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Sulphur, the fourth essential nutrient

by Graeme Blair

It is increasingly recognized that plants require as much sulphur as they do phosphorus, and that deficiency of sulphur reduces plant protein production – and hence crop yield and quality. For many years little attention was paid to sulphur as a plant nutrient. This was mainly because it was supplied to soils via rainfall and volcanic emissions, and as a component of nitrogenous, phosphatic and potassic fertilizers. Cleaner air has reduced atmospheric sulphur inputs. In parts of Europe that once suffered from acid rain (sulphuric acid dissolved in water), fertilizer sulphur is now required in order to maintain crop growth.

The intensification of cropping systems is also accelerating sulphur removal from the soil. Together with increased use of high-analysis sulphur-free fertilizers, it is aggravating the sulphur deficiency problem in cropping systems.

Soils in many parts of the world are therefore becoming increasingly sulphur-deficient. There are several approaches to addressing this problem with sulphur-enhanced fertilizers.

Plants utilize soil sulphur in the sulphate form. However, particularly in sandy soils and/or soils that have high pH, sulphate sulphur is mobile and easily leached from the rooting zone.

Elemental sulphur is not susceptible to leaching. Nevertheless, before the plant can use it, the elemental sulphur has to be oxidized to sulphate by soil microorganisms. Numerous factors affect the oxidation rate (microbial population, temperature, pH, moisture and aeration). The particle size of the elemental sulphur is a major factor. Sulphur par-



Photo: Shell Thiengo

Plant response to elemental sulphur (left plot) compared to zero sulphur (right plot) on a white clover pasture at Armidale, NSW, Australia.

ticles must be less than 150 μm (150 millionths of a metre) in diameter in order to be oxidized to sulphate in the year of application.

For fertilizer manufacturers, making and handling such fine sulphur particles poses safety concerns that must be considered. Much effort has been put into developing processes to produce micro-fine sulphur safely and to incorporate the particles on (or into) the fertilizer granule.

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Sustainability

Inkabor's commitment to biodiversity and communities in Peru

by Yanina Paredes

The Peruvian company Inkabor produces boron-based organic fertilizers which are sold worldwide, with the brand Fertibagra. In the manufacture of its fertilizers, Inkabor is committed to environmental protection and to benefiting the communities living near its facilities.

Laguna Salinas, in the Arequipa region of southern Peru, is the site of an important boron deposit. Boron is one micronutrient essential to healthy plant growth. It occurs abundantly in the evaporite ore ulexite. The mineral is directly deposited in arid locations due to the evaporation of water in intermittent playa lakes such as Laguna Salinas.



Laguna Salinas

At Inkabor's Laguna Salinas mining facility, ulexite is extracted from an open pit which allows a rational and selective exploitation.

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sustainability

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Production at this facility is strictly controlled by the company's Quality Department and by the Peruvian Ministry of Energy and Mines, thus helping to protect the 3,670 square kilometres in Salinas and Aguada Blanca National Reserves. Inkabor operates six months a year during the lagoon dry season. During the rest of the time due to the weather, the company does not carry out activities and during the heavy rain season (December to May) there is migration of Andean Parihuana Birds.



Open pit mining at Laguna Salinas

per cent of the world's flamingo of James population (also known as the Puna Flamingos). There is a population of approximately 8,000 birds during the rainy season.

Among Inkabor's environmental protection activities at Laguna Salinas, the company monitors water, soil and air quality, the state of groundwater, zooplankton levels and bird populations. Two scientific projects with geological, biological and hydrological characters have been undertaken with Italian and Peruvian universities. These projects will help to ensure an adequate protection of the National Reserve.

Inkabor's boron-based organic fertilizers have been certified by the international entity Control Union Certifications as suitable for use in organic agriculture, under the definition in the European Union Council Regulation (EC) No. 834/2007 on organic production and labelling of organic products.

Inkabor has also been working towards implementing international standards such as: ISO 9001 (quality management system), OHSAS 18001 (occupational health and safety) and ISO 14001 (environmental management system).



Water monitoring by Inkabor

Working with local communities

Because Inkabor is a socially responsible company, it looks for ways to benefit local communities. In particular, it supports sustainable development concepts among indigenous people. The areas in which Inkabor's social responsibility activities are being carried out include education, health, employment, training of young people, culture and the preservation of traditions.

Due to climatic conditions in the area, Inkabor encourages the improvement of basic infrastructure as required through certain planned projects such as: the building of houses and alpaca sheds to protect residents from the cold, projects to improve the communication lines between communities, among other important projects benefiting communities close to the operation site.

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Flamingos at Laguna Salinas



Salt project

Biodiversity and sustainable mining

Laguna Salinas is at more than 4,000 metres above sea level and has a puna seca ecosystem (puna seca refers to conditions on a high, dry Andean plateau). There is abundant birdlife. It is a nesting area for waterfowl and during the migration period (December to May) it provides shelter to three per cent of the world's flamingo population, and two



Distribution of school material (left); adults training (right)

focus on

The Russian Fertilizers Producers Association

by Vladimir Kalensky

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Incentives have been created for young people and adults to participate in training programmes financed by the company, so that they will be able to establish their own microcompanies.

