



Helping to feed the world sustainably

Sustainability Report 2022



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Tony Will
IFA Chair
CF Industries

From the IFA Chair

"Sustainability is at the heart of the fertilizer industry given our products' role in sustaining life."



To our Stakeholders:

On behalf of the more than 450 members of the International Fertilizer Association (IFA), I am pleased to share our 2022 Sustainability Report. The report details how IFA's vision for productive and sustainable agriculture systems that contribute to a world free of hunger and malnutrition aligns with and complements the world's sustainability goals.

Sustainability is at the heart of the fertilizer industry given our products' role in sustaining life. Along with advancements in seed technology and farming practices, the use of fertilizers dramatically increased food production in the second half of the 1900s. It is estimated that approximately 50% of the world's food is made possible due to our products, enabling the lives of billions and lifting countless people out of hunger.

At the same time, fertilizer allows more food to be grown on fewer acres. This reduces the amount of land cleared for agriculture, preserving carbon sequestering forests and important wildlife ecosystems. Our industry has also taken a proactive approach to mitigate negative impacts from

under- and over-use of our products by promoting the 4R principles of nutrient management – applying the right source of nutrients, at the right rate needed to optimize yields to a specific crop; at the right time they are needed by the crop; and at the right place in the field.

Our focus today is on how we can further contribute to the sustainability of the earth and leave the ecosystems from which we draw natural resources as good or healthier than when we found them. As you will read, this includes efforts by some of our members to accelerate the decarbonization of our production processes. Many are also assessing how the fertilizer industry can have a positive impact on biodiversity.

These challenges are shared across the agricultural value chain and, in many cases, will take cooperative efforts to solve. As an industry, we are committed to engaging with all our stakeholders and working with them to make progress together on these important issues.

We are proud of the legacy that the fertilizer industry has created by feeding the crops that feed the world. We are even more excited by the opportunity ahead of us to build on this legacy as we expand and enhance our focus on

decarbonization and biodiversity. We look forward to working with each of you and sharing our progress in the years ahead.

From the IFA
CEO/Director General

Alzbeta Klein
CEO/Director General
IFA



Sustainability guides us and permeates everything we do. The task ahead of us is to feed the world sustainably. That means balancing available land, production and distribution of nutrients around the world, clean and reliable sources of energy to produce these nutrients, education on how to use them sustainably, and prioritizing food security. And we must do all of this while facing multitude of geopolitical, trade, and other constraints. The task may be simple in theory, but in practice there are many obstacles to overcome.

IFA and the entire fertilizer industry have been on the sustainability journey for a long time, starting with the development of regular production benchmarks for safety, emissions and energy efficiency in the early 2000s, as well as Product Stewardship certification (Protect & Sustain) and promotion of the 4Rs of nutrient stewardship for over a decade. A major milestone was reached in 2020 when IFA published its first Sustainability Report at the Global Sustainability Conference in New York. This report is an update on what we have done since then, and on where we are heading.

Work starts in one's own house. That is why we initially focused on the industry's Scope 1 and 2 emissions. From 2019-2021, we worked with the International

Energy Agency (IEA) and the European Bank for Reconstruction and Development (EBRD) to publish the global Ammonia Technology Roadmap. We started with the sector that is hardest to decarbonize – the nitrogen value chain – because it requires enormous amounts of energy in its production process, and that energy until now has come predominantly from fossil fuels. In 2022, we embarked on regionalizing this global roadmap, and took it “on the road” to Egypt. It is the first of many local roadmaps – IFA is involved in the development of a roadmap for Turkey, which is due to be finalized end of 2023. This is an effort to illustrate what can be done concretely in ammonia production, looking at local conditions, local financing capabilities and nationally determined contributions (NDCs).

Also in 2022, we started looking beyond our backyard, to the industry's Scope 3 emissions. We teamed up with Systemiq to produce the first Scope 3 report for our industry. The report highlights that greenhouse gas emissions from mineral fertilizer use can be reduced by 70% by 2050. Based on the report, we are seeing many of our members designing pathways to net zero. We were delighted to receive an endorsement of this report by Secretary John Kerry, United States Special Presidential Envoy for Climate.

We also realized that it is not enough to educate ourselves, but that we also need to help others – within our industry and stakeholders as well – to get on the same page. That is why we launched the Sustainable Fertilizer Academy, a unique e-learning platform focused on sustainability in our industry, which is open to everyone.

Our Smart & Green platform ensures that climate tech and AgTech innovations make it to our industry – fast. That's why we ran two editions of our S&G conference, in 2021 and 2023, as well as the Africa Startup Showcase. More is yet to come.

In 2022, we launched our work on biodiversity with help of world-class consultants. Their resulting report allows IFA to tell the fertilizer industry's biodiversity story from here onwards and it will help our members to fine-tune their strategies.

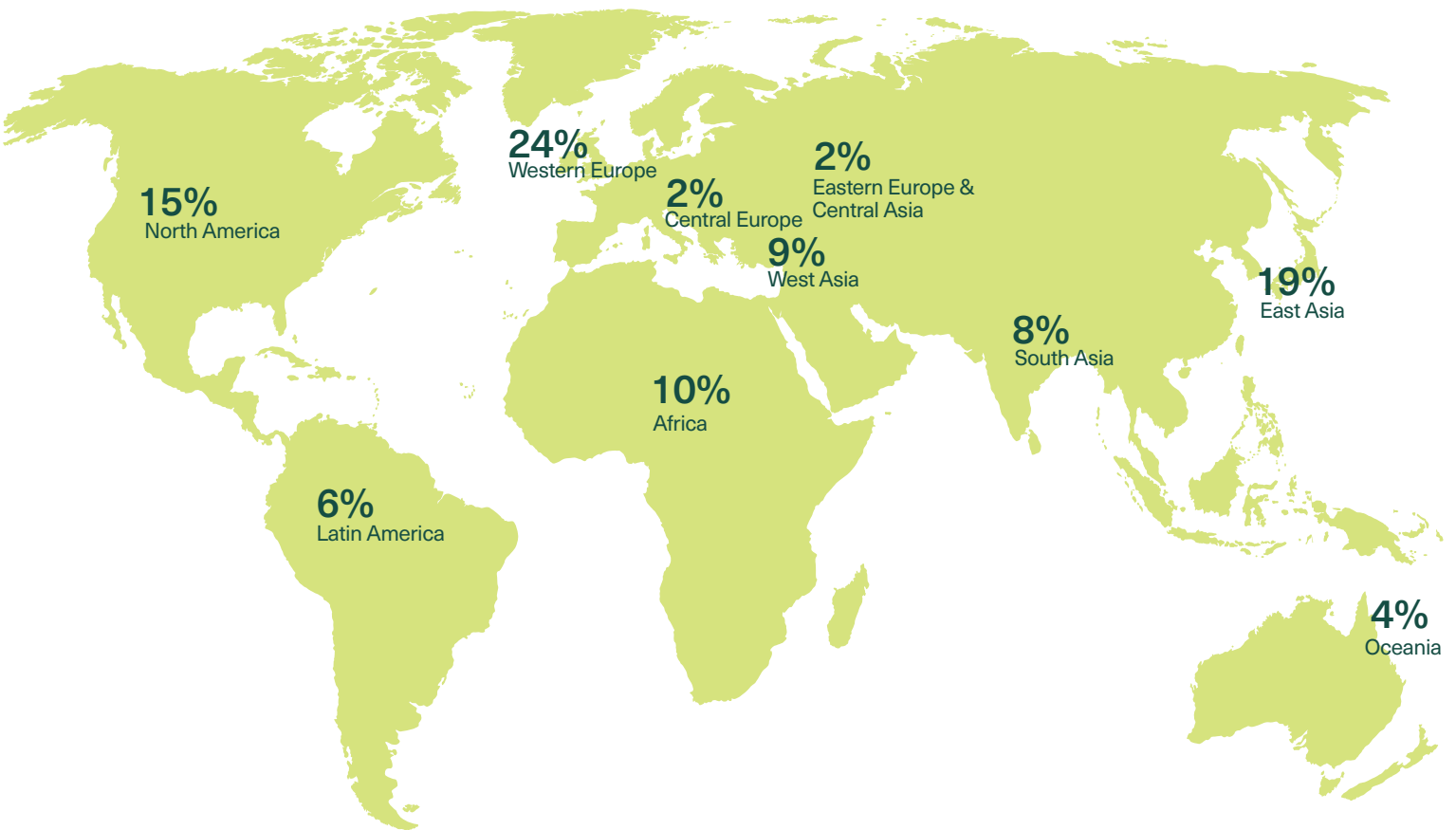
Scope 1, 2 and 3, and our biodiversity work are the building blocks of sustainability in our industry. Now we need to form coalitions and continue building on the solid foundations of the past years.

