

## 2004 Crop Nutrition Laureate

Dr Kenneth G. Cassman has been selected by a distinguished panel of experts to receive the 2004 IFA International Crop Nutrition Award for work that improves fertilizer use efficiency, has positive environmental impacts and has been successfully communicated to a wide range of farmers. Laureates receive USD 10,000, an invitation to the IFA Annual Conference and the opportunity to attend one international conference with IFA support during the year following this recognition.

Dr Cassman's 27-year career in research and extension on plant nutrition, nutrient cycling and soil quality has been distinguished by the breadth of his

work on all three major plant nutrients: nitrogen, phosphate and potassium. He is a firm advocate of fertilizers' crucial role in crop intensification, which he considers necessary to safeguard important natural ecosystems that contain much of the world's terrestrial biodiversity. To meet the dual goals of global food security and protection of natural resources, he argues that fertilizer use efficiency must increase and that current or emerging crop nutrient technologies already provide effective options for it to do so. The major accomplishments for which Dr Cassman was selected include:

- Increasing fertilizer use efficiency and yields of irrigated

rice in Asia. Rice systems account for the majority of nitrogen fertilizer use in this region. Enhancing nitrogen fertilizer use efficiency therefore has a substantial positive impact on water quality and greenhouse gas emissions.

- Improving the basic understanding of cotton potassium requirements and translating this into better nutrient management at farm level. Dr Cassman's work has helped researchers and extension workers identify and correct potassium deficiencies in Australia, Brazil, Egypt, India, South Africa, the United States and Zimbabwe.



Courtesy K.G. Cassman

Kenneth G. Cassman

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## IFA-FAO Summit Reflects Renewed Focus on Fertilizers

On 10 March, an IFA delegation visited the Director-General of the Food and Agriculture Organization (FAO) of the United Nations. The high-level meeting considered ways for FAO and the fertilizer industry to work together more closely to strengthen access to fertilizers and thus bolster food security around the globe. IFA offered to make a number of contributions:

- Provide case studies that have worked to build up fertilizer markets;
- Share the technical knowledge of fertilizer industry experts;
- Contribute to the assessment of current and future fertilizer production in Africa to be carried out for the Secretariat of the New Partnership for Africa's Development (NEPAD);
- Share the outcomes of IFA's current work on constraints

on fertilizer use in developing countries;

- Give a business perspective on the key factors needed for market development in poorer countries.

The fertilizer industry delegation summarized case studies from their home countries that show how the industry supports agricultural development. As part of the follow-up to this meeting, IFA has suggested that the leadership of FAO and IFA hold such discussions every two years.







On this occasion, IFA was represented by John Van Brunt, President of IFA - Vice Chairman of the Board of Agrium, Inc., Canada; Sihai Wu, Senior Vice President of IFA - President of the Sino-Arab Chemical Fertilizers Company Ltd; Mourad Cherif, IFA Vice President/Member of the Executive Management Group - Director General of the Groupe Office Chérifien

des Phosphates (OCP); Ajay Shriram, Chairman of IFA's Agriculture Committee - Chairman & Senior Managing Director of DCM Shriram Consolidated Ltd, India; Djibril Ngom, Representative of Senegal to the IFA Council - CEO of Industries Chimiques du Sénégal; and Luc M. Maene, Director General of IFA.

This meeting was the culmination of more than a year's efforts by the Secretariat to deepen IFA's relationship with FAO and move it to a higher political level. The Association's work has resulted in a groundswell of support for the role of fertilizers in agricultural development.

Growing recognition of the key importance of crop nutrition has been expressed across a wide range of international organizations, including FAO, the United Nations Economic and Social Council and the World Bank.

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IFA participates in the International Agri-Food Network (IAFN)

- www.agrifood.net -

which represents all sectors in the food chain

# Knowledge-based Soil Health for Sustainable Agriculture

*Julian Smith, Sam Page and Mark Holderness, CAB International*

Soil health and productivity are key to the sustainability of agriculture, particularly in developing countries. In 2001, the International Board for Soil Research and Management (IBSRAM) estimated that around 10-20 per cent of cultivated soils would be degraded by erosion and pollution within 15 years. IBSRAM also said that a further five per cent of the best agricultural land could be lost to urban spread during that period.

These factors, coupled with the effects of climate change and the food demands of a further 1.5 thousand million people in the world, will create tremendous pressure to make better use of good soils and to improve less productive land. Success will require meeting the basic needs of the poor and marginalized as well as improving soil management by those who are better off.

Helping farmers to enhance their knowledge about soils is vital. Knowledge empowers the poor because it is the foundation for effective decision making, whether at the grassroots or national policy levels.

Major socio-cultural barriers currently prevent the poor from accessing and making use of science-derived knowledge. At the same time, science rarely captures local innovation. Particularly since knowledge about rehabilitation of degraded soils remains incomplete, such blockages represent a major challenge: how can disadvantaged communities access and use knowledge about the needs of their soils?

## Ensuring knowledge transfer

High input-high output systems have flourished in recent decades, underpinned by the effective use of inorganic fertilizers. Yields in temperate systems have risen dramatically, largely due to a better understanding of soil requirements coupled with the increased availability of agricultural inputs. They were the foundation for the Green Revolution, through which tropical Asia developed the capacity to feed itself.

Green Revolution practices favour those with access to fertilizers, other key inputs and the most productive land. As a general rule, the poor do not have the financial resources or knowledge to benefit from technology-driven agricultural develop-

ment. Furthermore, enthusiasm for technological improvement meant that the Green Revolution neglected holistic practices, such as integrated soil fertility management, which are often the best approach.

Conveying external knowledge to poor communities is an essential first step in enabling change. A wealth of scientific knowledge about soil chemistry and physics exists, as well as extensive geo-data on the distribution of soil types. Thanks to modern technology, this information can be brought directly to communities and service providers through rural telecentres, electronic information resources (such as cd-roms and internet sites) and other media including video presentations. The “digital divide” remains a very real constraint, but the rapid spread of mobile phones and satellite technologies opens new vistas for extending access to relevant knowledge.

