

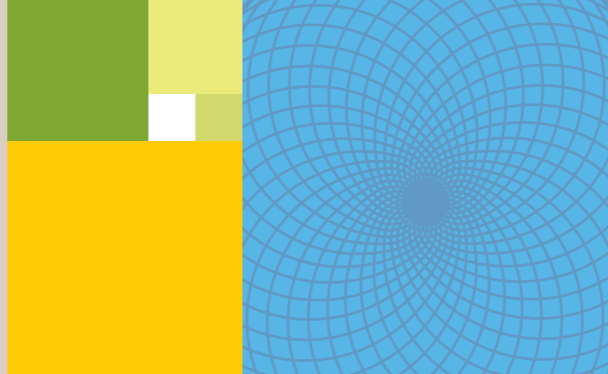


Knowledge grows

## Impact Review 2015

"People don't care how much you know until they know how much you care."

Theodore Roosevelt



### Impact Review 2015

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## Agriculture as a game changer

Svein Tore Holsether, President and CEO

**Q:** Svein Tore Holsether, when you joined Yara as CEO and President in September 2015 you were new to the fertilizer business and agricultural sector. What are your reflections on the role agriculture plays?

**A:** It's been quite a steep learning curve for me, and I'm impressed by what I've experienced. Agriculture is a sector that affects so many lives all over the world. I find it interesting that agriculture is at the intersection of so many global challenges, such as food security, climate change and the eradication of extreme poverty. You could even add mass migration, with a number of reports highlighting the link between food insecurity and social unrest and conflict, causing people to flee their homes in search of a better life.

**Q:** What is Yara doing to help solve these challenges?

**A:** We're doing a lot at farm level, and it's been inspiring to be out in the field to see the direct impact we have. I recently visited a lime and banana farmer in

Thailand, who had achieved higher yields and income since working with the Yara team, using our products and following our crop nutrition programs. These are very tangible outcomes. We are also engaged in a number of public-private partnerships.

**Q:** Can you give an example of a partnership Yara is involved in?

**A:** I'll give two examples. In January 2016 I attended the World Economic Forum in Davos, where I signed an agreement with among others The United Nations World Food Programme, Alliance for a Green Revolution in Africa (AGRA), Rabobank and Syngenta. The initiative is called The Patient Procurement Platform and the goal is to support smallholder farmers with improved market access and the means to improve their yields. The ambition is ultimately to aggregate USD 750 million of purchasing power demand through engagement with approximately 1.5

million farmers in Africa, Asia and Latin America.

I also like to look at our relationships with farmers across the world as partnerships. In Asia alone we meet with 250,000 farmers each year to share knowledge and farming practices. In Europe we are working with farmers offering them a number of precision farming tools to help them maximize yields and income while minimizing negative environmental impact.

**Q:** It seems you believe agriculture has the potential to play an even more important role in the future?

**A:** I believe agriculture has the potential to be a game changer. According to the UN more than 800 million people still live in extreme poverty today and almost 800 million are undernourished. If you look at Africa the agricultural sector can be an engine for growth. A number of studies show that growth in the agri-

cultural sector is three times as efficient as other sectors when it comes to lifting people out of poverty.

**Q:** Is this something people are aware of or do you think many underestimate agriculture as a sector?

**A:** In case people are still not aware of the positive impact agriculture can have on rural development and the fight against climate change, we will certainly do what we can to explain it. But I believe more and more people are increasingly recognizing agriculture's importance. If you look at emissions for example, there's huge potential for reductions through best farming practices and precision farming tools. I think one of the most exciting trends we've seen in recent years is that of digital agriculture.

**Q:** Does this mean that you are an innovation optimist?

**A:** Absolutely! If you look at the history of Yara, it's a story of innovation.

It started more than one hundred years ago when Sam Eyde and Kristian Birke-land found a way of extracting nitrogen from the air to produce mineral fertilizers. We have developed this nitrogen expertise, finding new ways of applying our products. Yara is, for instance, the largest producer of AdBlue, which is used to clean NO<sub>x</sub> emissions from vehicles, and NO<sub>x</sub> reduction reagents for ships and industrial plants. This is only one example of how a large company can help drive innovation and actually be in the business of helping to solve society's problems.

Regarding the agricultural sector, I believe we will see a large number of innovations and improvements in the next few years. At Yara we're working on several technology projects that hopefully can support farmers in unleashing the huge potential of sustainable agriculture.

# The smell of danger – and how to treat it

More than 7 million inhabitants in Hong Kong and 60 million passengers at Hong Kong International Airport are benefitting from Yara International's solution to prevent the dangerous and unpleasant hydrogen sulfide gas.





“The issue of H<sub>2</sub>S is a great example of how businesses and society have a common interest in combatting a problem. Several hundred million people worldwide are affected by this gas without even knowing it, but our solution effectively solves the problem”

Joacim Rød Christiansen,  
Business Unit Manager Industrial Nitrates

Hydrogen sulfide (H<sub>2</sub>S) is a nasty gas that has to be treated both in big cities and smaller municipalities. The foul smell is just one of the problems it causes. An even more severe effect of this particular gas is the health risk it poses, in addition to the harm it does to the sewer line systems.

Even when exposed to a low concentration of H<sub>2</sub>S, workers in wastewater treatment plants can experience health problems – everything from respiratory disorder to headache and fatigue. At higher concentration short-term exposure can lead to brain damage and in worst case, death (see table on next page). Exposure to very low levels over a long period of time can also lead to long-term health effects.

While some products on the market only mask the foul smell related to H<sub>2</sub>S, without solving the underlying problem, Yara’s Nutriox solution tackles

the problem at the core, preventing the gas from developing.

“The issue of H<sub>2</sub>S is a great example of how businesses and society have a common interest in combatting a problem. Several hundred million people worldwide are affected by this gas without even knowing it, but our solution effectively solves the problem,” says Joacim Rød Christiansen, Business Unit Manager Industrial Nitrates at Yara International. “The fact that we are increasing our sales of Nutriox implies that the H<sub>2</sub>S problem is being handled in a growing number of cities around the globe, thereby safeguarding both the public and those people that are at risk.”

**Protecting passengers and the public**  
The Government Logistics Department of Hong Kong is one of the most recent customers that have chosen Yara’s solution to tackle their H<sub>2</sub>S problems. Approximately 7 million people live

in the city, and seawater, which has a high concentration of sulfide, is being used for toilet flushing. The sulfide in the sewerage system can then lead to emissions of hydrogen sulfides, if not treated correctly. In 2015 Hong Kong therefore entered an agreement with Yara to tackle the issue.