In the case of sustainability, the destination is the journey.



Global Distribution of IFA Members

Percentages have been rounded to the nearest whole number.



About IFA

The International Fertilizer Association (IFA) was founded in 1927 and is the only global fertilizer association, with over **450 members** in some **80 countries** and a mission to promote the efficient and responsible production, distribution and use of plant nutrients. This mission plays a critical role in helping to feed the world sustainably. IFA represents providers of plant nutrition solutions.

Members include fertilizer producers, traders and distributors, as well as

their associations, service providers to the industry, research organizations, AgTech start-ups and non-governmental organizations.

Our Vision

Productive and sustainable agriculture systems contribute to a world free of hunger and malnutrition.

Our Mission

IFA promotes the efficient and

responsible production, distribution and use of plant nutrients.

Our Approach

IFA provides a framework for exchanges and collaboration among its members and a structure for agreeing common positions and joint actions.

Sustainability pathways



SCIENTIFIC PANEL
ON RESPONSIBLE PLANT NUTRITION



In 2018, following an extensive long-term strategic planning process involving members and stakeholders, IFA's Board of Directors embarked on a transformative journey known as **IFA2030**. This approach, inspired by the UN Sustainable Development Goals framework, emphasized outreach, data-informed decision-making, and a commitment to sustainability.

Key pillars of the IFA2030 approach included reinforcing the **Association's Public Affairs Committee**, establishing an independent **Scientific Panel on Responsible Plant Nutrition**, and launching a dedicated **Sustainability Committee**. These initiatives formed the foundation for IFA's sustainability-focused endeavors.

Today, the impact of these sustainability pathways is evident. IFA actively engages in **United Nations Conference of the Parties (COP)** events related to climate change and biodiversity, demonstrating its commitment to global environmental priorities. The Association also provides scientific analysis and guidance to both the industry and stakeholders, in support of evidence-based decision-making.

In addition, IFA has joined with strategic partners to publish **decarbonization roadmaps for fertilizer production**,

outlining clear strategies for reducing carbon emissions. These roadmaps exemplify IFA's dedication to addressing climate challenges within the fertilizer sector.

In 2022, IFA formed its Biodiversity Working Group to define what biodiversity means for the fertilizer industry and decide on collective actions. Please see p.21 for further details.

Furthermore, IFA has launched special initiatives such as **Sustain Africa**, aimed at enhancing the availability, affordability, and sustainable utilization of fertilizers across the continent. These initiatives are designed to enable responsible fertilizer practices while mitigating unintended market distortions.

In an effort to explore the ways in which **diversity** can be a transformative tool for the industry, IFA formed a Gender Diversity Task Force in 2019.

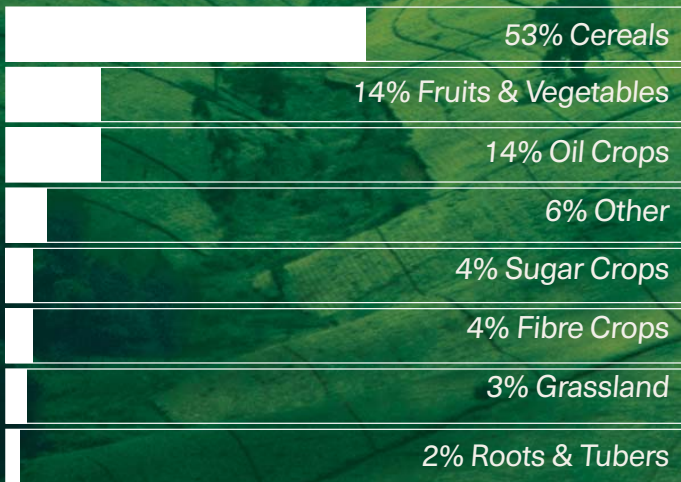
Since then, the Task Force has organized several high-profile communications campaigns during International Women's Day, which have focused on the ways to break gender biases within the industry (2022), attracting and retaining a diverse pool of talent to the industry (2021), and showcasing the profiles of leading women of the industry (2020 and 2023, visit IFA's [LinkedIn page](#) for the most recent campaign).

Gender Diversity sessions have also become staples of IFA Annual Conferences since 2019: each year inviting IFA Members to share their successes in implementing diversity policies, and providing a forum for frank exchanges on the progress made and remaining challenges for the industry.

Through these sustainability initiatives and more, IFA demonstrates its ongoing dedication to fostering a sustainable future for the fertilizer industry, aligning its efforts with global goals and aspirations for a more sustainable world.

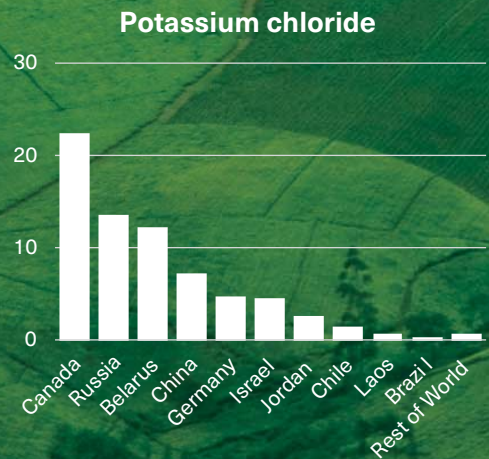
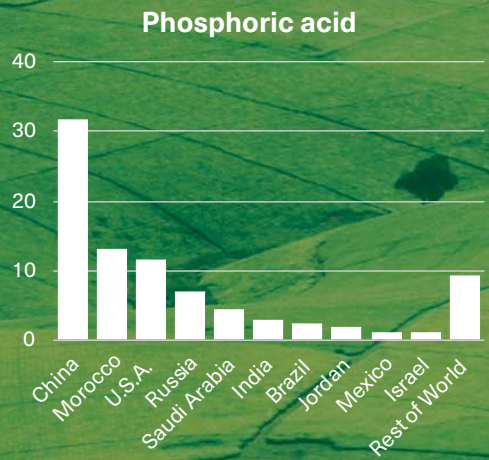
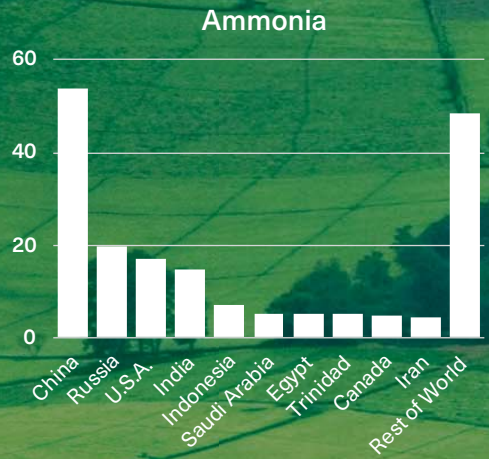
Section 1: A global industry, feeding the world sustainably