During the past year, Inkabor has donated more than USD 2,7 million to boost the local economy and to develop the communities of Salinas, Moche, Huito and Santa Lucia. Temporary jobs for the elderly have benefited around 1,000 people. Employment has been created in mineral recuperation and transport. A new economic development project (with a participative focus) has been created to improve the collection and sales by local people of salt from the salt mine. More than 50 families will benefit from this project.

Inkabor is a company of Gruppo Colobbia. As a modern manufacturer, it respects the environment, accepts responsibility for the future and works to continue generating trust through development projects and other opportunities for improvement, in order to meet the expectations of its shareholders, clients and the general public.



Photos: Inkabor

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The Russian Fertilizers Producers Association (RFPA) was founded in 2008 to formulate consolidated positions and address problems associated with long-term performance by the industry. Current members are: Acron, EuroChem, the International Potash Company, KuibyshevAzot, MendeleevskAzot, Minudobreniya Rossosh, PhosAgro AG, Salavatnefteorgsintez, Sibur-Fertilizers, Silvinit, URALCHEM and Uralkali.

Mineral fertilizers represent more than 20 per cent of total production by the Russian Federation's chemical and petrochemical industries. Over 90 per cent of these fertilizers are manufactured by RFPA members.

RFPA cooperates with the Government of the Russian Federation (Ministry of Industry and Energy, Ministry of Agriculture, Ministry for Economic Development, Federal Anti-monopoly Service, and other ministries and departments) on emerging problems and tasks.

To satisfy local agriculture's growing need for mineral fertilizers, RFPA and the Agro-industrial Union signed an agreement covering the period 2008 to 2012. Under this agreement, fertilizer producers will increase mineral fertilizer deliveries to the domestic market. They have also agreed to support local agricultural producers, prevent drastic increases in food prices, and fix a maximum price for fertilizers in the domestic market.

In 2008, despite the financial crisis and economic slowdown, Russian producers increased shipments of mineral fertilizers to the domestic market by 17.7 per cent compared with the previous year. Due to the work of the Association, export duties on mineral fertilizers were abolished ahead of schedule in February 2008.

RFPA actively participates in planning the fertilizer industry's long-term operation. Fertilizer industry investment projects amounting to 40 billion roubles



are included in the action plan for implementing the strategy for development of the chemical and petrochemical industries in the Russian Federation up to 2015, which was approved by the Ministry of Industry and Energy. The Association's proposals concerning an agricultural subsidy system, preferential credits for agricultural producers, and the development of a fertilizer distribution infrastructure for the domestic market have been included in a programme to stimulate competition in the Russian Federation, also approved by the Government.

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Russian
fertilizers
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How efficient is phosphorus fertilizer use?

by J. Keith Syers and A. Edward Johnston

Crops use the phosphorus added to fertilizers more efficiently than has been commonly believed: phosphorus is rarely fixed irreversibly in soil. This is the main conclusion of a recent study, funded by IFA and four other organizations involved with fertilizers, which analyzed and synthesized available data from experiments in which phosphorous recovery by crops was assessed over an adequate period of time. Critical to the assessment was the use of the "balance" method to calculate recovery. The balance method takes into account the uptake of residual phosphorus from previous applications.



Grazing animals aggregate and deposit dung unevenly giving a lower efficiency of phosphorus use in grazed pasture.

Why is there concern about the efficient use of fertilizer phosphorus?

Phosphate rock used in the manufacture of phosphate fertilizer is a finite, non-renewable resource and must be used as efficiently as possible. The phosphorus status of many soils also has to be improved to produce increased yields of food crops. Additionally, the transfer of soil phosphorus derived from fertilizers and manures from land to surface waters needs to be minimized to preserve water quality.

The common belief that the efficiency of phosphorus fertilizer use by plants is very low (between 10 and 30 per cent) because of phosphate fixation in soil arose from the results of laboratory studies showing that water-insoluble phosphate compounds are formed when

water-soluble phosphates are reacted with soil components under laboratory conditions far removed from those in the soil environment in the field. To add to the confusion, the small recoveries of added P in field experiments resulted from using a method of calculation that, in retrospect, was not appropriate because it ignored residual phosphorus in the soil.

Concepts of phosphorus behaviour in soils have been changing over the last 30 or so years. The focus has gradually shifted from an emphasis on precipitation of insoluble phosphates to reactions of phosphate ions occurring on the external and internal surfaces of soil components. However, no attempt has been made to reconcile this change in thinking with agronomic data obtained from long-term field experiments. The study has made this reconciliation using data from many field experiments on different soils and farming systems in contrasting climates. The conclusion, which is likely to have widespread applicability, is that the recovery and thus the efficiency of use of added phosphorus can be high – up to 80-90 per cent in most soils.