Hong Kong International Airport also started using our solution. The airport is not only one of the busiest passenger airports in the world – it is the busiest cargo airport. With 73,000 employees and more than 60 million passengers traveling each year to almost 200 destinations worldwide, the airport is like a small community. And as every community it has challenges to deal with, including a well functioning sewerage system.

**Feeding nitrates to the bacteria**  
H<sub>2</sub>S develops due to lack of oxygen and nitrates in the wastewater systems.

Hydrogen sulfide creates serious health risks, even at low concentrations:

| Parts per million (ppm) | Health Effect  |
|-------------------------|--|
| 0.001 ppm               | Odor Threshold – Rotten egg smell detected   |
| 3–7 ppm                 | Eye irritation, respiration disorder   |
| 5 ppm                   | Long Term Exposure Limit (EH40)  |
| 10 ppm                  | Short Term Exposure Limit (EH40)   |
| 10–50 ppm               | Headache, fatigue, diarrhoea, loss of concentration, reduced lung capacity, eye irritation   |
| 50–100 ppm              | Chronic brain damage and/or chronic respiratory damage (Reactive Airways Dysfunction Syndrome) resulting in asthma after some years and/or chronic eye tissue damage ("gas eye") |
| 100–300 ppm             | Prolonged exposure can result in death after some weeks as a result of aspiration pneumonia  |
| 300–500 ppm             | Death after 6–24 hours as a result of pulmonary oedema (affecting the central nervous system)  |
| 500–1000 ppm            | Immediate death  |



## H<sub>2</sub>S

- Hydrogen sulfide (H<sub>2</sub>S) is a toxic gas.
- It often develops in waste water treatment plants, sewerage systems, sewage treatment works and industrial wastewater treatment facilities including refineries and oil fields.
- Even at very low concentration over time H<sub>2</sub>S can cause serious health risks in addition to the unpleasant smell.
- H<sub>2</sub>S also leads to corrosion in the sewer systems lines made of concrete and corrodes electrical systems.



Put simply, there are “good” and “bad” bacteria in the system: The good bacteria are fed by oxygen and nitrates, while the bad bacteria consume sulfides and then produce H<sub>2</sub>S.

In general there is limited oxygen in such sewer systems, as well as very little nitrates. And that is where Nutriox comes into the picture. The product is a liquid blend of calcium nitrates (CN), and by adding this to the wastewater system you are feeding the “good” bacteria.

“Basically, we are changing the mix of bacteria in the wastewater systems. Instead of dealing with the dangerous gas when it is already released, we are

preventing H<sub>2</sub>S from even developing,” explains Bernhard Habermeier, Global Product Manager Nutriox.

### Dynamic dosage

However, Nutriox is not just about adding nitrates. This is a complete solution, including technology and services. The keyword – as with adding nitrogen fertilizers to the fields – is precision. Too much nitrates in the water system can create unwanted effects, while too little nitrates can lead to H<sub>2</sub>S developing. Hence, accuracy is critical, and Yara has created a system for dynamic dosage, enabling the customers to add exactly the amount of nitrates when and where it is needed. This is

beneficial both from an environmental and economic point of view.

Yara works closely with its customers to determine the correct dosage points, where we then mount a digital monitoring and dosing device. Based on input about the bacteria levels, temperature and other factors, this information is transferred to Yara. Based on an algorithm developed at our research center in Porsgrunn, Norway, a recommendation is generated to the monitoring and dosage device, and the correct amount of nitrates is added automatically. In essence, Yara provides our customers with the advice, solutions and service to solve odor and H<sub>2</sub>S problems.

## Same molecules – different application – significant growth

Nutriox was born due to a surplus of calcium nitrates in the early 1990s and the need to find new high-value applications. More than 20 years later it continues to reach new markets.

“In fact this market didn’t exist until we created it,” says Joacim Rød Christiansen, Business Unit Manager Industrial Nitrates in Yara International.

The story of Nutriox starts more than 20 years ago at our fertilizer plant in Porsgrunn. While NPK is the main product produced, the process also leads to the production of large amounts of calcium nitrates (CN).

“Generally, you have half a tonne of CN as a co-product for every tonne of NPK

you produce,” says Per Knudsen, Plant Manager for Yara’s Porsgrunn plant.

Through the 1980s and going into the 90s Porsgrunn therefore had a significant surplus of CN, and they asked themselves if this particular product could be used for something completely different to fertilizers.

### Three innovations

“We were looking for other high-value applications of CN, and three products can be traced back to this particular

process in the early 1990s. We came up with NitCal, which is widely used in the concrete industry, PetroCare for the oil industry and Nutriox for odor control,” explains Rød Christiansen.

Produced outside our fertilizers plants, in a separate factory, Nutriox is a highly purified product, meeting the strictest of quality requirements.

Information about nitrates being used to neutralize H<sub>2</sub>S can be found in scientific literature as far back

“When you consider the costs involved in closing off streets in a city and digging through the asphalt to replace the lines, there is a strong incentive to prevent the H<sub>2</sub>S gas from developing”

Bernhard Habermeier, Global Product Manager Nutriox

as the 1930s. When a few of Yara’s clients in Sweden wanted to buy CN for this specific use, we explored the possibility of developing a complete solution for the H<sub>2</sub>S problem.

The technology center in Porsgrunn, therefore developed technology that could electronically monitor sewerage systems and then precisely apply a blend of nitrates based on an algorithm that they also developed.

The Nutriox solution was then built up by combining this technology, the nitrate product and recommendations based on the proprietary algorithm.

#### Worldwide market

The first customer in Norway was the municipality of Nes, an hour’s drive northeast of Oslo.

However, H<sub>2</sub>S is not only a problem limited to the Nordic countries. The warmer the climate, the bigger the problems are, and Yara soon stepped up its efforts. As a company with a global presence we are able to take a new product and commercialize it in a number of markets.

“There really isn’t anyone else that has been able to develop this market with the same scale as Yara,” says Joacim Rød Christiansen.

One customer in Norway soon turned into hundreds of customers in a number of countries, and today our Nutriox solution is being used at more than 4,000 sites worldwide. “We are particularly strong in Europe and North America, but we are expanding in countries in Asia, Latin-America and the Middle East,” explains Rød Christiansen.

#### Driven by urbanization and HESQ standards

One of the mega trends for decades has been increased urbanization. According to the World Health Organization (WHO) the urban population accounted for approximately one third of the global population in 1960. Today it accounts for more than half.