Fertilizer use by crop

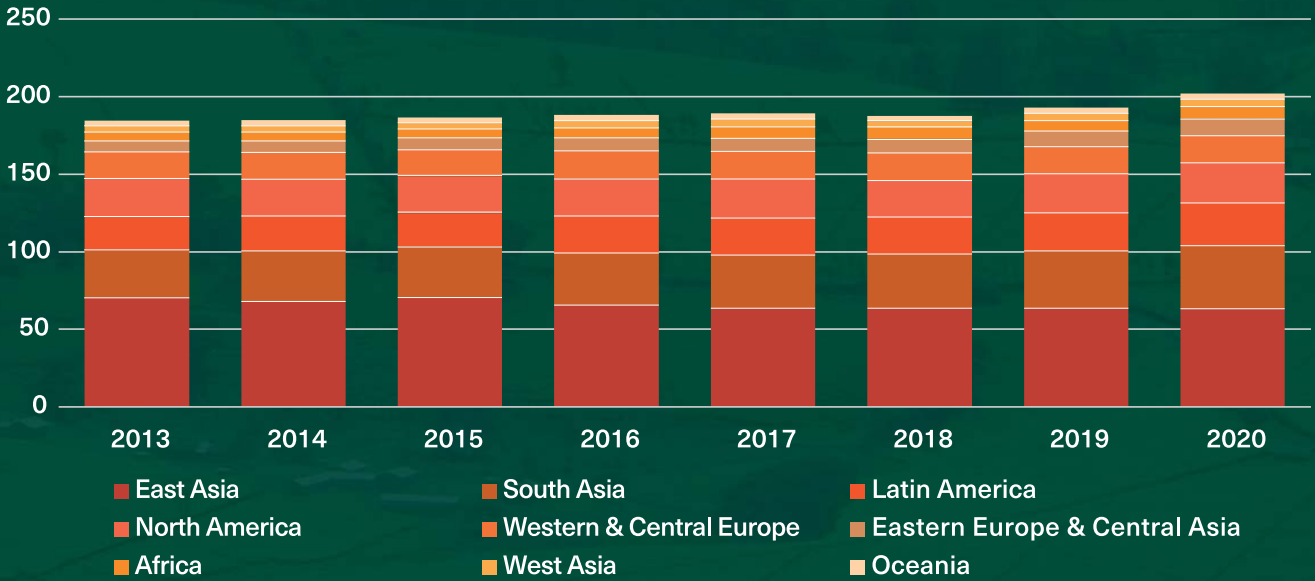


Supply/Production by country

Data year 2021

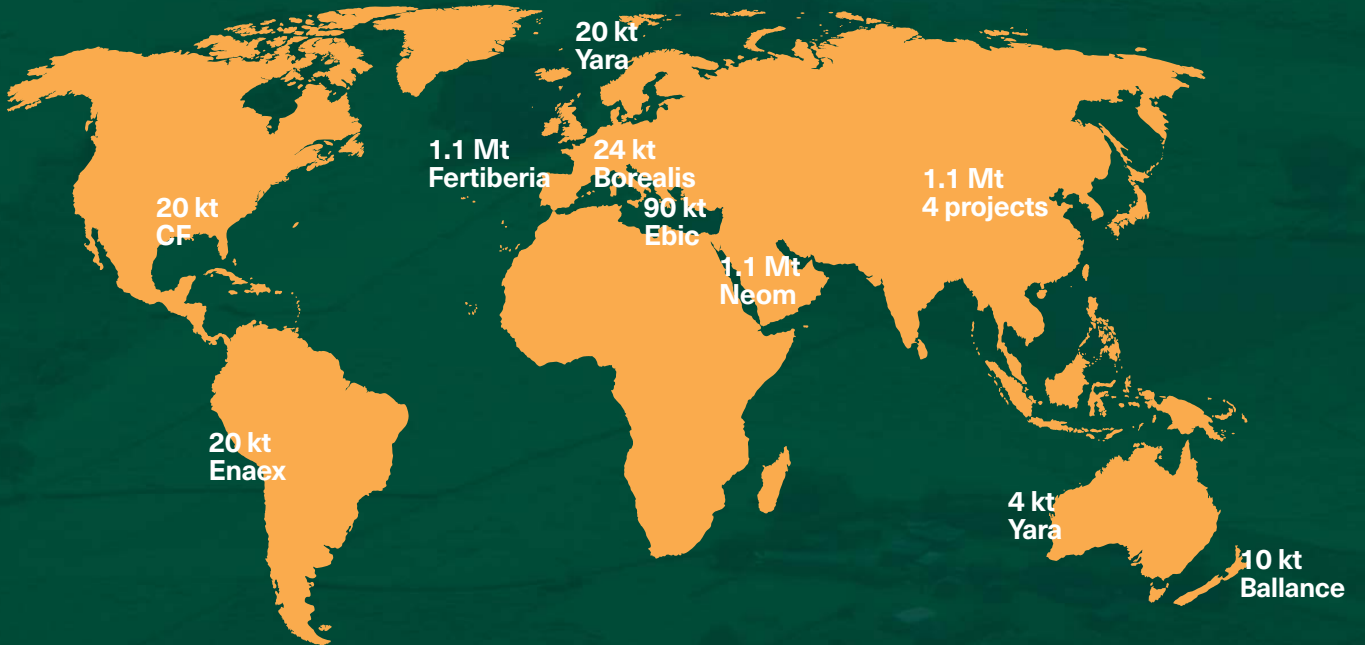


Global Demand (sorted by market size) Global fertilizer consumption (N + P₂O₅ + K₂O) Mt nutrients



Low carbon ammonia projects

Green ammonia projects in IFA forecast 2023-27
Only projects under construction or with approved FID included in five year forecast.

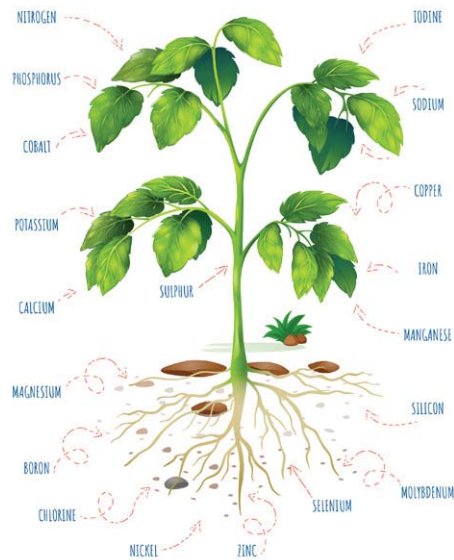


Some IFA members are also investing heavily in blue ammonia projects. IFA is tracking their progress and will include this data in its next Sustainability Report.



Fertilizer facts

Fertilizers are food for plants: they provide nutrients for plants to grow and thrive. In addition to carbon, hydrogen and oxygen, which they get from the atmosphere and water, plants need numerous nutrients for their growth and health, which fertilizers provide.



Nitrogen (N), phosphorus (P) and potassium (K) are the primary nutrients in commercial fertilizers.