Another important outcome is that it is possible to define a "critical level" of available soil phosphorus for a particular soil type and farming system, at which maximum economic yield is obtained. At this value P-use efficiency is very close to 100 per cent when measured by the bal-



Efficient use of fertilizer phosphorus is important for maintaining high water quality in lakes.

ance method. Plant-available phosphorus in the soil should be increased only to the critical level for that soil type and farming system, and then maintained at this level by replacing the phosphorus removed in harvested crops. Using this management system for phosphorus, the efficiency of use will be very close to 100 per cent.

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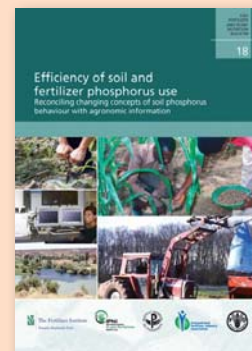
More information

■ Efficiency of soil and fertilizer phosphorus use: Reconciling changing concepts of soil phosphorus behaviour with agronomic information

J. Keith Syers, A. Edward Johnston and Denis Curtin.

The other four participating organizations were The Fertilizer Institute, the International Plant Nutrition Institute, the World Phosphate Institute and the Food and Agriculture Organization of the United Nations (FAO). The study, published by FAO in 2008 as Fertilizer and Plant Nutrition Bulletin 18, can be ordered or downloaded on IFA's website at:

www.fertilizer.org/ifa/Home-Page/LIBRARY/Our-selection/Fertilizer-use.html



Sulphur, the fourth essential nutrient

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Sulphur particles applied to the granule must also be able to resist breaking off during transportation and spreading.

At one time there was concern about the potential for increased soil acidity during the oxidation of elemental sulphur. While sulphuric acid is produced as a result of oxidation, the soil's ability to buffer against pH change means that a pH shift is rarely recorded.

There has also been a trend for fertilizer production to move from ammonium sulphate (24% S) and single superphosphate (11% S) to the production of MAP (1% S), DAP (1% S) and urea (0% S).

As farmers need to increase crop yields

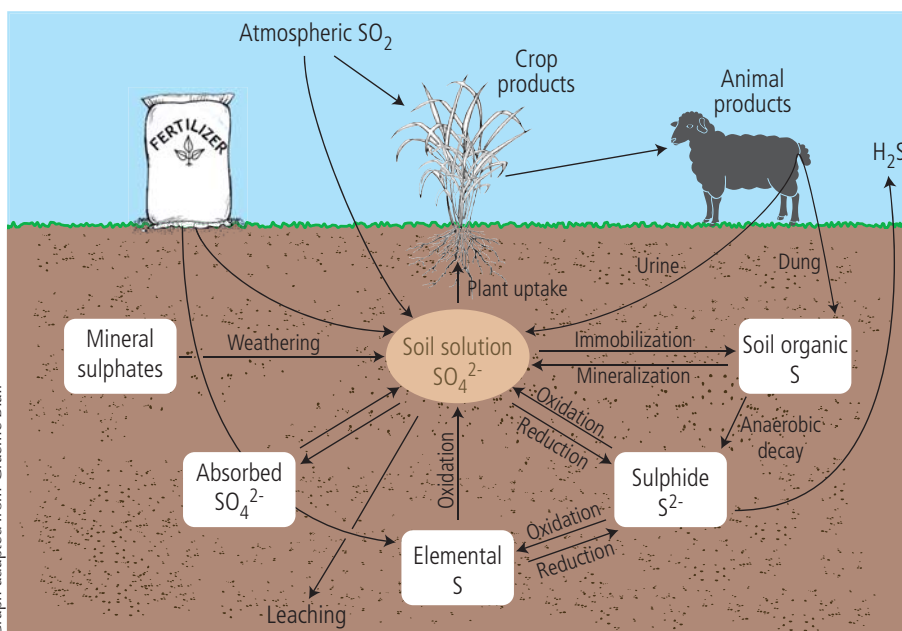


Photo: The Sulphur Institute

Cassava responds to sulphur-enhanced fertilizers in Guangxi Province, China, 2004

and crop quality to meet global food security demands, the hunt is on for ways to include sulphur in fertilizers. By incorporating sulphate and elemental sulphur in the fertilizer granule, the plant receives both immediate and ongoing benefits from this essential macronutrient.

Sulphur cycle in a grazed pasture showing fertilizer S supplying S directly to the soil sulphate pool and the elemental S being oxidized to sulphate before being taken up by the plant.



Graph adapted from Graeme Blair

IFA news

IFA Norman Borlaug Award will recognize excellence in crop nutrition knowledge transfer

Every year since 1993, IFA has selected a recipient for its International Crop Nutrition Award. This award recognizes scientists whose research has led to significant advances in crop nutrition and in practical application at field level.