With this follows increased pressure on urban services, including sewerage and wastewater treatment. This makes growing urbanization a driver for the market of H<sub>2</sub>S abatement.

Another key driver is the increased focus on HESQ standards (Health, Environment, Safety & Quality), in particular the need to safeguard the employees. Since exposure to even a low concentration of the gas can lead to serious health problems, equipment is needed both to detect and monitor and to treat the problem. With growing awareness of the health

risk involved, the demand for solutions such as Nutriox is increasing also in relatively new markets and regions.

#### Cost of corrosion

Another important aspect of the problem is the harm H<sub>2</sub>S causes on the sewer lines. The gas leads to corrosion of concrete, which is the typical material the lines are made of. Deterioration of the sewerage systems has a significant cost implication for the municipalities. One thing is the cost related to just replacing the sewer lines. However, an even bigger cost is related to the work needed to actually replace the lines.

“When you consider the costs involved in closing off streets in a city and digging through the asphalt to replace the lines, there is a strong incentive to prevent the H<sub>2</sub>S gas from developing. It is far more economical to protect the lines, thereby increasing the durability, yielding great savings to municipalities and the public,” explains Bernhard Habermeier.

According to a study from 2009 the cost of corroding infrastructure – not limited to sewerage systems – is between three and four percent of Gross Domestic Product (GDP) of industrialized countries.





# The wheat challenge

Wheat is a leading source of protein for humans, but farmers are increasingly faced with a three-way dilemma: How can they increase both yields and protein levels while adhering to stricter environmental regulations? Digitalization of agriculture is part of the answer.



“Limiting nitrogen supply can harm the protein level of the crop. At the same time the farmer cannot just increase the nitrogen dosage, due to the stricter environmental regulations”

Miles Harriman, Chief Agronomist



If you were to choose only one food crop out of all the possible crops around the world, chances are that you would pick wheat as the most significant one. No other crop covers as much of the world’s surface as wheat. Although world production of both maize and rice is larger in volume, wheat is the second largest crop for human food and the leading source of vegetable protein.

Wheat is a key ingredient in everything from bread to pasta and breakfast cereals. It is also an important ingredient in animal feed.

When it comes to bread production, the quality of the wheat grain is critical. The right balance of protein and gluten creates a soft, pliable, delicious loaf of bread. If, on the other hand, the quality of the grain and the flour is not good enough, it is unfit for human consumption.

**Protein drives quality...**

There are many criteria both farmers and millers consider to determine the quality of wheat and flour. They look, for example, at the type of wheat, the hardness and the water absorption. But in general, it’s the protein level that determines the commercial value of wheat, and in recent years the protein level in wheat farming has been under pressure. “It can be a real challenge for farmers to produce high quality wheat,” says Miles Harriman, Chief Agronomist in Yara. “This is not just a problem for the individual farmer, but for the whole sector, and we have seen wheat exports from several European countries affected by this.”

**...nitrogen drives protein**

Normally, high quality flour requires a protein level of at least 12%, and there is a general trend towards bread

types requiring flour with high protein content. When farmers fail to reach the required protein content for milling wheat (bread), they are forced to sell at lower prices for feed wheat. With current low crop prices, this can make the difference between profit or loss.

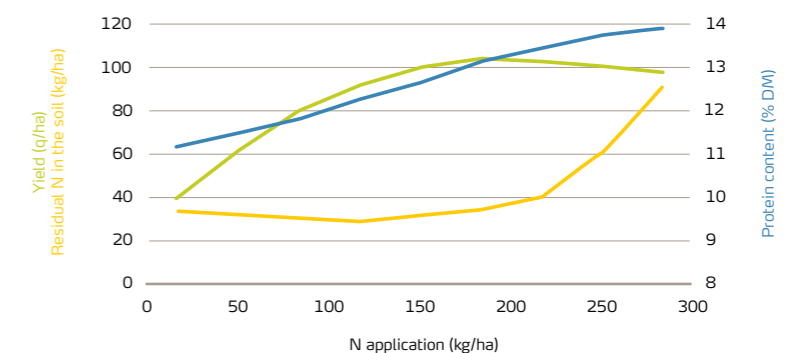
The single most important factor affecting the protein level of wheat and flour is the supply of nitrogen. But there is a challenge: overuse of nitrogen can cause negative environmental impact.

To complicate things even further there is a protein-nitrogen dilemma the farmer has to handle. Harriman explains: “There is an agronomical optimum where additional nitrogen won’t lead to yield increase. But protein levels continue to increase even beyond this point. Limiting nitrogen supply can therefore harm the protein level of the crop. At the same time the farmer cannot just

**Effect of N fertilization on protein content of soft wheat**

Field trials conducted in France. Protein content increases linearly even beyond the agronomic optimum but so does the residual nitrogen in the soil.

— Yield  
— Protein content  
— Residual N in the soil



increase the nitrogen dosage, due to the stricter environmental regulations.”

**Increase nitrogen use efficiency**

Put simply, a wheat farmer’s challenge is this: How can he/she increase both the yield and protein-level, while complying with stricter environmental regulations?

“The solution to the problem is to increase the nitrogen use efficiency, which means getting as much out of the nitrogen as possible. This can be achieved through a combination of best farming practice, balanced nutrition solutions and digital tools,” says Harriman.

The first step in achieving increased N use efficiency is split application of nitrogen fertilizers, typically three applications, depending upon yield potential, instead of one or two. If you add too much too early, you run the risk of the crop not being able absorb all the nitrogen. When coinciding

## Wheat

- A cereal grain, originally from the eastern Mediterranean, but now cultivated worldwide.
- Grown on more land area than any other commercial food.
- Leading source of vegetable protein in human food, having a higher protein content than other major cereals, i.e. maize (corn) or rice.
- World trade in wheat is greater than for all other crops combined.
- In 2013, world production of wheat was 713 million tonnes, making it the third most-produced cereal after maize (1,016 million tonnes) and rice (745 million tonnes). In terms of total production tonnages used for food, it is currently second to rice as the main human food crop. (Source: Wikipedia)



“In fact, what we see is that good environmental farming is also good economic farming”

Miles Harriman, Chief Agronomist

with heavy rain this can result in loss of nitrogen through leaching. That way the farmer both wastes valuable nitrogen resources and contributes to negative environmental impact.

By splitting the application, the farmer adjusts the fertilization to the crop's ability to absorb the nitrogen, thereby increasing the yield and protein, while limiting losses to the environment.

### Digital agriculture as a solution

A key element in modern agriculture is so-called precision farming, which enables the farmer to add the right amount of the right nutrient at the right time. This is possible through the use of new advanced technology as support tools for the farmer.