Other plant nutrients are sulphur (S), magnesium (Mg), calcium (Ca), zinc (Zn), iron (Fe), boron (B), manganese (Mn), copper (Cu), molybdenum (Mo), chlorine (Cl), nickel (Ni), iodine (I). Additional plant nutrients are required by a few plant species, e.g., sodium (Na) and cobalt (Co). Mineral fertilizer plays an essential role in our food systems: it increases the volume of food that can be grown on a



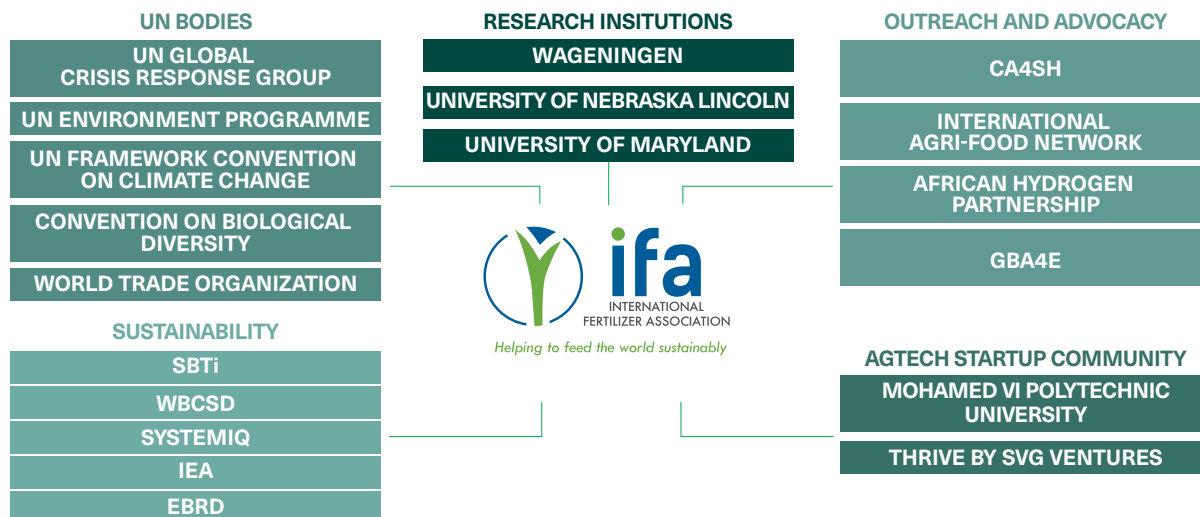
fixed amount of land. Approximately half the food we eat today has been produced thanks to mineral fertilizer.

Fertilizers are much more than agricultural input. By growing crops for human and animal consumption, they help provide essential calories, proteins, vitamins, minerals, dietary fiber, antioxidants and other bioactive compounds of importance for human nutrition and health.

They play a key role in reducing micronutrient deficiencies in people. The fertilizer fortification of staple food crops with micronutrients (also known as agronomic biofortification) has alleviated deficiencies in zinc, selenium and iodine in communities around the world.

The fertilizer industry supports policies that link agriculture, nutrition and health, and the use of micronutrients where they are needed most.

IFA Builds Partnerships



IFA is dedicated to engaging on behalf of the fertilizer industry on pressing environmental and social matters, and works closely with a number of partners in the AgTech space, academic institutions, UN agencies, international organizations, and global coalitions to achieve this goal.

Within the Public Affairs Service, IFA's priorities are focused on achieving the UN's Sustainable Development Goals (SDGs) on which the fertilizer industry has a direct impact.



Goal 2, Zero Hunger: IFA has actively contributed to help alleviate the food and fertilizer crisis by:

- Working closely with the **World Trade Organization (WTO)** to ensure the recognition of fertilizers as an essential good.
- Leading the Fertilizer Working Group (FWG) as part of the **Global Crisis Response Group**, established by the UN Secretary-General in early 2022 to address the issues of food and energy security resulting from the war in Ukraine.
- Co-founding **Sustain Africa** alongside **Rabobank, The Bill & Melinda Gates Foundation (BMGF) and the African Fertilizer and Agribusiness Partnership (AFAP) with the support of the Alliance for a Green Revolution in Africa (AGRA).**
- IFA also continued its long-term objective of disseminating fertilizer best management practices globally, through the renewal of the Memorandum of

Understanding with the FAO in December 2021 on fertilizer statistics, and sustainable fertilizer use.



Goal 13, Climate action: IFA is a longtime observer of the **UN Framework Convention on Climate Change (UNFCCC)** since the inception of a dedicated Working Group on agriculture in 2017. IFA has been successful in its advocacy for the recognition of site-specific nutrient management as a key solution for reducing GHG emissions from cropland, protecting biodiversity and reducing pollution while ensuring food security.

In a landmark development at COP 27, an official decision on agriculture was reached, whose language reflects IFA's efforts to highlight the critical role that nutrients play in climate-resilient food production systems and global food security.

From 2019 to 2021, IFA collaborated closely with experts from the **International Energy Agency (IEA)** and investors affiliated with the **European Bank for Reconstruction and Development (EBRD)**. Together, we embarked on a significant endeavor to develop a comprehensive global Ammonia Technology Roadmap. This pioneering roadmap was unveiled at the United Nations Conference of the Parties (COP 26) in Glasgow. See the Energy Transition section within this report for further information on this initiative.

In 2022, IFA and Systemiq produced the Reducing Emissions from Fertilizer Use report in order to examine the opportunities

to reduce the industry's Scope 3 emissions. See page 13 for more information.



Goal 15, Life on Land: At the crossroads of these three goals is the important topic of soil health: critical for food security, biodiversity protection and climate change mitigation. Therefore, IFA has co-founded the **Coalition of Action for Soil Health (CA4SH)** together with **CIFOR-ICRAF, WWF, 4 per Mille, WBCSD and CropLife International**. CA4SH was established in 2021 with the overarching goal of improving soil health globally. IFA facilitates the activities of the private sector guiding group to the Coalition, which issued a **Call to Action** during the Sustainable Food Systems Summit and organized a day dedicated to Soil Health on the Food Systems Pavilion at COP 27. The Coalition is currently pursuing the adoption of a **Soil Health Resolution** by governments at COP 28, which would formally recognize soil health as the foundation for sustainable food systems.

Accelerating the sustainability transformation is paramount for the fertilizer industry and this must be done by accelerating innovation, including through partnerships with **AgTech startups**. In 2021, IFA established its **Smart & Green** platform to share knowledge on the latest plant nutrition technologies and connect AgTech startups with established IFA member companies. IFA organized its first startup showcase at the 2019 IFA Annual Conference in Montreal and partnered with **Mohamed VI Polytechnic University** on the **IFA/UM6P Africa AgTech Startup Showcase**.

Section 2: Pathways to net zero

The value chain approach

Actions for fertilizer companies to address emissions alone and in coalition			
	Fertilizer manufacturer	Fertilizer traders and blenders	Fertilizer sellers
Individual companies	Improve understanding of the distribution chain		
	Supply enhanced fertilizer products		Educate and incentivise advisers, input suppliers and machinery providers for sustainable nutrient choices
	Supply tailored nutrient blends		Advise farmers on good practices
	In-house R&D		
Fertilizer sector together	Nutrient stewardship collective outreach programmes		
	Pre-competitive innovation initiatives (e.g., challenge prizes)		
	Work with standard setters to develop high quality farm certification criteria and robust evidence bases for carbon credit issuance for nutrient management		
In coalition with the food chain and policy makers	Form partnerships with research institutions to influence priority areas for research		
	Commercial partnerships with and advice for food companies to reward farmers for making changes to practices. Commercial incentives for farmers to adopt best fertilizer and wider farm management practices		
	Advocate policy reforms that better support emissions reductions. Advise policymakers on priorities and what is possible.		

The energy transition

One hundred years ago, during another global food shortage, ammonia helped to revolutionize the world. Now, as nitrogen fertilizer production aims to achieve near-zero carbon emissions to combat climate change, technology is poised to play a major role to save the planet once again.

Mineral fertilizers feed about 50% of the global population every day,

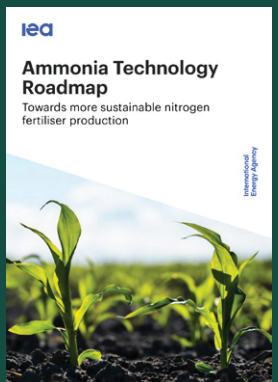
and with continuously rising population numbers, the role of fertilizers will be even more indispensable to ensure food availability and affordability in the coming decades.

At the same time, the production of fertilizers, and ammonia in particular, is carbon and energy intensive. So, we have the dual responsibility to feed the world and to do it sustainably.

It is estimated that 1.3% of the world's CO₂ emissions come from ammonia production and about 2% of the world's energy is needed to synthesize it. If ammonia were a country, its carbon footprint would be equivalent to that of South Africa.