One of the weakest components of today's agricultural systems, particularly in developing countries, is extension. While research is critical, it cannot bring about meaningful progress at farm level. The wider adoption of improved nutrient management practices requires effective knowledge transfer. At its meeting in May 2009 in Shanghai, the IFA Agriculture Committee therefore agreed to recognize effective last-mile delivery in developing countries through an IFA Norman Borlaug

Award for excellence in crop nutrition knowledge transfer. This first IFA award for extension work will alternate with the crop nutrition research award.

Information about nominations and evaluation procedures is provided in the leaflet accompanying this issue of Fertilizers & Agriculture. Applications are to be submitted to an IFA member by 15 January 2010. Nominations by IFA members must be forwarded to the IFA Secretariat by 31 January. Since extension workers operate mainly at local level, active involvement in the nomination process by IFA members will be essential.

The recipient will be awarded ten thousand euros and will be invited to make a presentation concerning his or her strategy and achievements at the IFA Annual Conference in Paris from 31 May to 2 June 2010.

For information on previous IFA awards: www.fertilizer.org/ifa/Home-Page/IFA-awards



More information

■ Graeme Blair, University of New England, Australia

Graeme Blair has researched sulphur in soils and as a plant nutrient for 44 years. He was awarded the 2000 IFA International Fertilizer Award for his sulphur research and its extension to industry. As Special Advisor to Shell Thiogro, he has conducted numerous field trials on MAP-S, DAP-S and TSP-S that include micro-fine elemental sulphur in the fertilizer granule.

For information or comments, Graeme Blair may be contacted at: gblair2@une.edu.au



Across Asia, millions of rice farmers depend on urea fertilizer to meet the nitrogen needs of the continent's primary crop. Many farmers still spread urea into floodwaters to fertilize rice. This is highly inefficient – about two-thirds of the fertilizer is lost as greenhouse gas or becomes a groundwater pollutant.

Urea deep placement (UDP) is a more efficient and environmentally responsible method of fertilization. IFDC pioneered UDP research and helped introduce it in Bangladesh in the 1980s. UDP technology has since been spread to other countries in Asia, including Cambodia, Nepal and Vietnam.

Farmers using UDP place urea briquettes in the soil near the rice plants. UDP increases nitrogen use efficiency because most of the urea nitrogen stays in the soil, close to the plant roots where it is absorbed more effectively. The net result is that crop yields are increased while pollution is lessened. Farmers using UDP are increasing yields by more than 20 per cent while using 40 per cent less urea.

By 2008/09, the Bangladesh Department of Agricultural Extension (with IFDC assistance) spread UDP technology to 500,000 hectares (ha) of rice fields, increasing production by 268,000 metric tonnes (mt) annually. UDP farmers had additional annual net returns of USD188/ha.

UDP use reduced Bangladesh's urea imports in 2008 by 50,000 mt, saving USD 22 million in fertilizer imports and USD 14 million in government subsidies. UDP generated an additional 9.5 days of labour per hectare – almost 4.6 million additional days of labour. More importantly, the additional rice has made 1.5 million more Bangladeshis food-secure.

The Bangladesh Government began expanding UDP technology this year to 2.9 million more farm families on 1.5 million ha.

Urea deep placement

Increasing agricultural production and protecting the environment in Bangladesh

By 2011, rice production is expected to increase by almost 1 million mt, ensuring food security for an additional 4.2 million Bangladeshis.

The UDP technology not only improves farmers' productivity and income, but the need for urea also creates employment opportunities. IFDC engineers developed a simple machine to mould urea into briquettes, and helped establish village-level businesses to manufacture and distribute the machines. Nearly 2,500 urea briquette machines are now in use across Bangladesh.

All farmers seek gains in efficiency and productivity, but nowhere is the need greater than in Africa. Because farmers worldwide face many of the same problems, a group of African farmers, scientists, policy makers, entrepreneurs and extension workers visited Bangladesh to see UDP use first-hand. As a result, the UDP technology is being introduced in Burkina Faso, Madagascar, Malawi, Mali, Niger, Nigeria, Rwanda, Senegal and Togo.

Visiting UDP rice fields in Niger, Chaibou Abdou, Secretary General to Niger's Minister of Agriculture, said "Spiralling food prices spurred the government decision to boost rice production and reduce costly imports. Niger has 30,000 hectares of land with rice production po-

tential. With UDP this land could supply 30 per cent of our needs."

"It's a delight to the eyes," said Mohamed Idrissa of the Daiberi Cooperative. "Rice fields stay green throughout the growing season because nitrogen is released slowly with UDP." Abdou Morou of the Karma Cooperative said,

"Farmers who visit the UDP fields are intrigued. They know that something very different is happening! We're especially motivated because of the food crisis. Even our livestock went hungry! Before, we didn't know the importance of

rice husks – but we now know they make good animal feed."

In Burkina Faso, farmers and cooperative leaders toured UDP rice fields in the country's Kou Valley. Farmers using UDP harvested about 1.3 mt/ha more than those who spread urea conventionally. UDP farmers also received over USD 350 more for their crops. Farmer Kindo Souleymane pointed out, "UDP takes more time, but it's only one application versus two or three using regular urea. This actually saves time."

