the "2o Congresso Brasileiro de Fertilizantes" in São Paulo, Brazil, promoting the "Roots for Growth" campaign (see earlier story) and discussing the future of the fertilizer sector. This included presentations on the fertilizer market, update on the investments in the Brazilian domestic production of fertilizers and the importance of fertilizers in sustainability. More than 450 people, most of them executives and authorities from the fertilizer sector, participated in the conference. The event was sponsored by a number of key groups including Vale Fertilizantes, Mosaic, Petrobras, and the Ministry of Agriculture. IZA was an institutional supporter of this key event.

The importance of zinc in fertilizers to help ensure food security was emphasized by the key-note speaker, Mr. Luc Maene, Director General at IFA, by highlighting the clear linkage between zinc deficiency in soils, crops and humans, and the role zinc fertilizer can play in addressing this problem. For more information about this conference, contact Joao Moraes, Director-ZNI Brazil.

IZA Welcomes Two New Members

China Henan Xinlianxin Fertilizer Corp. Ltd.

China Henan Xinlianxin Fertiliser Ltd. (China XLX) is a large coal-based urea producer in China. The Company is mainly engaged in the production and sale of urea, compound fertilizers, methanol, liquefied ammonia and ammonia solution with the objective of becoming "the most profitable coal-based urea producer in the country." For more information, visit: www.hnxlx.com.cn.

Indian Micro-Fertilizers Manufacturers Association (IMMA)

IMMA, established in Pune, Maharashtra, India, represents several manufacturers of micronutrients in India. The organization plays a major role in improving the technical knowledge of its members, looking out for their common interests, and establishing dialogue with various institutions. It also organizes agricultural seminars and demonstrations to educate, guide and advise on fertilizer-related issues. For further information, visit: www.imma.co.in.

country spotlight: Mexico

a look at zinc deficiency in countries around the world

- All agricultural soils in Mexico are zinc-deficient, though it is most common in the highly weathered regions of Queretaro, Sonora, and Sinaloa.[1]
- Maize is by far the largest crop in Mexico and is the crop most likely to be grown on zinc-deficient soils.[2]
- Corn tortillas are the main source of caloric intake for Mexicans; thus, maize is the most consumed crop in Mexico.[2]
- 20% of the population in Mexico is deficient in zinc--19 million people.[3]
- 25% of children in Mexico have zinc deficiency. Those who are most deficient are children aged 0-4. This is the same age group that is most at risk of dying from diarrhea or pneumonia, diseases that could be prevented by adding zinc to diets.[3]

Crop	Produced in 2011 (1000 MT)[2]	Consumed in 2011 (1000 MT)[2]
Maize	19,000	29,700
Sorghum	6,125	4,187
Sugar	5,495	4,187
Coffee	4,000	1,975
Wheat	3,700	7,850

1.Alloway, B. Zinc in Soils and Crop Nutrition. 2008. 2. USDA Foreign Agricultural Service Mexico, 2012. www.mexico-usda.com.mx. 3. Rosado, J. Nutrient Composition for Fortified Complementary Foods. Journal of Nutrition. 2003.

IZA Releases First Portuguese Edition of the ZNI Newsletter

The 7th edition of *Zinc in Fertilizers* newsletter was the first to be translated into Portuguese. The creation of the Portuguese edition-- *Zinco em Fertilizantes* – is a response to the growing demand from the Brazilian market. It was sent to over 500 people, providing our affiliated members with operations in Brazil, and professionals from other Portuguese speaking countries with more information concerning the advances and benefits for the wider use of zinc in fertilizers. *Zinco em Fertilizantes* can be accessed on the Zinc Nutrient Initiative (Portuguese) website: www.zinc.org/info/zni_brazil.

Items of Interest

Some recently released items that provide useful, insightful information on zinc deficiency, zinc nutrition, food security, and nutritional crop varieties:

- "When zinc deficiency strikes — it hits hard and fast!" Trent Roberts and Nathan Slaton, University of Arkansas, Division of Agriculture. May 21, 2012. To access, click here.
- "Remember, nutrition security is about food quantity, quality and diversity." Farming First Nutrition Video. To access, click here.
- "Mining technology can help find nutritional crop varieties" by Steven Forrest. PlantWise blog. April 23, 2012. To access, click here.

Zinc in Fertilizers is a newsletter published by **The International Zinc Association** (IZA), a non-profit organization headquartered in Brussels, Belgium. IZA launched the Zinc Nutrient Initiative (ZNI) in response to the critical issue of zinc deficiency in soils, crops, and humans. For more information, please visit www.zinc.org/crops. Director, ZNI: Dr. Andrew Green. Editor: Teri Kuhn.