## Broadening the knowledge base

General understanding of the biochemical mechanisms by which soil nutrients and water are cycled or by which pathogens are suppressed is poor. Less than five per cent of fungi and bacteria have been described. This is in contrast to physico-chemical aspects, which are better understood. Attempts to



*Farmers apply micro-organisms to seed beds for disease control.*

**CAB International (CABI)** is a not-for-profit technical agency with 41 member countries. Established in 1913, it functions as an international extension of its member countries' capabilities and resources, supporting sustainable development through the generation of, access to and use of knowledge. CABI maintains the world's largest database of abstracted scientific information. It works on a cost-recovery basis, which ensures that its work remains rooted in finding practical solutions to real development challenges.

improve the biotic health of poor soils often fail because of ignorance about the nature and diversity of the micro-organisms concerned. The function of soil organic matter and its interrelationships with soil micro-organisms in determining crop health are also incompletely understood. Yet such interactions are instrumental in achieving the sustainable use of soils over the long term.

Debate concerning the relative merits of “organic” and “conventional” farming systems is often heated. In fact, there is a great need to integrate the respective benefits of these two approaches in order to rebuild exhausted soils. With its partner institutions, CABI addresses this need by analyzing different soil types and cropping systems to determine their biological function and related sustainability. For example, it has identified key indicators of soil biotic health in rice-wheat systems and examined their effects on crops and crop pests, so as to optimize input usage and conservation tillage on degraded soils.

## Farmer involvement for lasting positive results

Soil scientists and farmers rarely come together to share and synthesize their expertise. Farmers work in complex systems, often based on years of tradition and trial-and-error development. Science can be reductionist, specialized and difficult to transfer to the uncontrolled conditions of the farmer's field.

There are numerous other barriers to the uptake of external knowledge by farmers. Uneven power relationships and weak institutions can hamper their ability to obtain

scientific information. The form, language and channels of dissemination also influence whether new practices are adopted.

Locally derived knowledge has much to contribute to the development of new technologies for managing soil problems or to the adaptation of such tools to the varied agroclimatic and socio-economic environments in which farmers operate. However, it is often ignored by science.

Obstacles to the exchange of knowledge are major constraints on soil quality improvement by poor farmers. Furthermore, fostering the adoption of best practices can help prevent inappropriate use of crop nutrients by those farmers who do have access to agricultural inputs.

CABI, drawing on its extensive experience with integrated pest management (IPM), is pioneering innovative participatory rural knowledge systems that value and make use of both local and scientific knowledge. Participatory learning processes convey the underlying mechanisms regulating soil functions, which the farmers themselves then employ appropriately.

When farmers have the opportunity to judge the effects of new practices under their own farming conditions in the context of effective learning partnerships, knowledge flows increase greatly in all directions. Farmers who are actively engaged in learning how inputs can be used most effectively are motivated to improve and sustain the productivity of their land.

Healthy agro-ecosystems depend on synergies among the economic, social and environmental pillars of sustainability. Appropriate institutions are also essential. For example, agrochemical suppliers can provide relevant information in forms such that even farmers without technical expertise or those who cannot read can understand the essence of a subject and validate the information for themselves. CABI already works with governments, industry and agricultural service providers to foster this transition, and it intends to strengthen linkages with IFA in areas of common interest.

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## Micronutrients Symposium Highlights Stronger Role for Fertilizers

More than 130 participants gathered in New Delhi at the end of February for IFA's first ever International Symposium on Micronutrients. Many soils lack micronutrients that impact crop, animal and human health. Half the world's cereal soils are deficient in zinc and a third in iron. More than three thousand million people (half the global population) are malnourished in this way, a phenomenon specialists call "hidden hunger". Insufficient iron and iodine intake have the most notable effects on human health globally. Zinc, selenium and fluorine deficiencies are also widespread.

The Green Revolution significantly raised yields, helping to protect millions from starvation. However, it may have contributed to "hidden hunger" in several ways. Steady yield growth tends to lead to micronutrient deficiencies because more micronutrients are removed from the soil. The main Green Revolution crops—wheat and rice—are fairly poor in micronutrients, suggesting that food diversification would have beneficial effects on human nutrition.



Courtesy FAI

*From left to right: IFA Director General Luc M. Maene; Patrick Heffer, Executive Secretary of the IFA Agriculture Committee; Marcos Gutierrez (Rio Tinto Borax), Convenor of the IFA Task Force on Micronutrients; Ajay S. Shriram (DSCL), Chairman of the IFA Agriculture Committee; William D. Dar, Director General of the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT).*

product per year). Producers and retailers should support the development of this market by fostering technology transfer and by encouraging the incorporation of micronutrients into a wider integrated plant nutrient management framework.

IFA is grateful to members Akzo Nobel, DCM Shriram Consolidated Ltd and Rio Tinto Borax for their generous support of various programme elements. The Fertiliser Association of India (FAI) provided vital assistance with the conference organization. A field visit was kindly hosted by the Indian Council of Agricultural Research (ICAR), although it is not a member of IFA.

All papers, slides, poster abstracts and the summary are available on the IFA web site and on cd-rom (*see order form, page 12*).



IFA / D. Sardalian

*The Indian Council of Agricultural Research (ICAR) graciously welcomed participants at the Micronutrients Symposium for a field visit.*

Micronutrient fertilization can contribute to a number of sustainable development goals. Increasing the micronutrient levels in soil can augment the micronutrient content of grain. Micronutrients positively influence yields, crop quality, seed vigour and symbiotic nitrogen fixation. Furthermore, in keeping with the principle of balanced fertilization, they can improve the use efficiency of other nutrients and of water. Micronutrient fertilization is not only interesting for health and environmental reasons, it can also significantly improve farmers' economic returns.

Despite the absence of an organized campaign to increase micronutrient use, the market is growing by three to four per cent annually (from a current base of approximately 700,000 tonnes product

**from principle to practice**

*This article is part of a series that explores how IFA members integrate concepts like sustainable development into their business strategy and daily activities.*

# Bringing Value to Farmers Proves to Be a Sustainable Business Model for DSCL

Rajesh Gupta, Vice President and Business Head - Haryali Kisaan Bazaar, DCM Shriram Consolidated Limited



DCM Shriram Consolidated Ltd (DSCL) is a company with over 35 years' experience in the agricultural sector. DSCL has set up a chain of centres across northern India to provide innovative solutions that can improve farmers' profitability and productivity. The chain is called "Hariyali Kisaan Bazaar", an apt name since the word "Hariyali" means "greenery", "prosperity" or "wellbeing" in Hindi.

The Hariyali centres are profit-based businesses that aim to catalyze the modernization of Indian agriculture and enhance farmers' prosperity and quality of life, thus creating a sustainable business model.