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“UDP use reduced Bangladesh's urea imports in 2008 by 50,000 mt, saving USD 22 million in fertilizer imports and USD 14 million in government subsidies.”



Recognizing the importance of China's fertilizer industry and evaluating world trends



IFA's 77th Annual Conference took place in Shanghai in May. The 1,225 participants represented 333 fertilizer companies in 72 countries. It has been 12 years since the Annual Conference was held in Beijing. During this period, the Chinese fertilizer industry has demonstrated that it is an important global player – as producer, consumer and trader.

The Chinese fertilizer market has experienced a dramatic shift. Within the space of a decade, China has gone from a net nitrogen and phosphorus importer to a major exporter. It is now a well-established partner in international markets, particularly as a supplier of nitrogen and phosphate fertilizers.

In his opening speech in Shanghai, the Association's outgoing President, Thorleif Enger, emphasized the contribution that is made by the fertilizer industry to increasing agricultural productivity sustainably. Mr Enger encouraged member companies to join IFA's sustainability initiatives. He pointed out that "Last year's global food crisis stimulated renewed interest in the agricultural sector on the international policy agenda." The role of inputs, especially plant nutrients, is

given central importance in most policy documents that focus on global food security. Important amounts of funding have been pledged at international meetings to support agricultural development in developing countries.

In order to establish the international context for fertilizer markets, three presentations were made: "Energy Futures" by Seng Yee Loh, "Soil Fertility Management Techniques in Africa" by André Bationo and "N₂O Emissions in China" by Zucong Cai. The IFA Secretariat also presented its biannual fertilizer outlooks (for 2009-2013) on global fertilizer demand and supply. Following the sudden fall in demand during the 2008/09 fertilizer campaign, and a period of

extreme volatility, the IFA demand report suggested that a rebound can be expected for the 2009/10 campaign.

At the close of the conference, Thorleif Enger reminisced about his own experience in the industry. He also stressed the importance of fertilizers in responding to global challenges through:

• providing enough healthy food to feed the world;

• conserving water and managing future water scarcity;

• developing enough clean energy to sustain economic development;

• avoiding climate change.

Thorleif Enger reminded participants that "Our industry must continue to strive for innovation and higher efficiency in our operations along the value chain."

“Our industry must continue to strive for innovation and higher efficiency in our operations along the value chain.”

IFA news

New IFA sustainability programmes

During the Annual Conference in Shanghai, IFA announced the launch of two new programmes that complement the Association's sustainable development strategy: a task force on water management, and a global task force on zinc deficiency (jointly with the International Zinc Association, IZA).

For more information:

www.zincworld.org

www.zinc-crops.org

www.fertilizer.org/ifa/Home-Page/SUSTAINABILITY/Micronutrients

IFA welcomes its new president

Ajay Shriram, Chairman and Senior Managing Director of DCM Shriram Consolidated Ltd. (DSCL), was elected as IFA's



new President on 27 May 2009 during the Annual Conference in Shanghai.

As President, Ajay Shriram will be responsible for promoting the Association's international agenda, which focuses on making agriculture

more sustainable through programmes such as Fertilizer Best Management Practices, the Safety, Health and Environment Principles, and balanced fertilizer use (including addressing micronutrient deficiencies). Ajay Shriram will also be involved in water management and nutrition and human health activities, as well as in the Africa Forum projects.

For more information:

www.dscl.com

www.faidelhi.org

Farming First multilingual

Farming First is an international public campaign in favor of sustainable agriculture. IFA is one of the co-founders.

The Farming First site is now available in Russian, Chinese, French, Spanish and Portuguese at: www.farmingfirst.org/

More information

■ IFA's China initiative:

www.fertilizer.org/ifa/Home-Page/INITIATIVES/China-Initiative

■ The IFA Call to the G8: www.fertilizer.org/ifa/Home-Page/SUSTAINABILITY/Food-security/IFA-call-to-the-G8

■ IFA Fertilizer Outlooks: www.fertilizer.org/ifa/Home-Page/FERTILIZERS-THE-INDUSTRY/Market-outlooks.html



Farmers working in a plot in Manica, Beira Corridor, Mozambique

Delegates representing the African fertilizer industry met in Durban, South Africa, on 10 and 11 June for the second IFA Africa Forum meeting, during which they were brought up to date on the implementation of the Abuja Declaration on Fertilizers for an African Green Revolution. While the declaration has started to be implemented by several countries and by regional economic communities, other countries lag behind with respect to their commitments. In

Industry looks at how to better realize Africa's potential

particular, the African Fertilizer Financing Mechanism does not yet have the minimum level of funding to become operational.