This is certainly not a small task for our generation. The fertilizer industry understands the importance of creating partnerships and building alliances to succeed with this significant task. That is why IFA partnered with the International Energy Agency to develop a

global [Ammonia Technology Roadmap](#), which was jointly presented at the 2021 UN COP 26 in Glasgow.



Ammonia Technology Roadmap
Towards more sustainable nitrogen fertiliser production

This guide explains how nitrogen fertilizer producers can reduce up to 90% of CO₂ emissions from ammonia production between now and 2050.

The conclusions are clear – to reach the Paris Agreement’s goal of limiting global warming to 1.5°C, the industry must transition to new technologies, making the switch from ‘grey’ ammonia (primarily produced using natural gas) to green ammonia (produced using renewable energy) and blue ammonia (which involves capturing and either using or storing CO₂).

This historic transition is not going to be cheap.

The IEA conservatively estimates USD 14 billion in capital investment in carbon-free technologies for ammonia production are needed every year between now and 2050.

This is only for current uses of ammonia. The new Ammonia Transition Strategy report of the Mission Possible Partnership estimates that an annual investment of approximately USD 60 billion in new ammonia production facilities is required between now and 2050 to produce up to five times more low-carbon ammonia to cover promising applications in the green energy transition, such as the use of ammonia as a shipping fuel, for power generation, or as a hydrogen carrier.

Strong collaboration by all stakeholders is the only way to put ammonia production on a pathway to achieve deep CO₂ emission reductions on time. Governments need to put supporting regulations and infrastructure in place; technology providers need to scale up green and blue ammonia options; ammonia producers need to accelerate the transition to low carbon solutions and investors need to help the fertilizer industry with this historical transition due to the significant upfront costs required.

In addition, there isn’t one decarbonization pathway that will fit every country. Different infrastructure, access to fuels or renewable energies, different policies and financing mechanisms will influence different decarbonization pathways. This is why

IFA is now focusing on helping translate the outcomes of the Global Ammonia Technology Roadmap into tailored local roadmaps to assess each country’s specific risks and opportunities to decarbonize their fertilizer industry.

Egypt is now the first country that will have a tailored decarbonization roadmap for its fertilizer industry.

A first glimpse of this local Roadmap was provided at the 2022 UN COP 27 in Sharm El Sheikh with the full support of the local government (the final Roadmap is planned to be published mid-2023). Several countries are currently working on their own Roadmaps and many more will follow.

In parallel, some of IFA’s largest producer members are already moving individually in this direction and have started building large-scale low carbon ammonia capacity.

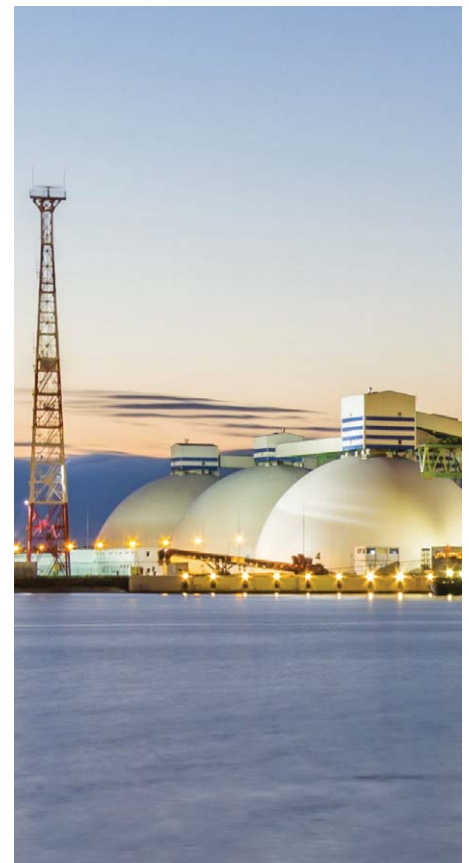
These initiatives will not only help them tackle their environmental footprint, but also help mitigate the low-carbon transition risks and physical climate risks faced along the whole supply chain, including the pressures of climate change, extreme heat and water stress, carbon prices, the Carbon Border Adjustment Mechanism (CBAM), environmental, social and governance (ESG) ratings systems and access to capital.

Finally, fertilizer companies are also in the process of setting ambitious decarbonization targets. To further help members align to the Paris Agreement 1.5°C trajectory by 2050, IFA is also partnering with the World Business Council on Sustainable Development (WBCSD) to support the Science Based Targets Initiative (SBTi) in developing a Sectoral Decarbonization Approach (SDA). The SDA is a guidance aimed at enabling individual companies calculate their emissions intensity and to set tailored decarbonization targets. The science-based targets are expected to become available starting in 2024.

Did you know that IFA is tracking more than 60 green ammonia projects?

IFA’s 2023 capacity survey indicated that of the green ammonia projects currently under development, 3.5 Mt of ammonia capacity could be commissioned by 2027. This would account for 1.4% of global capacity.

Larger-scale projects under development with capacity between 200 kt and 1 Mt ammonia total 10 Mt, and so called “mega projects” with capacity above 1 Mt could total 75 Mt ammonia, with these projects being mostly associated with ammonia’s role in the green energy transition.



The farm

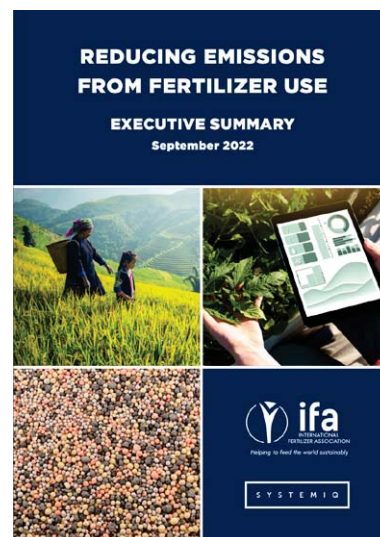


Mineral fertilizer has been a key factor in boosting agricultural yields, feeding a growing population and mitigating pressure for land use change. At the same time, mineral nitrogen fertilizer use is associated with annual greenhouse gas emissions of around 0.7 billion tonnes of carbon dioxide equivalent (Gt CO₂e), alongside other forms of nitrogen pollution.

The industry is looking to address these emissions, playing its part in keeping to the Paris Agreement's 1.5°C goal, while ensuring the continued supply of fertilizers required by farmers to ensure the world's ability to feed a growing global population. Proactive efforts will also help the sector meet increasing demands for decarbonization from investors, policymakers, scientists and civil society.

The industry's 2022 [Reducing Emissions from Fertilizer Use](#) report, produced in collaboration with Systemiq, was commissioned by IFA and its members in order to examine the opportunities to reduce the industry's downstream Scope 3 emissions from fertilizer use, and the scope to support carbon removals from the atmosphere through soil carbon sequestration.

Implementing the recommendations in the Scope 3 report, and meeting the decarbonization challenge head-on, will help secure the long-term economic and environmental sustainability of the entire food system and create a crop nutrition sector for the future. At a time when the availability and affordability of food and fertilizer are under great pressure, it is more essential than ever to put the industry on a sustainable footing.



The report examines the opportunities to reduce the industry's downstream Scope 3 emissions from fertilizer use, and the scope to support carbon removals from the atmosphere through soil carbon sequestration.

IFA, alongside its members, is actively engaged in reviewing and road-testing an emissions accounting model tailored specifically to the fertilizer industry.

The sector, science-based targets

The chemical sector recognizes the imperative of aligning with the ambitious 1.5°C trajectory of the Paris Agreement by 2050 and acknowledges the need for an independent and science-based methodology to achieve this goal. In collaboration with various industries, the Science Based Target Initiative (SBTi) is diligently developing a model to guide this alignment process.