## The Indian context

Agriculture is a core sector of the Indian economy. However, the multitude of problems and complexities associated with this sector have kept farm productivity far below international levels. They have also led to low incomes for farmers, who make up some two-thirds of the population.

Appropriate technology and research, which is available at Indian agricultural universities, often do not reach farmers' fields. As objective agricultural advice is limited, farmers depend upon traditional retailers whose products/brands often do not meet their particular needs.

Farmers' timely access to good quality agricultural inputs and services is frequently

limited. It is difficult for them to obtain a complete range of critical inputs, such as high-yield hybrid seeds, speciality fertilizers, micronutrients and recently developed pesticides.

Over the years, companies that sell agricultural inputs and buyers of farm produce have remained overtly focused on dealers and commission agents. These "middlemen" have increased the number of levels existing between farmers and producers/consumers, thus creating inefficiencies in the agri-food chain.

Farmers traditionally depend on unorganized sources (e.g. village moneylenders) to meet their credit requirements. Economically prohibitive interest rates are often charged. Lack of remunerative markets for farm produce and low farm gate prices further reduce farmers' chances of succeeding. Low productivity and low profitability are the result.



## Hariyali Kisaan Bazaar

The Hariyali centres seek to empower farmers by meeting all their agricultural requirements under one roof—providing timely access to quality inputs, agronomic support, fair financing and output linkages.

The centres operate in "catchments" of 20 kilometres. Potentially, each centre will serve between 10,000 and 15,000 farmers who cultivate a total of 20,000-30,000 hectares. The objective is to contribute to intensive and sustained agricultural development and income improvement in this target area.

The first Hariyali centre was established in mid 2002. Eight centres are currently in operation.

## Timely availability, fair prices and a modern retail ambience

Centres cater to all farming needs. They provide a wide range of good quality agricultural inputs (e.g. fertilizers, seeds, pesticides and animal feed), implements, spare parts (e.g. for tractors), irrigation equipment and farm fuels, and services such as equipment rentals and spraying. Hariyali offers multiple brands to farmers, not just DSCL's agricultural inputs. The wide range of products in stock means that the farmer can have immediate and timely access to the necessary products and services.

A fair and transparent pricing policy is followed. Prices are clearly displayed and invoicing is computerized, something the Indian farmer has not experienced before.

Each centre has a team of qualified agricultural professionals, supported by a panel of senior scientists, which offer unbiased on- and off-farm advice at no cost. This team works with farmers throughout the year to increase yields, using improved practices such as soil test-based fertilizer application and seed treatment.

## Information technology: an important enabler

Information technology provides online support to farmers concerning technical advances, weather forecasts, market prices and other types of information. Detailed information about farmers' fields stored in extensive databases makes customized service possible.

## Farm credit

Recognizing that cash flow usually does not match farmers' needs to buy supplies, centres offer farm credit at reasonable interest rates using simplified and transparent processes.

## Output related services

Farmers' investment in their land is greatly influenced by the ability to sell their harvest. Centres facilitate direct market access and better returns by fostering links with buyers/

*Hariyali advisors visit farmers' fields.*





#### Technical advice

processors. When contract farming arrangements are made, the centres provide the know-how that allows farmers to meet the agreed standards.

#### Respect, dignity and freedom for the farmer

The staff of each centre is highly trained in customer service. Proper attention is given to each farmer's specific situation. Farmers are allowed to browse, giving them (for the first time) the freedom to touch, feel and examine each product before committing to a purchase.

#### Farmers' warm reaction

Some 150-200 farmers per day visit each centre. They appreciate the quality, choice, convenience, fair pricing and market access offered by Hariyal.

Strong bonds are developing between the centres and farmers. The farmers in Hariyal catchments have begun to refer to Hariyal as their most "trusted" and "reliable" agricultural partner, according to a recent study.

Positive results can already be seen in the field. Farmers in the catchments of Hariyal centres are above the national average with respect to the use of high-yielding seeds, balanced fertilization and crop diversification. Moisture conservation, zero tillage and other new techniques are being introduced. Activities such as milk production, fruit and mushroom cultivation and bee-keeping are being promoted to diversify farm diets and as additional income sources.

#### Future plan

In view of its initial success, Hariyal Kisaan Bazaar plans to establish more than 100 centres throughout India in the next five years. This would mean serving 1-1.5 million farmers cultivating 200,000-300,000 hectares.



#### Inside the centre

Alliances that could create value for farmers are being forged with other rural service providers. These include input suppliers, farm output processors and groups promoting rural development (e.g. government authorities or NGOs).

Hariyal intends to play a greater role in farmers' lives by moving into other important areas such as veterinary and pharmaceutical products, construction supplies and some consumer goods.

DSCL believes that this venture must create value for both the farmer (through higher farm income) and the company (through steady revenue) to be a sustainable business model. Assuming that this win-win formula proves its durability, the Hariyal concept can be replicated in other developing agrarian countries.

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#### 2004 Crop Nutrition Laureate

- Documenting the critical role of fertilizers, proactive nutrient management and soil quality maintenance as essential components of sustainable agriculture and global food security.

Dr Cassman's contributions have been enduring. The work he began ten years ago on irrigated rice yields in Asia was the forerunner of the Reaching Towards Optimum Productivity project, which IFA continues to support. Cooperation with extension-oriented researchers has ensured rapid dissemination of project results to leaders of national research and extension systems, farmers and industry. As well as being widely published in scientific journals, he is frequently interviewed by farm press magazines and contributes to fertilizer industry-related publications.

Dr Cassman is currently Head of the Department of Agronomy and Horticulture at the University of Nebraska in the United States. He earned his Ph.D. and Master's Degree in agronomy and soil science (1979 and 1977, respectively) from the University of Hawaii, Honolulu after graduating from the University of California-San Diego with a biology major.

He is a member of the American Society of Agronomy (ASA)/Soil Science Society of America (SSSA)/Crop Science Society of America (CSSA) and the International Union of Soil Sciences. He is also active in the Council for Agricultural Science and Technology (CAST) as well as the American Association for the Advancement of Science (AAAS).

He is a Lead Coordinating Author of the Millennium Ecosystem Assessment (on "Cultivated Systems, Conditions and Trends") and is a member of the Science and Policy Program Committee of the Third International Nitrogen Conference, which will take place in October 2004 in China.