These precision farming tools are part of the digitalization of agriculture,

which has been one of the strongest trends within agriculture the past years.

Yara has developed a number of precision farming tools, among them the Yara N-Tester and the Yara N-Sensor. Both help detect the nitrogen status of the plant. In a field of wheat the level of nutrients can vary from one part of the field to another, which means that there are significant benefits in tailoring the application to meet the nutrient need. While the Yara N-Tester is a handheld device, the Yara N-Sensor is mounted on a tractor and automatically adjusts the rate of nitrogen application in response to variations in soil nitrogen supply across the field in real-time.

### Environmentally friendly = good for business

Nitrogen fertilizers come in different forms, and they impact the environment

differently. Regulators are introducing increasingly tighter restrictions on nitrogen use, in order to limit nitrogen run-off into ground and surface water sources, which is putting additional pressure on the farmer.

In general, if a farmer uses urea-based fertilizers, they have to apply a higher amount to achieve the desired protein level than by using nitrates, making urea a less efficient option.

In addition, urea-based fertilizers have a higher risk of losses to air through volatilization.

“Both from an environmental and nutrient use efficiency point of view, nitrate-based fertilizers are preferred. In fact, what we see is that good environmental farming is also good economic farming,” concludes Harriman.



## This is the Yara N-Sensor

Yara N-Sensor is a tractor-mounted tool that allows growers to measure a crop's nitrogen requirement as the tractor passes across the field and to vary the fertilizer application rate accordingly in real-time. The Yara N-Sensor ensures that the right and optimal rate of fertilizer is applied at each individual part of the field. This sensor tool has become the benchmark technology for precision agriculture. Practical experience shows that the Yara N-Sensor can increase yields significantly over standard farm practices, boosting profits and minimizing environmental losses. The Yara N-Sensor has won many international awards for innovation and for environmental protection.



## This is the Yara N-Tester

Yara N-Tester is a handheld device that measures the nitrogen status of a crop from the chlorophyll content of its leaves. From this, the agronomist can evaluate the additional nitrogen needed to meet target yields, and adjust fertilizer use accordingly. The Yara N-Tester is widely accepted as a useful decision-support tool for cereals and potatoes. In cereals, for example, it is being used to apply the right rate of nitrogen fertilizers at the right time to maximize quality and yield. It is also increasingly used with other high value, nitrogen-demanding crops in a range of countries throughout northern Europe, southern Africa and North America.







## Sustainable value strategy

Yara is a global leading company, providing knowledge, products and solutions to grow farmers' and industrial customers' businesses profitably and responsibly. Leveraging our knowledge, we create shared value.

In 2015, Yara defined its sustainable value drivers by developing a Sustainable Value Matrix, explaining what topics the company considers to be material to the company's value creation, and what topics are significant to society. The process built on our commitment to protect the Earth's resources, food and environment, and also brought in perspectives from the UN Sustainable Development Goals.

### Shared value

Yara delivers attractive returns to our shareholders while at the same time

creating value for society – creating shared value. Our knowledge margin enables us to combine environmental stewardship, farmer profitability and sustainable agriculture.

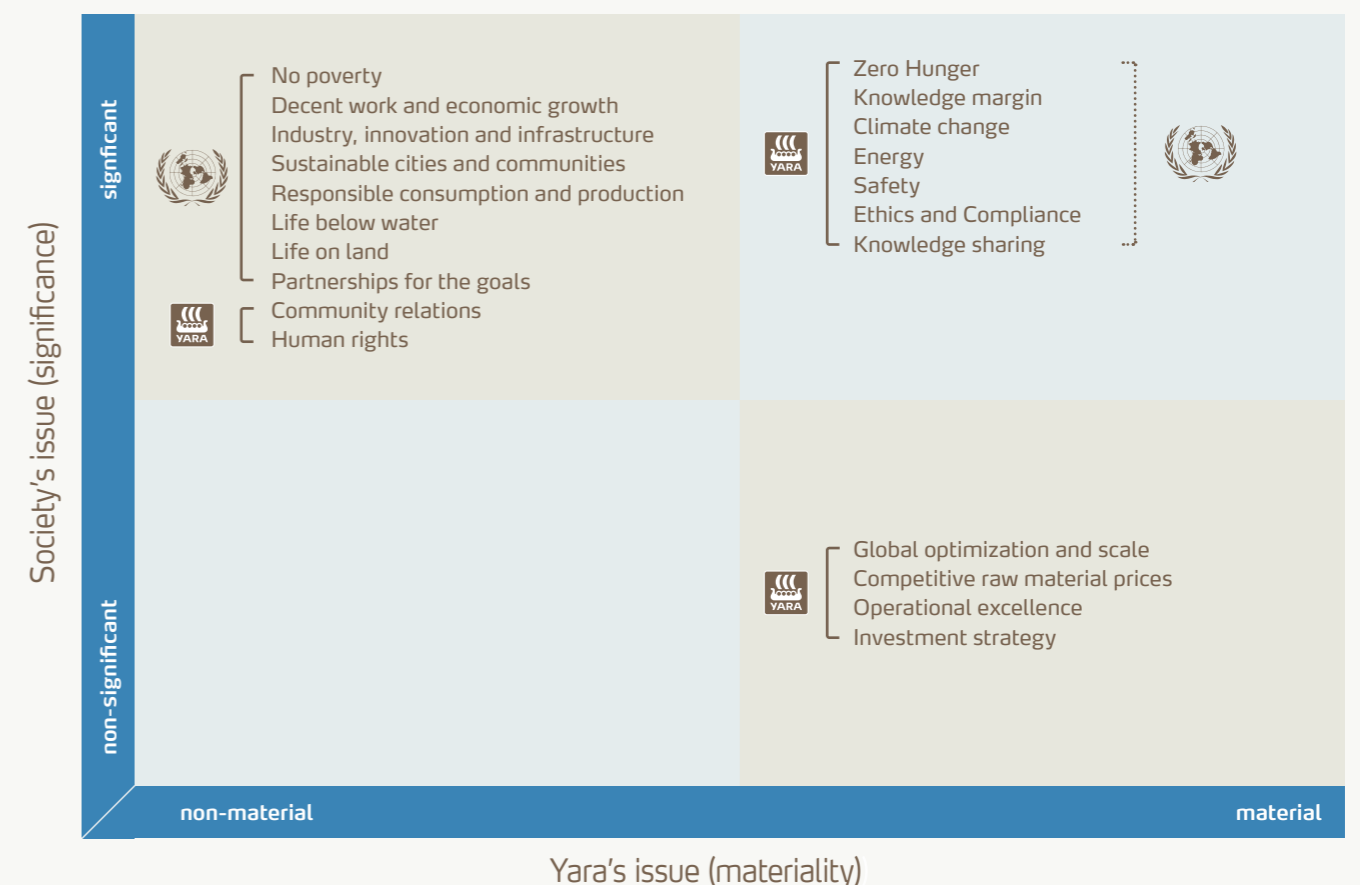
We are well positioned to address some of the major global challenges of our time, which also represent business opportunities.