A presentation on the Hariyali Kisaan Bazaar model, developed by DSCL in India, was made by Sanjay Chhabra. This model demonstrates that it is possible to nurture profitable agribusinesses in the small-scale farming sector in developing countries, provided win-win solutions that benefit both entrepreneurs and farmers are identified. A discussion took place on whether such a model could be adapted in selected African areas, e.g. agricultural growth corridors.

This meeting also provided an occasion to further develop industry linkages with key African partners such as the Alliance for a Green Revolution in Africa (AGRA). In addition, participants discussed the preliminary findings of the four working groups established by the



Field day in Nhamatanda, Mozambique

forum at its meeting in February 2009 in Cairo.

The next meeting of the IFA Africa Forum is scheduled for 3 June 2010 in Paris, in conjunction with the 2010 IFA Annual Conference.

Presentations given at meetings of the Africa Forum, the agendas and minutes of these meetings, and relevant news are available on the Africa Forum section of IFA's web site at: www.fertilizer.org/ifa/Home-Page/INITIATIVES/Africa-Forum2/AF-meetings.html

Communicators' Workshop focuses on message mapping

IFA's first Communicators' Workshop was held in Cavtat-Dubovnik, Croatia, from 9 to 11 June. Attended by a dozen representatives of member companies and associations, it was moderated by Dr Vincent Covello, an expert in risk communication. The workshop's objectives were to familiarize participants with message mapping methods used in risk and crisis communication, and to start developing a briefing book of message maps for use by the fertilizer industry. Participants agreed to establish a Communicators' Network to pursue this exercise. They also agreed to focus on five priority issues: food security and economic development; climate change; food safety; environmental degradation; and organic agriculture.



Participants of the workshop

For more information:
www.fertilizer.org/ifa/Home-Page/LIBRARY/Conference-proceedings/IFA-Communicators-Workshop

Recent IFA Best Practice Recommendations:

Laboratory Quality Assurance Guidelines and Sampling of Dry Bulk Fertilizer Shipments

With the growth of international fertilizer trade, IFA members have reported an increase in disputes related to the use of inconsistent methods for sampling and analyzing product shipments. Consequently, IFA established a Working Group on the Harmonization of Fertilizer Sampling and Quality Assurance Methods. Made up of representatives of fertilizer producers, traders and inspection companies, its purpose is to review and evaluate existing methods used globally, and then to develop best practice recommendations validated by international experts. Two resulting best practice recommendations were recently issued by IFA. Available to the general public, they should be considered as reference documents for the international trade of fertilizer products. They are not to be regarded as international standards; nor should they take precedence over existing national or regional regulations and standards. To download these two documents: www.fertilizer.org/ifa/Home-Page/FERTILIZERS-THE-INDUSTRY/Sampling-and-Analysis

Recommended Best Practices for the Sampling of Dry Bulk Fertilizer Shipments

In global fertilizer commerce, trading parties often use different sampling methods. Sometimes these methods are not well adapted to modern bulk loading practices, such as high-speed conveyor belt transfer systems.

Following a review, the IFA working group determined that sampling procedures for dry bulk shipments in different markets can lead to variations in representativeness. Through a series of pilot tests and procedural evaluation, it developed recommended best practices to provide sampling guidance during international fertilizer trade.



Laboratory Quality Assurance Guidelines

Laboratory chemists acknowledge that even when analytical methods have been validated by a collaborative study, a particular laboratory's performance may reduce precision and accuracy. National and international standards bodies have developed laboratory quality assurance accreditation schemes in an attempt to minimize such discrepancies.

To provide the most accurate and precise analytical data possible, the IFA working group developed a set of guidelines for laboratories participating in IFA collaborative studies (ring tests).

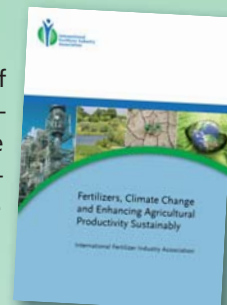
IFA news

Fertilizers can help to reduce global greenhouse gas emissions

IFA released a series of documents on fertilizers and climate change among which a white paper "Fertilizers, climate change and enhancing agricultural productivity sustainably".

This white paper was prepared collectively by the members of the IFA Task Force on Climate Change. The paper's objective is to provide a review of the fertilizer life cycle and its global impact, both positive and negative, on climate change.

To download all the papers: www.fertilizer.org/ifa/Home-Page/SUTAINABILITY/Climate-change



Fertilizer trade flow map



In 2009, IFA co-operated with ICIS to publish a global fertilizer trade-flow, production, consumption and price trend map. The map can be accessed or ordered at: www.fertilizer.org/ifa/Home-Page/FERTILIZERS-THE-INDUSTRY/Fertilizer-markets-and-trade

Fertilizer suppliers' online directory

IFA launched its new Fertilizer Suppliers' Online Directory to provide information on its members' production.

The directory lists the member companies that agree to have their information published on the IFA web site with the list of the products they manufacture themselves, as well as those they distribute and sell.

www.fertilizer.org/ifa/Home-Page/FERTILIZERS-THE-INDUSTRY/Suppliers-directory

Safety Handbook

Establishing and Maintaining Positive Safety Management Practices in the Work Place.