Dr Cassman was nominated by IMC Global, an IFA member based in the United States.

The annual Award ceremony is held during the Opening Session of the IFA Annual Conference. ●

Courtesy DSC

# Public Needs Better Information on Trace Radioactivity

Brian K. Birky, Research Director – Public and Environmental Health, Florida Institute of Phosphate Research (FIPR)

All phosphate rock—no matter what its geographic or geological origin—contains trace amounts of natural radioactivity. The amounts are so small that experts have never considered end product fertilizer use (and transfer to foods) to be a health concern. Epidemiological studies monitoring workers' disease incidence over time have never shown a link with chronic exposure to low-level radiation in the phosphate industry.

Nonetheless, the presence of radioactivity is understandably a very sensitive issue for the public—one the global fertilizer industry could address more proactively. Government policy in democracies is driven by public opinion. Therefore, neglecting to provide adequate information to the public (even if no problem actually exists from a scientific perspective) could lead to unnecessary and costly regulation. It could also lead to prohibitions on the use of by-products (in this case phosphogypsum), inappropriate environmental clean-up requirements and other consequences. The bottom line cost may be intangible (company image and goodwill) or financial or both.

Based on a review of scientific studies and risk analyses, the Florida Institute of Phosphate Research (FIPR) has concluded that some public health and environmental regulations in force in the United States and across the globe do not stand up to scientific scrutiny. Moreover, overprotective regulations are not in the public interest since they entail a societal cost.

## Occupational exposure

Since safety is paramount, numerous studies of worker exposure to technologically enhanced, naturally occurring radionuclides (TENORM) in the phosphate industry have been conducted in several countries. These studies have included measurements of external exposure to gamma radiation and internal exposure from inhalation of dust bearing radioactive materials. FIPR is currently carrying out research on the inhalation dose, using particle size distribution and lung solubility measurements to determine the likelihood of workers exceeding the annual dose that is considered safe.

Although no link has been established between disease and chronic exposure to low-level radiation in the phosphate industry, civil suits have been brought in several countries. These suits have usually involved older workers or retirees who would be likely to have cancers due to natural causes.

## Public and environmental exposure

Only a very small part of the natural radiation an average person receives each year is through food. Experts do not consider ingestion to be an area for concern. However, questions have been raised about the effects of repeated applications of phosphate fertilizers (or phosphogypsum as an amendment) to agricultural land and the potential for radioactive materials to build up in soils. There are concerns that accumulated radioactivity could leach to groundwater or reach surface water through run-off. There are also questions about whether converting agricultural land to residential use increases the potential for exposure to radiation. No matter how small such a risk may be, even the perception that there might be a danger could provoke a strong reaction.



Courtesy FIPR

## Current waste restrictions

One of the most high-profile issues facing the phosphate industry is storage or re-use of phosphogypsum. In many cases, recycling the phosphogypsum by-product for a beneficial use is forbidden. Yet the risks and liabilities of storing phosphogypsum in stacks may well exceed any incurred during its use for other purposes. On 15 March 2004, before the United States Congressional Subcommittee on Technology, Information Policy, Intergovernmental Relations and the Census, the risk analyses used to justify banning phosphogypsum in agriculture or for daily landfill cover, roadbed construction, soil conditioning and other beneficial activities that research might identify were challenged.

This issue has attracted significant attention from scientists. For example, studies on phosphogypsum and its environmental effects have looked at cases in Bangladesh, Croatia, Egypt, India, the Irish Sea, Italy, Korea and Spain. The Egyptian study indicated that the phosphate fertilizer source under study showed radioactivity above international levels and called for care to be exercised in its use.

## Possible trade disruptions?

Given the significant tonnage of ores and fertilizers shipped across national borders every year, barriers to the import of some fertilizers could conceivably be created on the grounds of keeping radioactive materials out of a country. It is unclear whether this type of ban would stand up to a challenge



Courtesy FIPR

under the World Trade Organization (WTO) rules.

In 2002, China drafted a law banning the import or transfer of "radiation waste or radiation-contaminated" articles. The intended target of this law is nuclear fission waste, but the wording leaves room for wider interpretation.

Some industrial sectors fear the over-generalized application of the International Safety Standards of the International Atomic Energy Agency (IAEA), which would impose excessive costs with little or no public benefit.

### Building the industry's capacity to address the issue

To help both the fertilizer industry and the public understand the natural radioactivity in the environment and the fertilizer products and wastes that contain it, FIPR is developing software designed to teach users:

- The basics of radioactivity and radiation;
- Radiation's biological effects;
- The risks in context; and
- The relevance of these topics to the phosphate industry.

The tool, called MiLoRAD, is being co-developed with AleffGroup, Inc, a business consultancy based in the United Kingdom. It will contain enough technical information to train managers and supervisors to function as radiation safety officers. It will also provide simple information for the public that can be easily understood by non-experts. This more basic information can be used in worker training as well.

For further technical information used as the basis for this article, please direct inquiries to the author.



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## Indian Government Recognizes Sulphur Fertilization Benefits

*D.L. Messick, Director, Agricultural and Market Studies Programs, The Sulphur Institute (TSI)*

In June 2003, the Government of India amended the specifications in the Fertiliser Control Order (FCO) to include sulphur content. The FCO outlines what can be sold as fertilizer in India. It also establishes quality standards. The fertilizer industry can now market the sulphur in listed fertilizers, as well as print the sulphur content on bags and other containers.

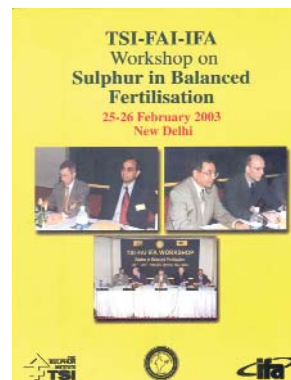
Evaluations by region and by crop carried out since 1997 with the joint support of the Fertiliser Association of India (FAI), The Sulphur Institute (TSI) and the International Fertilizer Industry Association (IFA) were instrumental in reaching this milestone. During the project, sulphur fertilization on deficient soils commonly increased crop yields by more than 25 per cent. As a result, farmers experienced dramatic improvements in returns on investment (frequently more than tenfold). The TSI-FAI-IFA project set out to expand knowledge about sulphur fertilizer requirements and about the need for balanced fertilization in India. Over the course of the project, there were more than 200 trials on farmers' fields, 40 on-site workshops and several national events related to this topic. Written educational materials supported information dissemination.