### Responsible growth

Innovation, R&D and accumulating knowledge across our global operation enable us to provide and uphold a pre-

mium value proposition to our customers, as exemplified in the cover stories. Through safety performance, responsible business conduct and product stewardship we are positioned as an attractive partner. Yara enters partnerships to build business opportunities beyond the commodity basis, sharing knowledge and promoting inclusive growth.

For further information on the topics of the Sustainable Value Matrix, refer to page 26. [For a full explanation, please visit Yara's GRI reporting webpage.](#)





# Global engagements 2015



Yara delivers sustainable value creation both in its daily business operations and through engagements in partnerships, initiatives and stakeholder dialogue. 2015 was a hallmark year for the global society, defining new frameworks for sustainable development.





### Yara's cradle on UNESCO list

In July 2015, UNESCO included the towns of Rjukan and Notodden, Norway, on their world Cultural Heritage List, which honors sites for "outstanding universal value." These sites were where it all started for Yara – and they now find themselves alongside the likes of the Taj Mahal, the Pyramid Fields from Giza to Dashur and the Great Wall of China.

### Global WFP partnership

Just entering 2016, Yara signed up to a partnership with the World Food Program (WFP). The MoU was signed during WEF Davos in January, where the CEO Svein Tore Holsether participated together with leaders of the other partners, including Alliance for a Green Revolution in Africa (AGRA), Bayer CropScience, International Finance Corporation, Rabobank, Syngenta and World Economic Forum's GrowAfrica. The initiative is called The Patient Procurement Platform, aimed at supporting smallholder farmers with improved market access and the means to improve their yields.

### Strategic response

Through 2015, Yara continued to build its business engagement on the three main themes of Food, Resources and Environment. Within these areas, mankind faces global challenges to which Yara is positioned to be part of the solution.

Providing food security in a time of climate change is of vital importance. Farming is a main solution, but farmland expansion needs to be constrained to safeguard biodiversity and maintain the carbon storage in forests and peat land. More food needs to be grown while curbing emissions and protecting the environment. Combining sustainable intensification, smarter farming and safeguarding of forests is a main solution.

In 2015, Yara defined its sustainable value drivers by developing a Sustainable Value Matrix, presented on page 15 and in further detail in Yara's online GRI report.

### Stakeholder engagement

Yara's knowledge margin as well as engagement with stakeholders through knowledge sharing are key sustainable value drivers. Throughout 2015 Yara was engaged in several ongoing partnerships and initiatives and engaged with external stakeholders to contribute to sustainable development.

Yara participated at several major global events in 2015, taking an active role in the dialogue on how to promote sustainable development goals, addressing topics such as climate smart agriculture, environmental stewardship and inclusive green growth.

### Global leadership

In January 2015, Yara partnered with the Norwegian Ministry of Foreign Affairs, FAO, World Bank, CGIAR, the US Department of State, UK's DFID and NEPAD. As individual members of the Global Alliance for Climate Smart Agriculture, the partners hosted a dinner event at the World Economic Forum (WEF) annual meeting in Davos.

More than 100 global leaders were gathered, including acting Yara CEO Torgeir Kvidal, heads of regional farmers' organizations, civil society leaders and agricultural ministers. The dialogue was on sustainable agriculture, food systems, water management and forestry in the context of climate change, pointing at the need to take down silos and increase the level of collaboration.

Yara's Africa strategy was featured as the keynote business case study when top corporate CEOs gathered at the Shared Value Leadership Summit in New York in May. The Yara case study was used as a prime example of how the private sector is developing strategies to take societal needs into consideration.

The study was written by Harvard Business School Professor Michael E. Porter, who is the leading authority on strategy and competitiveness. Yara's respondent was Head of Strategy and Business Development, Terje M. Tollefsen.

In much of the developing world, farm yields are much lower than those in the developed world. This needs to change. To this point, Yara was invited by the UN and the Business Sector Steering Committee to speak on behalf of the agribusiness at the Third International Conference on Financing for Development. This event took place in Addis Ababa, Ethiopia, in July. Represented by the Head of BU Africa, Bernhard Fonseca, Yara's message to this key global forum was to promote produc-



### Malaysian scientist wins Birkeland Prize

Yara's Birkeland prize for 2015 was awarded to Dr. Pei Cheng Chua for her thesis Studies on New Classes of Low Dosage Hydrate Inhibitors, for which she was awarded a PhD at the University of Stavanger in 2013. The prize was presented by Chief Technology Officer Pierre Herben in Oslo, Norway, in September.

tivity for the farmers in the developing world and the need for increasing agricultural investments. Giving farmers access to credit, knowledge, input, infrastructure and well-functioning markets, will raise yields and will help farmers improve their livelihood. To achieve this, farming needs to be considered a viable business, not only a development issue, and stakeholders need to cooperate.

A major 2015 achievement for global policy leaders was the establishment of a UN post-2015 agenda, defining 17 Sustainable Development Goals (SDGs). The SDGs were finally agreed upon at the UN General Assembly in September, where Yara's Chief Communications Officer Bente Slaatten spoke to state Yara's commitment to help meet the goals. The SDGs provide the world with a 15-year plan on how to end extreme poverty, fight inequality and injustice, and protect our planet.

Yara has been one of the private sector representatives in the participatory process leading to the 17 SDGs, with a main objective of promoting inclusive growth in agricultural productivity as a main strategy to end hunger. This work included having Yara's Public Affairs Director Natalia Federighi participating at intergovernmental negotiations and co-chairing the Post 2015 Task Force of the UN Global Compact LEAD – the world's top leadership platform to promote corporate sustainability. This working group compiled and communicated views of the private sector to UN bodies responsible for delivering the Post 2015 roadmap.

The African Green Revolution Forum was held in Lusaka, Zambia from from 29 September–2 October. The forum was attended by high profile delegates including more than 500 leaders from over 40 countries. Yara played a prominent role by setting the agenda at the opening of the forum, represented by the CEO Svein Tore Holsether. His main message was how agriculture represents the sector of most opportunity for Africa to realize rural economic growth and the best opportunity to solve the problems of rural poverty.