In a notable achievement, IFA's [Ammonia Technology Roadmap](#) and its [Scope 3](#) report have received official acceptance as primary sources for the decarbonization of ammonia production and utilization. Recognizing the importance of accurate emissions accounting, IFA, alongside its members, is actively engaged in reviewing and road-testing an emissions accounting model tailored specifically to the fertilizer industry.

The SBTi, with its commitment to sector-specific approaches, aims to publish its comprehensive Sectoral Decarbonization Approach (SDA) by early 2024. This forthcoming publication will provide a robust framework for decarbonization efforts, guiding the chemical sector and facilitating its transition to a low-carbon future in line with the goals of the Paris Agreement.

Section 3: Product Stewardship

IFA's 12 SHE Principles

All IFA members have adopted the 12 IFA Safety, Health and Environment Principles, which commits them to “establish and improve their safety, security, health and environmental performance through annual objectives, targets or key performance indicators,” among other actions.

01

Leadership

Demonstrate leadership and management commitment with regard to safety, security, health and environmental issues in fertilizer production, distribution and sales.

02

Zero Harm

Strive for zero harm and adverse environmental impact whilst maintaining a healthy work place for all employees and contractual staff.

03

Priority

Ensure that safety, security, health and environmental issues are integrated into their corporate policy and receive the utmost importance and priority.

04

Resources

Ensure adequate financial and human resources for continual improvement of safety, security, health and environment performance.

05

Law Compliance

Comply with local safety, security, health and environmental laws and embrace international laws and best practices as much as possible.

06

Performance

Establish and improve their safety, security, health and environmental performance through annual objectives, targets or key performance indicators.

07

Procedure

Establish adequate procedures and controls to ensure that safety, security, health and environment are not jeopardized at any time or in any form.

08

Competence

Ensure that all employees and contractual staff have the right competence and are adequately trained and informed about safety, security, health and the environment related to their specific activities, and shall encourage the participation of employees and contractual staff for further improvements.

09

Enhancement

Adhere to the principles of hazard and risk assessment in evaluating all their activities to ensure that safety, security, health and environmental standards are continually enhanced.

10

Auditing

Strive to subscribe to safety, security, health and environmental management systems that will be subjected to internal and external auditing.

11

Information

Voluntarily share information with regard to experiences and lessons related to safety, health and the environment with all employees and contractual staff, and with other IFA members, unless there are legal constraints or if the information is of proprietary nature.

12

Responsibility

Strive to continually promote safety, security, health and environmental matters to enhance the social responsibility and accountability of the global fertilizer industry.

Sustainability Performance Benchmarks

In order to track progress, IFA regularly surveys the membership in the three established “pillars” of Safety, Health & Environment (SHE) performance on a voluntary basis:

- **Safety performance: lost time and total recordable injuries**

- **Environmental performance: industrial emissions from N, P, and K production**
- **Energy efficiency and CO₂ emissions in the ammonia sector**

These benchmarks provide valuable insight into where the industry stands and showcases members’ efforts to continually improve SHE performance. The indicators also provide critical feedback into individual and collective achievements, and in doing so, establish

a high standard for SHE performance in the industry.

Participants of the benchmarks also receive tailored Performance Dashboards with company-specific metrics and trends that enable members to develop key performance indicators and set global targets in ESG initiatives.

1. IFA's Safety Performance Benchmark

Since 2002, IFA has been measuring the industry’s yearly achievements in lost-time injuries (LTI) and total recordable injuries (TRI) for company employees and contractors, to create global key performance indicators for safety.

2022 Snapshot

- Voluntary participation: 61 producers from 35 countries, representing more than 600 million employee & contractor hours worked.
- The LTI rate for company employees and contractors combined is trending down, reaching 1.34 in 2021.
- The TRI rate for company employees reached 4.59 in 2021, showing a noticeable improvement over the previous years.
- In addition, members of IFA’s Board of Directors inform each other of best safety practices and learnings from accidents as first agenda topic of their regular in-person meetings.

2. IFA's Environmental Performance Benchmark

IFA has become increasingly proficient in how it measures and tracks environmental performance in the industry. Its biennial Environmental Performance Benchmark includes the evaluation of over 50 industrial emission areas to air, water, and land across the main nutrient product areas.

This benchmark provides fertilizer producers with highly targeted industrial emissions indicators, to better inform individual environmental performance as well as company continual improvement plans and investment priorities.

2022 Snapshot

- Voluntary participation: 54 companies reported on 599 individual production lines in 32 countries representing 240 million tons of fertilizers.
- Global emissions averages are decreasing, as significant emissions improvements are being observed in key emissions areas over time.
- The ammonia and nitric acid sectors confirmed their continued reduction of greenhouse gases, as carbon dioxide (CO₂) and nitrous oxide (N₂O) emission rates show continual improvement over several review periods.

3. Energy Efficiency and CO₂ Emissions Benchmark

IFA’s third benchmark tracks energy efficiency & CO₂ emissions in the ammonia sector. Since 2004, this benchmark has showcased the industry’s commitment to reducing its environmental footprint thanks to a widespread adoption of Best Available Techniques (BAT), mitigation technologies and to the capture and re-use of CO₂. Participants receive invaluable insights on how different technologies, fuels, and feedstocks impact their energy efficiency and GHG emissions.

2021 Snapshot

- Voluntary participation reached record levels: 35 producers covering 95 ammonia plants in 30 countries
- The average net energy efficiency continues to improve, reaching 36.4 GJ/mt NH₃.
- During the most recent survey period, participants reported eliminating or capturing over 36 million tons of carbon dioxide.

Protect & Sustain



The implementation of sustainable management processes across the fertilizer lifecycle is needed to take greater responsibility not only for how products are produced, but also for how they are developed, sourced, stored, transported, and used.

IFA's Protect & Sustain (P&S) initiative is a core component of the Association's strategy to facilitate the fertilizer industry's transition to more sustainable operations. Since its launch in 2012, Protect & Sustain Certification has become the de facto global product stewardship standard for the fertilizer industry, as it allows producers, distributors, traders, and transporters to publicly and credibly prove their commitment to reaching the highest levels of safety, security and sustainability.

Today the P&S certification is maintained by 57 producers and 3 traders from 61 countries around the world.

Combining multiple certification criteria in one tailored industry standard.

Protect & Sustain was built on the most popular industry standards. It covers 90% of the specific quality, environmental, health and safety requirements of the ISO 9001, 14001, 45001 and the Responsible Care certifications.



The 6 Evaluation Areas

- 01 Management system**
- 02 Product development and planning**
- 03 Sourcing and contractor management**
- 04 Manufacturing techniques**
- 05 Supply chain to customer**
- 06 Marketing, sales and application**

Industry Stewardship Champions



Following the launch of its Industry Stewardship Champions program in 2019, IFA members' commitments to Sustainability and Product Stewardship have further increased in 2022. At IFA's Strategic General Meeting in Washington D.C., IFA's Chairman Svein Tore Holsether, President and CEO of Yara, who

2022 INDUSTRY STEWARDSHIP CHAMPIONS

CONGRATULATIONS TO THE 36 ISC

Argentina, Austria, Bahrain, Belgium, Canada, Croatia, Egypt, Germany, Greece, India, Indonesia, Israel, Jordan, Lithuania, Morocco, Netherlands, New Zealand, Norway, Pakistan, Poland, Qatar, South Africa, Spain, Tanzania, Turkey, and USA.

congratulated all 36 companies who became Industry Stewardship Champions in previous years for remaining at this level of excellence.

The Industry Stewardship Champions label is awarded to fertilizer companies that have participated in all of IFA's most recent Safety Performance,

Environmental Performance, and Energy Efficiency & CO₂ Emissions benchmarks and that are certified IFA Protect & Sustain or have valid international certifications that are the building blocks of the Protect & Sustain certification (ISO, OHSAS, Responsible Care).



Green Leaf Awards



Leaders in our industry believe that outstanding **Safety, Health and Environment (SHE)** performance should be recognized among peers. With that in mind, IFA grants its **Green Leaf Awards** every two years to two deserving production sites

– one in N-production and one in P/K-production - that have distinguished themselves from the rest with innovative management systems in SHE programs.