### A beneficial change for industry, farmers and the government of India

This change in the FCO will help bring sulphur into the mainstream of Indian agriculture. The cooperative project has answered many questions concerning sulphur's role in balanced fertilization. It has also provided a large information base to aid informed decision-making. The fertilizer industry has an important new market opportunity; farmers clearly stand to benefit from better economic returns; and balanced fertilization, including sulphur use, will help India reach its goal of doubling domestic food production by 2011-2012.



Courtesy TSI



*Workshop Proceedings, New Delhi, India, 25-26 February 2003. Ed. M.C. Sarkar, B.C. Biswas et al. FAI, New Delhi, India, November 2003. Some copies are available from IFA (see order form, page 12)*

### A significant market to develop

India's application rate of fertilizer nutrients, 85 kilograms (kg) per hectare of cultivated area, is significantly lower than that of many other countries. For example, France's application rate is about 240 kg and China's about 270 kg per hectare.

Consumption of sulphur-containing fertilizers in India in 2001 reached more than 12 million tonnes, but only 600,000 tonnes of sulphur were included. The current crop requirement for sulphur is 2.1 million tonnes, which means there is a deficit of 1.5 million tonnes per year. The Sulphur Institute projects that 1.9 million tonnes of sulphur will need to be replenished annually by 2012. India must address how to meet the demand for sulphur-containing fertilizers.

The change in the FCO applies only to fertilizers that were already listed. A variety of other sulphur-containing fertilizers could also help India overcome its growing sulphur deficit. These products, which contain elemental sulphur or a combination of this form with sulphates, are marketed in other countries and have a promising future under India's agricultural conditions. However, their commercialization will require further modification of the FCO.

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## Highlights from the Agriculture Committee

One of the Agriculture Committee's major activities in the first quarter of 2004 was organizing the first IFA International Symposium on Micronutrients. The symposium, held in New Delhi, India, from 23 to 25 February, was attended by 134 industry representatives, scientists and policy makers from 19 countries (see related article). Presentations and lively discussions addressed agronomic, economic, health and market issues. A poster session, featuring the work of a dozen scientists, increased the breadth of information presented. Following the symposium, participants visited a research station where the use of micronutrients in a rice-wheat rotation is being studied.

The symposium outcomes are available on the IFA web site and on cd-rom. Recommendations concerning IFA's future involvement in micronutrient issues as developed by the IFA Task Force on Micronutrients at the end of the symposium, will be presented to the Agriculture

Committee in Marrakech.

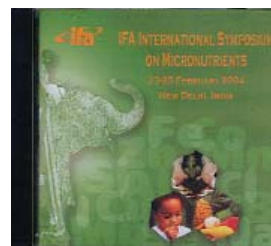
In the context of its ongoing involvement in the Nitrogen Fertilizer Rapid Assessment Project (NFRAP), IFA took part in the NFRAP workshop organized in Kampala, Uganda, in January by the Scientific Committee on Problems of the Environment (SCOPE). The workshop was attended by some 40 scientists, including three industry representatives. Four working groups discussed cross-cutting issues related to:

- The efficiency of fertilizer nitrogen use as determined by product, method and timing of application, soil, crop and the interactions of these elements;
- The role of emerging technologies with respect to the efficiency of fertilizer nitrogen use;
- The pathways of nitrogen loss and the related impacts on human health and the environment; and
- Societal responses to meeting nitrogen input needs in different regions.

The workshop was part of the International Nitrogen Initiative (INI). Its outcomes represent a constructive and science-based approach to addressing the contribution of nitrogen fertilizers to the accumulation and fate of reactive nitrogen in the environment. A SCOPE publication based on all the workshop papers and reports is expected to be a critical input into the 3rd International Nitrogen Conference, scheduled to be held in Nanjing, China in October.

The Task Force on Fertilizer Use Constraints is finalizing country reports for Ghana, Indonesia, India, Mexico and Russia, as well as the synthesis of the study on fertilizer use constraints. The study's main conclusions will be presented in Marrakech at the Fertilizer Demand Meeting. The Agriculture Committee will then decide how to move forward with this initiative.

At its meeting in December 2003, the Strategic Advisory Team (SAT) of the Agriculture



*To order a copy of the Micronutrients Symposium Proceedings please use the order form, page 12.*

Committee agreed to establish two new task forces: on slow and controlled-release fertilizers, and on the 2006 IFA Agriculture Conference. The two task forces are expected to meet for the first time in Marrakech and to make recommendations subsequently to the Agriculture Committee.

A panel of independent scientists reviewed the seven nominations for the 2004 IFA International Crop Nutrition Award (see related article). This year's recipient is Kenneth G. Cassman, Head of the Agronomy and Horticulture Department at the University of Nebraska in the United States. Dr Cassman was nominated by IMC Global. ●

## Highlights from the Conference Service

In addition to its extensive preparations for the IFA Annual Conference, two major international events dominated the work of the Conference Service in early 2004. IFA's first International Micronutrients Symposium was held in New Delhi, India, at the end of February. This event was a great success. IFA is grateful for the generous support of Akzo Nobel, DCM Shriram Consolidated Ltd, the Fertiliser Association of India (FAI), the Indian Council of Agricultural Research (ICAR) and Rio Tinto Borax.

Holding the Technical Conference in April is another inno-

vation that required significant planning. The Beijing Conference is part of IFA's China Initiative, which seeks to integrate the Chinese fertilizer industry more fully into the global fertilizer community. The conference was organized in cooperation with the China National Chemical Construction Corporation (CNCCC) and the China Petroleum and Chemical Industry Association (CPCIA). CNCCC kindly coordinated papers by Chinese authors, together with their translation and interpretation, and the registration of local participants.

The contributions of

CNCCC and CPCIA were supported by a group of seven companies, including three local IFA members. Industry associations representing the nitrogen, phosphate, sulphuric acid and mining sectors also cooperated. Cargill Crop Nutrition, KBR and Stamicarbon sponsored the conference lunches. The field visit took place at the facilities of the Sino-Arab Chemical Fertilizers Company in Qinhuangdao.