### Climate smart agriculture

Yara has promoted the concept of climate smart agriculture (CSA) throughout 2015. Having been on Yara's agenda for years, the concept has increasingly become a mainstay in global dialogues not least following the UN Climate Week in 2014, when the Global Alliance for Climate Smart Agriculture (GACSA) was launched with Yara being amongst the first companies to join.



### Tanzania terminal opening

Tanzania's President Jakaya Kikwete was the guest of honor, with other prominent guests including the Norwegian Minister of Trade and Industry Monica Mæland, as Yara, represented by its CEO Svein Tore Holsether, launched the next step of its commitment to the Southern Agricultural Growth Corridor of Tanzania (SAGCOT). Adding an annual capacity of importing 350,000 tonnes, Yara formally opened its new fertilizer terminal in Dar es Salaam in September. SAGCOT is a public private partnership of more than 80 organizations, aligned in efforts to invest into inclusive green growth for Tanzanian farmers.



### Yara prize laureates

Two extraordinary men with inspiring visions were awarded the 2015 Yara Prize for their development efforts in African agriculture: Mr. Eric Kaduru (right), Founder and CEO of KadAfrica, and Dr. Ousmane Badiane (left), Director for Africa, IFPRI. The 10th anniversary prize ceremony took place in Lusaka, Zambia in September, as part of the African Green Revolution Forum (AGRF). Yara's CEO Svein Tore Holsether presented the award.

In March 2015, Yara participated at the third Global Science Conference on Climate Smart Agriculture and International Workshop of the Knowledge Action group of GACSA. Yara scientist Dr. Katharina Plassmann did a poster presentation on "Climate mitigation: trade-offs between agricultural product carbon footprints and land use intensity."

Also in March, the Global Climate-Smart Agriculture Summit was organized by the Global Forum for Innovations in Agriculture (GFIA) in Abu Dhabi. Yara's VP Global Initiatives Sean de Cleene had a speaking slot, sharing insights on how a country like Tanzania has built a green growth strategy for agriculture.

In June, the Sokoine University of Agriculture in Tanzania, together with partners Ohio State University and iAGRI, convened the International conference on Climate Change and Multi-Dimensional Sustainability in African Agriculture in Morogoro. The event was supported by the Norwegian University of Life Sciences, NORAD, the Norwegian Royal Embassy, and FAO. Yara was represented by Dr. Frank Brentrup, who did a presentation about "Sustainability of intensification measures in smallholder maize production in Tanzania".

CSA was also on the agenda at the Expo Milan 2015. The World Farmer Organization (WFO) organized a workshop in June on Climate Smart Farming (CSF). The Chief Technology Officer of Yara, Pierre Herben, did a presentation about "Crop nutrition to improve soil quality", contributing to the WFO agenda; enabling farmers to pursue their critical role to feed the world in a sustainable manner and fight climate degradation.

In October, the leading Norwegian newspaper Aftenposten hosted a conference on climate change, where the UNFCCC leader Chistian Figueres was the most prominent of keynote speakers. Yara was a sponsor of the event, promoting the role of agriculture as part of the solution to reduce emissions of greenhouse gases. Yara's CEO, Svein Tore Holsether, participated in a panel presenting solutions from the private sector.

At the COP21 climate negotiations in Paris, Yara entered a unique partnership with the Norwegian NGO Bellona, the climate research institute CICERO and the Norwegian Ministry of Foreign Affairs. The partners hosted a number of side events

at a pavilion inside the main convention center of the COP21. Yara used the seminars as a platform to promote Climate Smart Agriculture and place agriculture on the agenda as a necessary part of the solution to climate change.

Yara was represented up to the CEO level, with Svein Tore Holsether joining a panel together with the Costa Rican Minister of Agriculture, Luis Felipe Arauz Cavallini; the CEO and Chairman of Kellogg Company, John Bryant; the CEO of CICERO, Kristin Halvorsen; and the CEO of Bellona, Frederic Hauge.

The CSA agenda also involves a number of research initiatives with external stakeholders. Research partners in 2015 include University of Aberdeen, the Sustainable Agriculture Initiative platform, the Cool Farm Alliance, E.D.E. Consulting, Nestlé, Agronomical Institute of Campinas (IAC) and the World Food LCA Database project. In these engagements, Yara Innovation and R&D scientists have contributed to projects looking into several crops, such as coffee and sugar cane.

#### Environmental performance

Yara is also engaged in improving resource use efficiency and environmental performance outside of the purely CSA approach. Environmental Solutions is a fast-growing business area of Yara, where the main emphasis is on clean air.

In June, Yara's Head of Industrial, Yves Bonte, spoke at a gathering at the European Parliament. The meeting was initiated by two members of the European Parliament – MEP Julie Girling and MEP Peter Jahr – and was organized by Fertilizers Europe.

Bonte explained how specialist knowledge helps cleanse harmful emissions to air. Air pollution drives societal costs and causes premature deaths, but emissions can be prevented. Through its Industrial segment, Yara helped its customers remove 1.4 million tonnes of NO<sub>x</sub> emissions in 2015 – an amount exceeding the total emissions in France.

Freshwater availability is seen as a major global risk, and agriculture consumes about 70% of the global human consumption. At the XV World Water Congress in Edinburgh, Scotland, in May, Yara's Dr. Dejene Eticha presented a poster about improving agricultural water productivity through better crop nutrition. The results of Yara's studies indicate that with optimal nutrient supply, less water is required for every kilogram of crop harvested. Therefore, optimal fertilizer application helps to produce more crop per drop.

Yara also holds a position on the European Nitrogen Expert Panel, represented by Dr. Joachim Lammel. Together with Dr. Frank Brentrup, Dr. Lammel engaged in two panel meetings, in June and December. In the report 'Nitrogen Use Efficiency (NUE) - an indicator for the utilization of nitrogen in agriculture and food systems', the panel developed recommendations for a NUE indicator. The Yara representatives are co-authors of the published report.

In June, Yara's acting CEO Torgeir Kvidal talked about the circular economy and how balanced crop nutrition was necessary to feed a growing population at the second EAT Forum in Stockholm. According to co-host of the forum, Professor Johan Rockström, "Getting it right on food is the key challenge." The EAT forum attracted royalty, academics, heads of state as well as societal and business leaders.