In 2022, ICL Iberia's plant in Suria, Spain received the award in the phosphate/potash producer category for its excellent environmental case study – on actions taken to further lower greenhouse gas emissions at the Suria plant – and overall management of SHE at a fertilizer mining site.

Yara India's plant in Babrala received the award in the nitrogen producer category by demonstrating a world class SHE management program with a hands-on approach across the plant and active monitoring, including during the Covid-19 response.

Section 4: Nutrient Stewardship



SCIENTIFIC PANEL

ON RESPONSIBLE PLANT NUTRITION

IFA's nutrient stewardship and science activities support members on issues that are critical for the sustainability-driven transformation of the fertilizer industry. The New Paradigm for Responsible Plant Nutrition provides the overall framework for this work, as described in a key publication by the [Scientific Panel on Responsible Plant Nutrition](#).

In 2020, IFA adopted a new Industry Code of Practice on Nutrient Stewardship, which sets forth good practices that reflect nutrient stewardship commitments for industry players in the fertilizer value chain. It draws on related elements of the broader FAO International Code of Conduct for the Sustainable Use and Management of Fertilizers, which was adopted in 2019 and is designed to help monitor and report progress over time at the company level and for the industry as a whole. A first baseline survey among IFA members produced the following highlights:

All respondents had agronomic advisory capacity on nutrient management, either in-house or in partnership with third parties

82%

train commercial staff and partners on agronomic and crop nutrition matters

97%

verify the quality and purity of the fertilizer products they offer for sale to end users

90%

provide general recommendations for safe handling and efficient use of their products on the label packaging or through other information materials

75%

provide additional science-based recommendations for the efficient use of fertilizers and support nutrient stewardship program encompassing the 4Rs or similar principles

53%

offer customized nutrient management information on demand using ICT tools

80%

conduct research to develop site- and crop-specific recommendations

97%

conduct research to develop fertilizer products with a better use efficiency

86%

engage in dialogue with national authorities and other stakeholders for advancing policy reform

56%

report on nutrient stewardship in their sustainability reports

To further advanced nutrient stewardship, IFA supports research in two main areas:

1. The role of fertilizers in feeding the world sustainably

and

2. Climate change and soil health

In 2022, particular emphasis was on improving global data resources on nutrient use efficiency.

Through the Consortium for Precision Crop Nutrition, in collaboration with Agmatix, Wageningen UR and the African Plant Nutrition Institute (APNI), we have launched a new [Crop Nutrient Data](#)

[web portal](#), providing easy ways for open sharing of field research data that are relevant for researchers as well as agronomists, policy makers and other professionals.

Currently, the website contains two global databases, one on crop nutrient concentrations and removal, and one on nutrient omission and response. The new platform already has more than 400 registered users, including over 100 from the private sector, and many have started to share their own data. It was also featured in several media. We plan to expand the site with more data and other thematic databases of wide interest.

A [new global reference database](#) for cropland nutrient budgets and nutrient use efficiency was released through FAO in November 2022. This database is the result of close collaboration of FAO, IFA and researchers from Wageningen UR, the University of Maryland, the University of Nebraska, the Polytechnic University Madrid, the Swedish Agricultural University and APNI. It provides estimates of nutrient input-output budgets as well as nutrient use efficiencies of N, P and K by countries, for the period 1961-2020.

The revised data show, for example, that on a global scale nitrogen use efficiency of all crops grown has steadily risen, from about 40% in the late 1980s to about 55% at present. During the same period – characterized by increasing fertilizer use and crop yields – the average nitrogen surplus has remained steady, at about 50 kg N per hectare of cropland. Subsequent annual releases will take place, including further improvements in critical data.

IFA's nutrient stewardship and science activities contribute to making systematic improvements to this unique global data platform so that more in-depth analytical studies as well as improved long-term nutrient demand projections will become possible.



Gypsum, a versatile mineral, occurs naturally or as a co- or by-product of various industrial processes. Its wide-ranging applications span multiple industries, including construction and agriculture. When phosphate ore is processed into fertilizer using sulfuric acid, the resulting gypsum is referred to as phosphogypsum (PG). Embracing the principles of the circular economy, reusing gypsum aligns with the goal of waste reduction and recycling.

In the past decade, IFA's Naturally occurring radioactive materials (NORM) Working Group has played a pivotal role in providing scientific guidance to the phosphate industry. Through numerous meetings with members and stakeholders, this

Working Group has effectively advocated for positioning PG as a valuable inventory rather than mere waste. The dedication of the Working Group is evident in the publication of two comprehensive reports.

Notably, the most recent report titled "Phosphogypsum – Leadership, Innovation, Partnership" was published in 2020. This report highlights the transformative impact of collaborations between government, academia, and industry in many phosphate-producing countries worldwide.

The utilization of PG in agriculture, construction, and roadbuilding has been steadily increasing over time. Currently, an estimated ~69 million tonnes (~30% of all new PG) is utilized,

with a compound annual growth rate (CAGR) of 5%. Furthermore, innovative applications are emerging, such as the successful use of Ra-226 derived from PG in radiopharmaceutical cancer treatments. These advancements exemplify the continuous exploration of new possibilities and the evolving role of PG in diverse sectors.

The ongoing efforts and achievements in harnessing the potential of PG demonstrate the industry's commitment to sustainability, resource efficiency, circularity and the pursuit of innovative solutions. Through collaboration and knowledge-sharing, the responsible utilization of PG continues to advance, driving positive change within the phosphate industry and beyond.

Biodiversity

Biodiversity plays a critical role in promoting human well-being and securing the future of our planet. To halt the ongoing decline of biodiversity, both global efforts and local actions are necessary. In December 2022, the Kunming-Montreal Global Biodiversity Framework (GBF) was signed by almost 200 nations and has marked a shift in the recognition of the central role of ecosystem protection and the urgency to develop nature-protective measures.

Mineral fertilizer production and use are often viewed as detrimental to biodiversity, and therefore, IFA and its members are committed to assuming their responsibility in implementing the GBF by assessing their positive and negative impacts, developing appropriate measures on their production site, in upstream and downstream activities, and actively participating in public-private partnerships that aim to transform farming practices through training, recognition, and certification.

What has the fertilizer industry collectively done to date?

- In 2021, all members of the IFA adopted **Nutrient Stewardship Commitments** that underpin biodiversity protection measures on the farm and reaffirm the industry's overarching goal to help farmers to optimize their fertilizer use and minimize nutrient losses to the environment.
- Also since 2021, an IFA **Position Paper** outlines solution pathways and recommends the development and implementation of regionally customized nutrient load reduction targets and roadmaps through multi-stakeholder initiatives.
- Strongly committed to supporting the definition of the new GBF, IFA has been actively involved in its development process by providing scientific knowledge and expertise, such as the scientific brief on "**Achieving Nature-Positive Plant Nutrition – Fertilizers and Biodiversity**", developed by the independent Scientific Panel on Responsible Plant Nutrition. This document is intended to provide IFA's stakeholders with a comprehensive overview of the benefits, the synergies and the trade-offs between food production, biodiversity and plant nutrients.
- At the beginning of 2022, well ahead of the GBF final approval, IFA has formed a popular Biodiversity Working Group to determine what biodiversity means for the industry and to identify the drivers and levers that can be used for concrete actions in terms of reporting, measuring and goal setting.
- In September 2022, IFA launched its **Sustainable Fertilizer Academy (SFA)**, a unique e-learning experience which is open to everybody. The SFA covers topics ranging from sustainable sourcing and production to the use of fertilizers on the farm. It offers students a two-level certification program: Introductory and Intermediate – each level includes a high-quality class on biodiversity.
- To provide practical guidance to the 450 members across 80 countries on how to positively impact biodiversity, IFA collaborated with two leading consulting firms to map out nature positive activities that drive changes in manufacturing, upstream and downstream sectors. This effort included well-attended workshops at the IFA's Strategic Forum in Washington D.C. in late 2022 and at the Rome Dialogues in early 2023. The outcome report of this collaborative work was presented at the IFA's 2023 Annual Conference in Prague and communicated to all members afterwards.