The programme for the second half of the year is well advanced. Members are extending support for the three events scheduled later in 2004. During the Production and Interna-

tional Trade Conference, Saudi Basic Industries Corp. (SABIC), Qatar Fertiliser Company S.A.Q. (QAFCO), Gulf Petrochemical Industries Co. (GPIC), Petrochemical Industries Company (KSC) and FERTIL-Ruwais Fertilizer Industries will jointly sponsor a dinner. SQM will be involved in many aspects of hospitality for the Enlarged Council Meeting. The industry in New Zealand will host a reception during the Regional Conference for Asia and the Pacific.

*The list of IFA events can be viewed on page 11.* ●

## Highlights from the Technical Committee

### Energy Efficiency Survey

Plant Survey International (PSI) has been selected to conduct the first IFA survey on energy efficiency related to ammonia production, which will cover 2002-03. PSI has successfully carried out a similar survey for the European Fertilizer Manufacturers Association (EFMA). EFMA and IFA have adopted the same questionnaire, allowing data to be compared across the results compiled by each association. As the two organizations carry out their surveys in alternating years, this will present a broader picture of industry progress. EFMA's next survey will take place in 2005, as part of requirements under the EU's Kyoto Protocol commitments.

IFA members have been requested to signal their interest in taking part in the survey to the Secretariat during the first quarter. From this point forward, PSI will contact participating member companies directly.

Members who have not yet signed up may still do so. The Secretariat will continue its efforts to encourage participation, and to ensure a representative sample of the global fertilizer industry. The survey will provide a good benchmark of a company's performance. It will also help demonstrate the industry-wide resolve to conduct business in a sustainable manner by working towards greater energy efficiency and emissions reductions.

The final report of the 2002-03 survey is expected to appear at the end of 2004.

### Safety in the Workplace

The IFA Safety Survey documents (covering the industry's performance in 2003) have been made available to members, who are requested to return completed questionnaires by 15 May 2004. This new benchmarking exercise will show the trend of industry performance in the past three years. First-time participants will become eligible to sign a certificate pledging their commitment to uphold IFA's 11 principles of safety in fertilizer production.

During the first two surveys, 92 com-

panies and 14 subsidiaries in 46 countries provided safety performance data, revealing an excellent safety record overall. IFA's goal is to reach an even higher level.

Companies are therefore urged to register incidents with IFA, so that members can learn from each other and strive to eliminate accidents. Members are requested to report any incident that involves a fatality, or damage to material or the environment exceeding USD 250,000. Reports can be made using an online form available in the "Members Only" section of the IFA web site. The form includes the option to report that no accidents have occurred. It is useful for the Secretariat to know when members have reached such a high level of safety.

### Technical Conference Provides a Learning Platform

In the spirit of sharing information for mutual improvement, the Technical Service in recent months has been occupied with preparations for the Beijing Technical Conference. All presentations were circulated well before the event, allowing participants to formulate in-depth questions. Delegates were encouraged to submit questions so that the authors could prepare complete answers prior to the conference discussions.

The Beijing Conference demonstrates one of the major benefits of IFA membership: exchange of up-to-date technical information. Numerous registrations were received from around the globe. Some 100 local engineers and several dignitaries were invited, and interpretation into Chinese was available. The China National Chemical Construction Corporation (CNCCC) kindly coordinated the presentation of papers by Chinese authors (as well as their translation and interpretation) and registration of local participants. For a full list of sponsors, please see highlights from the Conference Service.

A field visit was hosted by the Sino-Arab Chemical Fertilizers Company at its Qinhuangdao facilities.

Non-participants will not be able to receive copies of the papers until six months after the conference. ●

## Highlights from the Production and International Trade Committee

Following the Enlarged Council Meeting in December, IFA released the comprehensive reports on global fertilizer supply and demand in the short term (2003-2004). These reports can be downloaded from the "Members Only" section of the IFA web site or they are available from the Secretariat on request.

IFA also issued the first publicly available report providing a summary of the world agricultural situation and short-term prospects for fertilizer demand, supply and trade.

The Production and International Trade (PIT) Service made the following information available:

- The final report covering sulphur and sulphuric acid production, trade and consumption in 2002 (available on request only);
- Minutes of the PIT Committee meeting held in St Petersburg in September 2003 (found in the "Members Only" section of the IFA web site);
- Quarterly statistics (available on request only) covering January to December 2003 for:
  - ammonia and urea,
  - processed phosphates and phosphate rock,
  - sulphur;
- The 2003 annual report of potash statistics (available on request only);
- The 2004 publication schedule for all production and trade statistics and capacity reports (also in the "Members Only" section of the web site).

Statistics reserved for members can be requested from the PIT Secretariat.

Contacts of the PIT Committee recently received a green form. To remain on the distribution list for production and trade statistics and reports, members must fill out this form and return it to the Secretariat. Members have been requested to provide full contact details, and to indicate the products and services they would like to continue receiving, in order to streamline distribution. They also need to choose to receive either paper copies or electronic documents, which are sent by e-mail. Members who did not return the form by 1 April 2004 have been deleted from the PIT distribution list.

*Continued on page 10*

**word: Association**

# United We Stand

I recently attended the annual conference of one of IFA's regional member associations. A participant asked me why I speak at so many events organized by other fertilizer associations. Surely their meetings compete with attendance at IFA's events?



On another occasion, someone wondered why I insisted on including the relevant national research institute in a fertilizer

development project, even though that organization could not contribute to the project funding.

The answers are quite simple. As well as having direct member companies, IFA is the umbrella organization bringing together a number of associations and research institutes that are related to the fertilizer industry. At the end of the day, we are all working towards similar goals:

- Promoting responsible fertilizer production and use;
- Fostering a positive operating environment for the industry through our actions;
- Increasing the body of knowledge about plant nutrients and the fertilizer industry.

We are all working with limited resources—both time and money. Singly, none of us can possibly accomplish all the tasks that would further our cause. We therefore need to combine forces and mutually strengthen one another's efforts.

In the first case mentioned above, the international perspective provided by IFA is valuable to the regional association and to its members. They need to know how they might be affected by global developments. Furthermore, most international issues play

themselves out at regional or national level, so it is in IFA's best interest to help the industry at this level understand the key questions IFA is confronting. These members can then speak on behalf of the industry in local debates.

In the second case, the national research institute is young, but it can fulfil an important role locally. The institute has much to contribute in terms of knowledge of local conditions and languages. In addition, working with international partners will help build the national institute's capacity to implement similar projects in future.