Following the English and Chinese versions, a Russian version is now available for download.

Portuguese and Arabic versions will be coming shortly. Check the IFA web site at: www.fertilizer.org/ifa/Home-Page/LIBRARY/Our-selection/Fertilizer-production-technology-and-distribution.html



New publication advocates Integrated Plant Nutrient Management and Integrated Soil Fertility Management

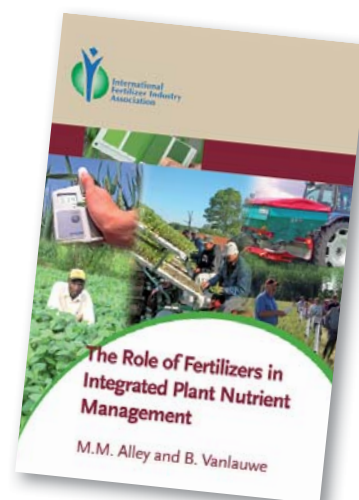
There is a common misconception that supporting the use of manufactured fertilizers means opposing the use of organic sources of nutrients. Nothing could be further from the truth. Most agronomists agree that optimal nutrient management entails starting with on-farm sources of nutrients, and then supplementing these sources with manufactured fertilizers.

To put fertilizers in context, and to make it clear that manufactured fertilizers and organic sources of nutrients can (and should) be used in a complementary fashion, IFA and the Tropical Soil Biology and Fertility Institute of the International Center for Tropical Agriculture (TSBF-CIAT) recently published *The Role of Fertilizers in Integrated Plant Nutrient Management* by Mark M. Alley and Bernard Vanlauwe.

This publication – aimed at farmers, students, researchers, extension person-

nel, agribusiness representatives and policy makers – presents an overview of Integrated Plant Nutrient Management (IPNM) and Integrated Soil Fertility Management (ISFM). IPNM focuses on efficient use of all available sources of essential nutrients for crops. ISFM is a framework for managing soil fertility in order to sustain and improve soil quality and production capacity. Combining these two concepts offers a holistic approach to providing plant nutrients and maintaining and/or enhancing soil productivity.

Specific aspects of IPNM and ISFM are discussed, as well as the use of nutrient budgets to assess nutrient use on a farm, watershed, regional or national basis. It is hoped that this publication will lead to more efficient use of plant nutrients, in order to increase food production and to sustain and enhance soil productivity in an environmentally sensitive way.



The Role of Fertilizers in Integrated Plant Nutrient Management can be ordered on IFA's web site at: www.fertilizer.org/ifa/Home-Page/LIBRARY/Our-selection/Fertilizer-use.html (see also order form page 12).

Enhanced-efficiency fertilizers IFA and New Ag International plan international industry meeting

The market for enhanced-efficiency fertilizers (EEFs) is developing at a sustained rate. Traditionally this has mainly been a specialty market, but the market share of slow- and controlled-release fertilizers is steadily increasing in the broadacre crop sector (rice in Japan, and more recently corn in the United States and rice in China).

In 2005, IFA organized an international workshop on EEFs in Frankfurt, Germany. This was the first international industry event dedicated entirely to EEFs. Almost five years later the time has come to update knowledge in the areas of research and development; agronomic and environmental benefits; the economics of EEF use; policy and regulatory frameworks; and current markets and outlook. For example, how is the EEF market expected to evolve in the medium to

The term "enhanced-efficiency fertilizers" (EEFs) encompasses slow- and controlled-release fertilizers, as well as fertilizers stabilized with urease and nitrification inhibitors.



long term? And will the key drivers of the EEF market be product development, economics or policy environment?

IFA and New Ag International are co-organizing a one-day conference on EEFs in Miami, Florida, USA, on 23 March 2010, in conjunction with the 8th New Ag International Conference and Exhibition. A dozen presentations from the industry, academic and policy/regulatory perspectives are anticipated. The advanced programme will be available during the first half of January 2010.

IFA and New Ag International look forward to seeing many of you in Miami next year. Information about the EEF conference, including registration, hotel reservation, advanced programme and list of participants, will be available on the IFA web site and that of New Ag International at: www.newaginternational.com

IFA events

Fertilizers and Agriculture Conference to take place in Moscow in October

Fertilizer suppliers from throughout the world will meet Russian agri-food sector leaders from 6 to 9 October during the IFA Fertilizers and Agriculture Conference in Moscow, a joint event of the Association's Production and International Trade (PIT) and Agriculture Committees.

The conference will be an excellent opportunity for interaction with senior executives from major international fertilizer companies, including producers, traders and buyers. There will be an emphasis on the fertilizer industry and the agricultural market in Eastern Europe and Central Asia. Some 30 speakers and panelists from Russia and other countries are invited to share their knowledge with the other participants.