Section 5: IFA Members

Standards and reporting

IFA members are actively engaged in transparently reporting their extensive sustainability efforts through various channels. A growing number of members have Sustainability Reports that comply with the rigorous standards set by the Global Reporting Initiative (GRI). In addition to these reports, their commitment to sustainability is prominently reflected in their Annual Reports and corporate websites. This multifaceted approach ensures comprehensive coverage and transparency in showcasing their ongoing sustainable practices and commitments.

Recognizing the significance of **Environmental, Social, and Governance (ESG)** factors, the fertilizer industry has begun actively reporting to relevant ESG rating agencies such as Sustainalytics, MSCI, CDP, S&P, and others. In order to help our members better understand the ESG space, IFA has recently created a dedicated ESG Ratings working group for our members to learn about the latest ESG trends, share best reporting practices, and initiate dialogues with ESG rating agencies.

IFA and leading members demonstrate their continued dedication to enhancing the integration of the United Nations Global Compact and its principles into their business strategy, organizational culture, and day-to-day operations.

As of 2022, a total of 26 IFA member companies have joined the UN's Global Compact, representing virtually all continents in the world.

Since becoming a member of the United Nations Global Compact in 2014, IFA has upheld its Ten Principles and continually works towards the acceleration of the fertilizer industry's sustainability journey, and the achievement of the

Sustainable Development Goals.

Between 2021 and 2022, IFA undertook several important initiatives that contribute to the Global Compact's Food and Agriculture Principles, namely:

1. Aim for Food Security, Health and Nutrition
2. Be Environmentally Responsible
6. Promote Access and Transfer of Knowledge, Skills and Technology

Moreover, IFA members actively participate in various initiatives designed to promote diversity within their respective organizations.

Five IFA members are currently included in the 2023 Bloomberg Gender-Equality Index (GEI): **Anglo American, ICL, Incitec Pivot, S&P Global, and The Mosaic Co.**

The GEI serves as a benchmark for companies seeking to track their progress in gender inclusion and how the implementation of diversity policies shape company performance. Such initiatives underscore the commitment of IFA members towards building a sustainable and inclusive future.

When it comes to tackling the pressing issue of climate change and curbing greenhouse gas (GHG) emissions, many members have set ambitious targets, such as achieving net neutrality by 2050 (or earlier) or aligning with the 1.5 degrees Celsius goal outlined in the Paris Agreement. Furthermore, some members have proactively committed to establishing Science-Based Targets (SBTs) once the specific fertilizer guidance is published by the Science Based Targets initiative (SBTi). These targets will provide a robust framework to guide their emission reduction efforts in a scientifically rigorous and credible manner.

Notably, the fertilizer industry is actively

collaborating on the development of a harmonized carbon footprint certification. This certification aims to accurately measure and certify the carbon intensity of low-carbon ammonia entering the market. By establishing a standardized methodology for carbon footprint assessment, the industry endeavors to promote transparency and accountability, while facilitating informed decision-making for consumers seeking environmentally responsible products.

Overall, the International Fertilizer Association and its members are at the forefront of the sustainability movement. Through their comprehensive reporting practices, commitment to ESG principles, initiatives promoting gender diversity, and ambitious climate goals, they strive to be catalysts for positive change within the industry and contribute to a more sustainable and resilient future.

The United Nations Ten Global Compact Principles

1. Support and respect internationally proclaimed human rights
2. Avoid human rights abuses in all cases
3. Uphold the freedom of association and the right to collective bargaining
4. Eliminate all forms of forced and compulsory labor
5. Abolish child labor
6. Eliminate discrimination in employment and occupation
7. Support a precautionary approach to environmental challenges
8. Promote greater environmental responsibility with new initiatives
9. Facilitate the development and diffusion of environmentally friendly technologies
10. Combat corruption in all its forms, including extortion and bribery



Education and outreach



An IFA initiative
sustainable fertilizer academy



Helping to feed the world sustainably

The **Sustainable Fertilizer Academy (SFA)** was established in **September 2021** as a collaborative effort between the International Fertilizer Association (IFA) and its member companies. The SFA was created in conjunction with IFA's 2030 strategy scenarios and inspired by the United Nations' Sustainable Development Goals, aiming to provide education and training on sustainability within the fertilizer industry.

The SFA offers 32 classes divided between **Levels 1** and **2**:

- **Level 1** provides an introduction to sustainability within the fertilizer industry, covering topics such as the importance of sustainable agriculture,

LEVEL 1	LEVEL 2	
	Product Stewardship	Nutrient Stewardship
Introduction to Sustainability	Green and Circular Economy	A New Paradigm for Plant Nutrition
Introduction to Fertilizers	Sustainable Mining	Nutrient Budget and Nutrient Use Efficiency
Introduction to Regulatory Environment and International Cooperation	Safety and Security in Production	Policies and Roadmaps for Sustainable Nitrogen Management
Sustainability for Fertilizers	Fertilizer Quality and Quality Control	Data-driven, more Precise Crop Nutrition
Sustainability in Different Regions	Sustainable Ammonia Production - Part 1	Nutrient Recovery and Recycling
Global Agricultural Innovation and Investment	Sustainable Ammonia Production - Part 2	Technology Innovation and Novel Fertilizers
Sustainability Methodology, Measurements and Evaluation	Sustainable Phosphate Production - Part 1	Nutrient Stewardship Practice
Introduction to Sustainable Finance	Sustainable Phosphate Production - Part 2	Sustainable Food Production Chains
Biodiversity: The next wave in sustainability - Impacts, risks and opportunities for the fertilizer industry		Biodiversity and Fertilizer Use

the role of fertilizers in sustainable agriculture, and the benefits of sustainable fertilizer production and use.

- **Level 2** is more advanced and further divided into two groups: product stewardship and nutrient stewardship. Product stewardship covers sustainability within fertilizer production, while nutrient stewardship focuses on sustainability within nutrient use and application.

Each class within the SFA includes

an introduction, teacher profile, a video lecture, downloadable PowerPoint slides, and a short quiz. At the end of each level, there is a final exam, and once students pass, they receive either an Expert (Level 1) or Leader (Level 2) certificate from IFA. The SFA is led by IFA's Sustainability Committee, and managed by a full-time Sustainability Education Coordinator providing teacher coordination and student support.

The SFA has been financially supported by 10 Founding Partners from IFA's membership, additionally, a leading

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agronomic and environmental university provides academic support to the SFA. These parties form the Senior Advisory Group, which meets quarterly to review the SFA's progress and develop it further (e.g., through expansion of the curriculum, additional formats, opening to non-members, etc.).

Since the launch of the SFA, many additional developments have been conducted to further improve and expand the reach of the academy. The SFA was previously exclusive to IFA members, however the Academy has been made available to everyone in 2023. IFA has also added English and Spanish subtitles to all classes and more languages will be available soon.

The SFA aims to broaden its reach and as part of that objective, has introduced an "À la Carte" offering. This feature enables personalized learning experiences for specific target audiences by allowing them to choose SFA courses that are most relevant to their needs. At present, this offering is being developed in collaboration with the Brazilian government and multiple universities, and there are plans to potentially create an African module.

Since the launch of the SFA, more than 220 people have registered and from these, 55 students have graduated.

The SFA serves as a vital and all-encompassing educational initiative that aims to accelerate the fertilizer industry's sustainability transition. By equipping both professionals and students with the necessary knowledge and skills for sustainable fertilizer production and use, the SFA strives to promote the fertilizer industry's transformation towards a more sustainable and environmentally responsible future.





www.fertilizer.org

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