Two years ago, our members gave IFA the mandate to coordinate issues management for the global industry. The need to increase the resource efficiency of the industry's actions was the declared driver. However, I believe that we all learn and can better achieve our goals through cooperation. Varying perspectives and information exchanges shape each organization's activities, making the final product richer.

By working together, we are stronger and better. I fear that national associations too often feel they have little to contribute to international policy debates, which is not true. Most issues reoccur in different parts of the globe. Drawing on the experience of colleagues and materials that have already been created can greatly assist another organization in acting effectively and, with respect to issues management, in a timely manner.

One constraint on information sharing is the need to use a single working language. We encourage colleagues to overcome their shyness and make contributions or ask questions. Exchanging information and cooperating on solutions, as necessary, will make us all better at our jobs. ●

*Continued from page 9*

## Highlights from the PIT Committee

To be on the distribution list, please download the appropriate form from the Production and International Trade Committee page ("Members Only" section of the IFA web site).

The PIT Committee recently launched a survey to update the 1993 ammonium sulphate capacity report. Final results are expected to be released in the second half of the year.

The programme for the 2004 PIT Conference, to be held at the Shangri-La Hotel Dubai, is being developed. Registration is expected to start mid-June. During the conference, a dinner will be jointly sponsored by Saudi Basic Industries Corp. (SABIC), Qatar Fertiliser Company S.A.Q. (QAFCO), Gulf Petrochemical Industries Co. (GPIC), Petrochemical Industries Company (KSC), and FERTIL-Ruwais Fertilizer Industries. ●

*Continued from page 1*

## IFA-FAO Summit

The meeting in Rome followed close on the heels of the FAO Regional Conference for Africa in Johannesburg. An IFA delegation lobbied hard in Johannesburg to drive home the point that agricultural development in Africa is simply not possible without increased application of crop nutrients. IFA worked diligently behind the scenes for months preceding the Johannesburg meeting to ensure that the message was effectively communicated. As a result, governments dedicated an entire resolution to fertilizers. Noting that African food production has been falling and that mining of soil nutrients is a major cause, governments called for every possible effort to be made to facilitate fertilizer availability, affordability and production in Africa. The final text was a compromise for which IFA representatives had pushed hard. Early versions of the text only looked at local production and did not consider important constraints on consumption, such as inadequate infrastructures and lack of an enabling environment.

On this occasion, IFA was represented by Amit Roy, President of IFDC-An International Center for Soil Fertility, Hilmar Venter, Director of the Fertiliser Society of South Africa (FSSA), Luc M. Maene, IFA's Director General, and Patrick Heffer, Executive Secretary of the IFA Agriculture Committee. ●

## In Memoriam

IFA mourns the loss of Bernt Stenroed, Vice Chairman of the Agriculture Committee. After graduating from the Norwegian Agricultural University in 1967, Bernt spent almost his entire career at Norsk Hydro, remaining with that company from 1972 until his demise.

His managerial skills and his agronomic knowledge coupled with a talent for communicating a complex message in a simple way contributed to the high quality of his work throughout his career. Bernt clearly cared about farmers and the environment and truly believed that the fertilizer industry made a positive contribution to society. He was instrumental in documenting the connection between economically sound farming and care for the environment.

The fertilizer industry has lost a true leader, a visionary and a wonderful human being.





# Calendar

## IFA - 2004

24 - 26 May

**72nd IFA Annual Conference** Marrakech, Morocco #

3 - 5 October

**IFA Production and International Trade Conference**

Dubai, United Arab Emirates #

*Registration will open mid-June and close 27 August 2004*

1 - 3 December

**30th IFA Enlarged Council Meeting**

Santiago, Chile #

14 - 16 December

**IFA Regional Conference for Asia and the Pacific**

Auckland, New Zealand

# Restricted to IFA members

## Non-IFA - 2004

17 - 26 May

**Training Program on DSSAT: Assessing Crop Production, Nutrient Management, Climatic Risk and Environmental Sustainability with Simulations Models** Griffin, GA, USA

Fax: +1 770 222 6180 [conteduc@griffin.uga.edu](mailto:conteduc@griffin.uga.edu)

[www.icasa.net/events/dssat2004.html](http://www.icasa.net/events/dssat2004.html)

23 - 26 May

**IFS Annual Study Tour** Northern Italy

Fax: +44 1904 492700 [secretary@fertiliser-society.org](mailto:secretary@fertiliser-society.org)

[www.fertiliser-society.org](http://www.fertiliser-society.org)

7 - 10 June

**International ISHS Symposium "Towards Ecologically Sound Fertilisation Strategies for Field Vegetable Production"**

Perugia, Italy

Fax: +39 075 585 6344 [ishs2004@unipg.it](mailto:ishs2004@unipg.it) [www.unipg.it/ishs2004](http://www.unipg.it/ishs2004)

16 - 19 June

**5th Fertigation Course** Boading City, China

Fax: +972 8 62 80 995 [hillel.magen@icfertilizers.com](mailto:hillel.magen@icfertilizers.com)

[www.ipipotash.org](http://www.ipipotash.org) [www.ipipotashchina.org](http://www.ipipotashchina.org)

22 - 24 June

**17th AFA International Annual Technical Conference**

Amman, Jordan

Fax: +20 2 4173721 [info@afa.com.eg](mailto:info@afa.com.eg) [www.afa.com.eg](http://www.afa.com.eg)

11 - 15 July

**8th ESA Congress on European Agriculture in a Global Context**

Copenhagen, Denmark

Fax: +45 3528 3384 [seja@kvl.dk](mailto:seja@kvl.dk) [www.esaCopenhagen2004.kvl.dk](http://www.esaCopenhagen2004.kvl.dk)

25 - 28 July

**7th International Conference on Precision Agriculture**

Minneapolis, MN, USA

Fax: +1 612 625 2208

[contactus@cce.umn.edu](mailto:contactus@cce.umn.edu) [www.precision.agri.umn.edu/Conference](http://www.precision.agri.umn.edu/Conference)

While every attempt is made to provide accurate information, IFA cannot guarantee the details for non-IFA events. Contact the organizers for confirmation.