The programme will be organized around six sessions on: fertilizers and raw materials supply strategies; fertilizer markets outlook; agriculture and fertilizer demand developments in Russia and globally; the agricultural input market and supply systems; governmental efforts to achieve higher agricultural production and greater input consumption; and sustainable plant nutrition and fertilizer best management practices.



Photo: IFA/M. Prud'homme

The first two sessions will cover supply-related topics dealing with trade, logistics, capacity development, and market trends in key countries. The others will focus on developments in Eastern Europe and Central Asia. This enlarged regional conference is expected to help identify ways to alleviate some of the major constraints on fertilizer use in Russia, such as the distribution bottleneck.

IFA events



35th IFA Enlarged Council Meeting*

17-19 November 2009
Amman, Jordan
[Registration closes on 12 October](#)

Events organized in association with other organizations

IFA/IFDC Phosphate Fertilizer Production Technology Workshop

19-23 October 2009
Marrakech, Morocco
[Information and registration: hrd@ifdc.org](mailto:hrd@ifdc.org)



IFA Crossroads Asia-Pacific

8 - 10 December 2009
Kota Kinabalu, Malaysia
[Registration closes on 4 November](#)

IFA/New Ag International Conference on Enhanced-Efficiency Fertilizer

23 March 2010
Miami, Florida, USA
[Information and registration: www.newaginternational.com](http://www.newaginternational.com)



IFA Technical Symposium*

20-22 April 2010
Sun city, South Africa
[Registration opens in January](#)

More conference information

To access general and registration information on these events click on "Events" on IFA's web site: www.fertilizer.org/ifa/Home-Page/EVENTS. A pocket-sized events brochure can also be downloaded.

*Restricted to IFA member companies

Publications

Mitigating Climate Change Through Food and Land Use

S.J. Scheer and S. Sthapit.
Worldwatch report 179.
The Worldwatch Institute,
Washington, D.C., USA, 2009. 48 pp.

Contact
Fax: +1 301 567 9553
www.worldwatch.org

Soil Carbon Sequestration and the Greenhouse Effect

R. Lal and R.F. Follett.
SSSA Special Publication 57, 2nd edition,
SSSA, Madison, WI, USA, 2009. 410 pp.

Contact
www.soils.org

The Economics of Climate Change Mitigation

Policies and Options for Global Action beyond 2012
OECD, Paris, France, 2009. 301 pp.

Contact
www.oecd.org/publishing

Measurement, Reporting and Verification in a Post-2012 Climate Agreement

C. Breidenich and D. Bodansky.
Pew Center on Global Climate Change,
Arlington, VA, USA, April 2009. 32 pp.

Contact
www.pewclimate.org



EU Climate Policy and Emission Trading: Challenges for the European Fertilizer Industry

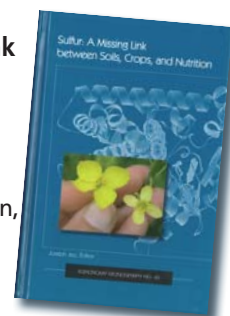
R. Zwiers, H. van Balken *et al.*
Proceedings No. 643. International
Fertilizer Society, Cambridge, UK,
2 April 2009. 20 pp.

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secretary@fertiliser-society.org
[www.fertiliser-society.org/Content/
Publications.asp](http://www.fertiliser-society.org/Content/Publications.asp)

Sulphur: A Missing Link between Soils, Crops, and Nutrition

Ed. J. Jez. Agronomy
Monograph No. 50.
ASA, CSSA, SSSA, Madison,
WI, USA, 2008. 328 pp.
This book describes the
relationship between
sulphur and nutrition in crops, animals
and humans, and analyzes the environ-
mental sulphur cycle in relation to spec-
ific crops and their nutritional needs.

Contact
www.soils.org



Web site update

“Extension and Delivery of Knowledge” – to people

The International Potash Institute has updated its web site and launched a new “Extension and Delivery of Knowledge” K centre, which contains three subsections: About Extension and FBMP; Choose Crop, Region and Language; Fertilizer Dealers’ Corner. These K centres contain new documents which are relevant to farmers, fertilizer dealers and advisors, in different languages.

www.ipipotash.org



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Fertilizers & Agriculture is a quarterly newsletter published by IFA covering issues in relation to fertilizers and sustainable agriculture.

Mailing list
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To consult the current and past issues of Fertilizers & Agriculture: [www.fertilizer.org/ifa/Home-Page/
LIBRARY/Newsletters](http://www.fertilizer.org/ifa/Home-Page/LIBRARY/Newsletters)

Contributions
We invite your contributions of letters, documents, articles, photographs, etc.

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Request form – Fertilizers & Agriculture – September 2009

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Note: most IFA materials are available via the web site at: www.fertilizer.org

- Safety Handbook. Russian version *hard copy restricted to IFA members*
- The Role of Plant Nutrients in Integrated Plant Nutrient Management
- IFA Norman Borlaug Award Leaflet
- Fertilizer Trade Flow Map

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