COMMITTED TO IMPROVING THE STATE OF THE WORLD

### WEF engagements

Through 2015, Yara continued its engagements in WEF on several platforms. These include the New Vision for Agriculture, Grow Africa and Grow Asia. A common feature across Yara's participation is a focused approach to inclusive growth and climate- and environmental smart solutions, developed and implemented through a partnership approach. In the Grow Africa platform, more than 300 partners have contributed to making more than USD 1.8 bn investments, benefitting more than 8.6 million smallholder farmers.

### UNGC LEAD

As an active member of the UN Global Compact and its LEAD initiative, Yara is committed to supporting the principles of responsible business. Yara is a signatory to several UNGC issue platforms; Caring for Climate, CEO Water Mandate and the Call to Action on Anticorruption. Yara's engagement is based on the belief that the private sector needs to play an important role in addressing global challenges.

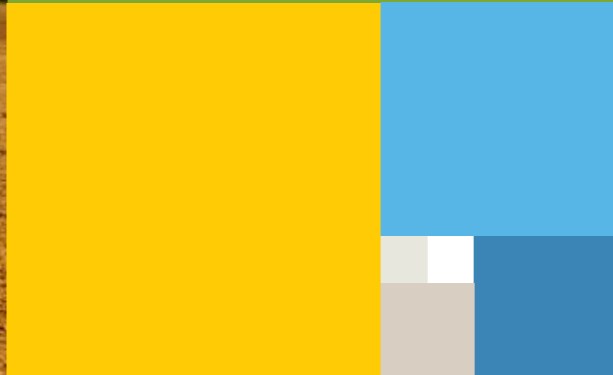


### Joining WBCSD

In 2015, Yara decided to join the World Business Council for Sustainable Development. The main focus from Yara's side was towards Climate Smart Agriculture (CSA), where Head of Sustainability Management, Bernhard Stormyr, represented Yara in the Low Carbon Technology Partnerships Initiative (LCTPI) working group on CSA.



# Performance 2015



## Responsible growth

We grow and share our knowledge for better business and better environment [page 26](#)

## Environment

We have made outstanding improvements in reducing greenhouse gas emissions [page 27](#)

## Health and safety

Safety is our top priority and we believe that every accident is preventable [page 28](#)

## Workforce

Our workforce represents a great set of diverse skills and competencies [page 29](#)



# Responsible growth

Yara's knowledge, products and solutions grow customers' businesses profitably and responsibly, while protecting the earth's resources, food and environment.



We are dedicated to growing our business responsibly. By offering a positive value proposition to our customers over time, we can deliver attractive returns to our shareholders while at the same time creating value for society – creating shared value.

### Sustainable value matrix

In 2015, Yara defined its sustainable value drivers by developing a Sustainable Value Matrix, explaining what topics the company considers to be material to the company's value creation, and what topics are significant to society. The resulting diagram is presented on page 17, and the complete process and findings are available at yara.com in the GRI reporting section.

Yara sees most of the SDGs as relevant to our business, and several are also materially significant to Yara. The following topics are seen as material to Yara and significant to society, as well as having a clear link to the SDGs:

**Zero Hunger:** SDG 2 – Zero Hunger, is in itself seen as materially important to Yara. An increased demand for enough food drives Yara's markets, and by working through partnerships Yara has a strong track record of reaching out to smallholder farmers to induce inclusive growth in the agriculture sector.

**Knowledge margin:** Yara realizes a knowledge margin relative to most of

its peers in several key areas, providing a competitive edge. For the Sustainable Value Matrix these dimensions include:

- Process safety and environmental stewardship
- Knowledge, tools and solutions to support yields, sustainable agriculture and farmer profitability
- Product Stewardship

These topics are linked to several SDGs, in particular SDG 9 – Industry, innovation and infrastructure; SDG 12 – Responsible consumption and production; SDG 15 – Life on land; SDG 6 – Clean water and sanitation; and SDG 14 – Life below water.

**Climate change:** Yara has a leading position in its industry on greenhouse gas emissions and solutions for climate smart agriculture, providing a competitive edge in a society dedicated to reducing emissions. Regional differences in policy implementation may, however, raise risks if regulatory actions do not ensure fair competition. This topic is linked to both SDG 13 – Climate action and to the COP21 negotiations and outcome.

**Energy:** Natural gas is Yara's main raw material and main cost. Affordable access to natural gas is a competitive advantage, and improving energy efficiency contributes to reduced costs. This topic is linked to SDG 7 – Affordable and clean energy.

**Safety:** Safety is a key priority in Yara. We value our employees, who represent a knowledgeable and diverse workforce, and every employee has a right to a safe working environment. A safe workplace is good for business. We believe that all accidents are preventable. Our goal is zero injuries. This topic is linked to SDG 8 – Decent work and economic growth.

**Ethics and Compliance:** Success can only be celebrated when it is achieved in the right way. Our manner of conducting business defines who we are as a company. We leverage this externally as a competitive advantage and use it internally as a directional compass. Through consistent integrity, we create trust both internally and externally. This topic is linked to SDG 16 – Peace, justice and strong institutions.

**Knowledge sharing:** Yara is dedicated to collaboration, working with other stakeholders to promote safe, sustainable, efficient and profitable solutions. Sharing knowledge with farmers, customers, policy makers, business partners and society at large promotes a supportive operating framework, creating shared value while also improving Yara's competitive position. While this topic touches upon most of the topics also mentioned above, the extension services element has additional relevance to SDG 1 – No poverty.

# Environment

We are committed to reducing pressure on the environment in every way we can. This includes minimizing the impact of our production, distribution and end use of our products in agriculture, as well as offering environmental solutions.

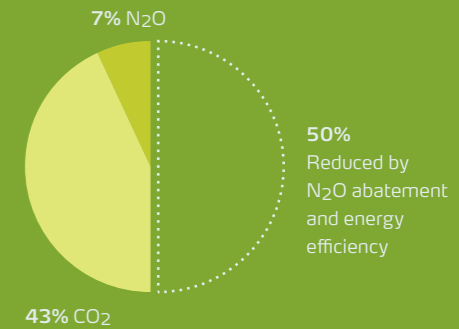
In 2015, Yara defined its sustainable value drivers. The environmental aspects that are material to the company's value creation are climate change, energy, process safety and environmental stewardship, and sharing knowledge with farmers, customers, policy makers, business partners and society at large.