2 - 5 August

**Australian Fertilizer Industry Conference: Food & Safety**

**Environment - AQIS & Quarantine** Couran Cove Island, Australia

Fax: +61 2 62487 9860 [fertilizer@fifa.asn.au](mailto:fertilizer@fifa.asn.au) [www.fifa.asn.au](http://www.fifa.asn.au)

16 - 20 August

**\*IFDC International Training Program on Agricultural Input**

**Regulatory Systems** Pretoria, South Africa

13 - 17 September

**\*IFDC International Training Program on Market Information**

**Systems** Accra, Ghana

26 September - 1 October

**4th International Crop Science Congress**

Brisbane, Queensland, Australia

Fax: +61 7 3858 5510 [4icsc04@im.com.au](mailto:4icsc04@im.com.au) [www.cropscience2004.com](http://www.cropscience2004.com)

27 - 30 September

**15th International Symposium on Fertilizers and Fertilization for**

**Sustainability in Agriculture** Pretoria, South Africa

Fax: +27 12 420 3221 [ladams@postino.up.ac.za](mailto:ladams@postino.up.ac.za)

[www.up.ac.za/academic/plansoil/15scie](http://www.up.ac.za/academic/plansoil/15scie)

6 - 8 October

**18th FMB European Fertilizer Conference and Exhibition 2004**

Marbella, Spain

Fax: +44 208 979 4573 [fmb@fmb-group.co.uk](mailto:fmb@fmb-group.co.uk) [www.fmb-group.co.uk](http://www.fmb-group.co.uk)

12 - 16 October

**3rd International Nitrogen Conference** Nanjing, China

Fax: +86 25 6881028 [n2004@ns.issas.ac.cn](mailto:n2004@ns.issas.ac.cn) [www.issas.ac.cn](http://www.issas.ac.cn)

14 - 15 October

**2004 World Food prize International Symposium on Rice: From Asia to Africa, Biofortification and Enhanced Nutrition**

Des Moines, IA, USA

Fax: +1 515 245 3785 [wfp@worldfoodprize.org](mailto:wfp@worldfoodprize.org) [www.worldfoodprize.org](http://www.worldfoodprize.org)

\*IFDC - An International Center for Soil Fertility and Agricultural Development  
Fax: +1 256 381 7408 [hrd@ifdc.org](mailto:hrd@ifdc.org) [www.ifdc.org](http://www.ifdc.org)

To view a more exhaustive list of conferences click on "Conferences and Events" on IFA's web site.



## CORRIGENDUM

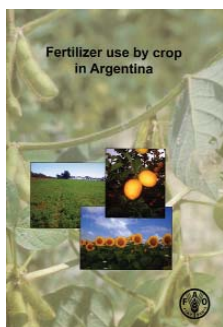
A photograph of P. S. Gahlaut, IFA's Regional Vice President for South Asia, was inadvertently printed on the front page of the January 2004 issue of *Fertilizers & Agriculture* in the place of Changchui He, Assistant Director-General of the Food and Agriculture Organization of the United Nations (FAO) and FAO Regional Representative for Asia and the Pacific. We apologize to both gentlemen for this error and renew our thanks to Mr He (pictured above) for addressing IFA's members on the occasion of the Enlarged Council Meeting in Bangkok in December 2003.



**Information resources**

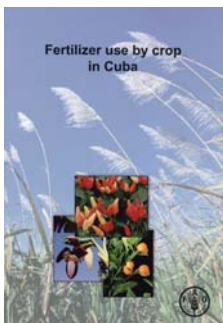
**Fertilizer Use by Crop in Argentina**

FAO, 1st edition, Rome, Italy, 2004. 44 pp. Argentina is an important world exporter of soybeans, maize and wheat and certain other agricultural products. This study examines the cropping systems in the different regions of the country. The supply, distribution and economics as well as the research and advisory infrastructure for fertilizers are described. Constraints on increased fertilizer consumption and factors affecting the outlook for fertilizer demand are considered.



**Fertilizer Use by Crop in Cuba**

FAO, 1st edition, Rome, Italy, 2003. 28 pp. This study examines the yields and fertilization of crops in Cuba as well as the areas planted and their agro-ecological composition.

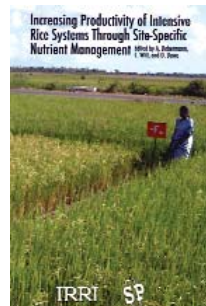


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*Some copies are available from IFA (see order form below).*

**Increasing Productivity of Intensive Rice Systems through Site-Specific Nutrient Management**

Ed. A. Dobermann, C. Witt and D. Dave. IRRI, Manila, Philippines, 2004. 410 pp. This book summarizes research conducted from 1994 to 2001 to develop a new concept of site-specific nutrient management in irrigated rice systems and the tools needed for applying it in farmers' fields.



**Contact**

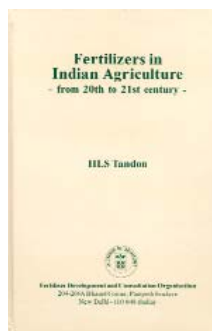
International Rice Research Institute (IRRI)  
 Manila, Philippines  
 Fax : + 63 2 580 5699  
[irri@cgiar.org](mailto:irri@cgiar.org) [www.irri.org](http://www.irri.org)  
*Some copies are available from IFA (see order form below).*

**Fertilizers in Indian Agriculture from 20th to 21st Century**

H.L.S. Tandon, FDCO, New Delhi, India, 2004. 240 pp.  
 Price: USD 95

**Contact**

FDCO, New Delhi, India  
 Fax: +91 11 26417801  
[fdco@vsnl.net](mailto:fdco@vsnl.net)  
[www.tandontech.8k.com](http://www.tandontech.8k.com)



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- [ifa@fertilizer.org](mailto:ifa@fertilizer.org)
- [www.fertilizer.org](http://www.fertilizer.org)

IFA comprises around 450 member companies in more than 80 countries and includes manufacturers of fertilizers, raw material suppliers, regional and national associations, research institutes, traders and engineering companies.

IFA collects, compiles and disseminates information on the production and consumption of fertilizers and acts as a forum for its members and others to meet and address technical, agronomic, supply and environmental issues.

IFA also sponsors research related to the efficient use of plant nutrients in agriculture, and liaises closely with relevant international organizations, such as the World Bank, FAO, UNEP and other UN agencies.

**IFA President**

John Van Brunt, President  
 Agrium, Canada

**IFA Director General**

L.M. Maene

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- Fertilizer Use by Crop in Argentina
- Increasing Productivity of Intensive Rice Systems
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- 2003 TSI-FAI-IFA Workshop on Sulphur in Balanced Fertilization

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