### Climate Change and Energy

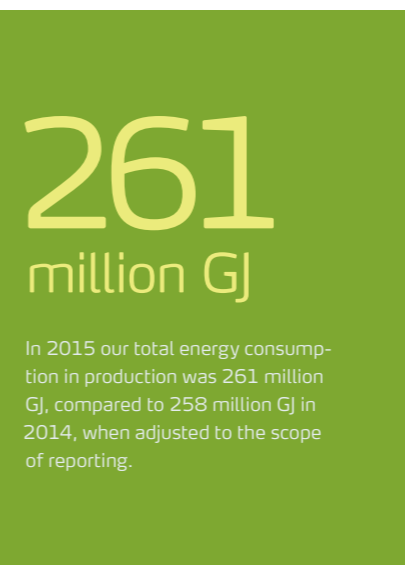
Agriculture causes about one quarter of global greenhouse gas (GHG) emissions, with farmland expansion as the main culprit. The manufacturing of mineral fertilizers contributes to GHG emissions, but they are also vital in limiting the need to expand farmland.

Using Yara's proven low-carbon fertilizers and best farming practices, the carbon footprint from crop production can be significantly reduced while maintaining yields. In 2015, Yara updated the carbon footprint calculations for our main fertilizers produced in the Nordic and Central European plants. Yara used the calculation tool specifically designed for the fertilizer sector. This allows easy visualization of fertilizers' impact into the Carbon Footprint of agricultural products.

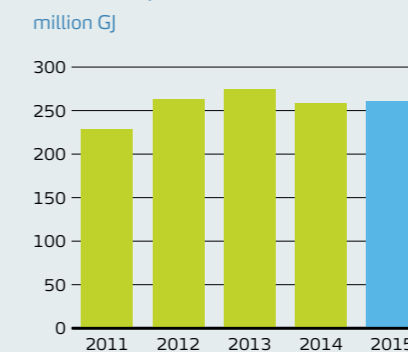
## Yara's GHG emissions cut in half



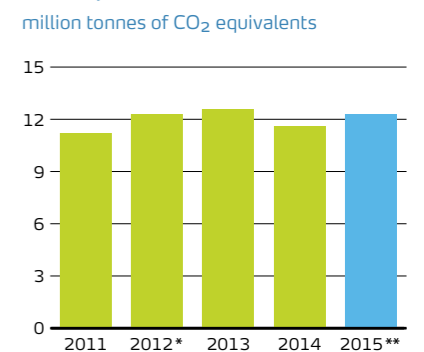
We have halved our GHG emissions by improving energy efficiency and developing an N<sub>2</sub>O catalyst technology. The diagram illustrates actual emissions for 2015 and the potential emissions without GHG reduction measurements.



### Total energy consumption

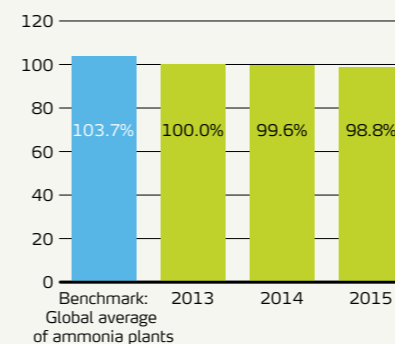


### Greenhouse gases from Yara production



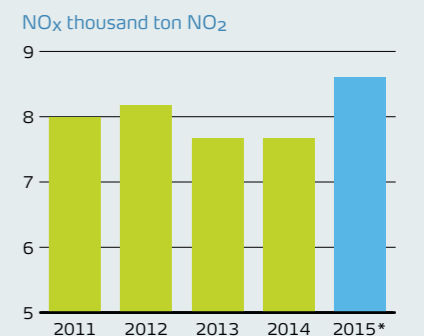
\* Pilbara and Lifeco included 2012 onward  
\*\* Including Cartagena and Galvani

### Energy intensity in ammonia production



Almost 90% of the energy is consumed in ammonia production. Yara has made a clear improvement in energy efficiency, performing better than the average ammonia plant.

### NOx emissions to air from Yara production



\* Increases due to high production, inclusion of Cartagena and damage to one process unit.

# Health and safety

Safety is a top priority for Yara. We believe that operating our business safely forms the cornerstone of our license to operate. In all areas where Yara operates, these principles and practices are deployed, to Yara employees, contractors, transport partners and customers.

Through the management commitment and engagement of employees and contractors, it is our ambition to work towards zero personal injuries in our operating environment.



In mid-2013, Yara launched its Safe by Choice program, designed to further improve the company performance by developing the safety culture of an ever growing global organization. The program targets both emotional, rational and sustainable organizational developments.

There has been a progressive reduction in the total recordable incident rate (TRI) both for employees and contractors. 2013 concluded with a combined rate of 4.3, 2014 delivered an improved rate of 3.9 and 2015 a further reduction down to 3.4.

Yara has a well-developed process safety management system, including detailed technical standards and an extensive audit program. Non-conformities to the technical standards are monitored and followed up in detail by the corporate management. Yara has a target of zero major process safety accidents. During 2015, there was one fire case classified as severity 1 (most severe level) due to economic loss. There were no process safety incidents leading to serious personal injuries, environmental impacts or international media coverage.

## Environmental Stewardship and Process Safety

Yara's operations in Europe are fully compliant with the requirements of Fertilizers Europe's Product Stewardship Program.



Outside Europe, Yara is rapidly implementing the Protect & Sustain product stewardship program of the International Fertilizer Industry Association (IFA).



So far, 13 non-European Yara units have received the IFA Protect & Sustain certificate, of which ten reached the highest "Excellence" level. All of Yara's business in USA, Canada and Mexico, big parts of Brazil and Latin America, as well as an increasing share of units in Asia and Africa are covered.

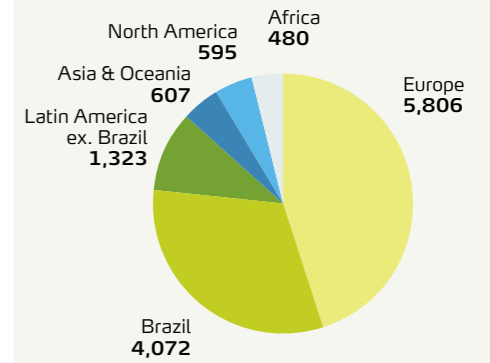
# Workforce

Yara's People Strategy was redefined in 2015, focusing on attracting, developing and retaining the people Yara needs; making leadership a competitive advantage; driving a high performance culture; being a catalyst for change; and delivering operational excellence.

In the period 2015–2017, we will prioritize leadership development and talent management. Yara aims to attract and retain scarce and valuable talent, and to provide these people with a career path that ensures we have the right experts in key roles.

So far, three career frameworks for experts have been developed: one for R&D professionals, one for agronomists, and one for engineers. A strategic workforce planning approach is also under development. Initiatives in the change leadership and culture field will support Yara's growth ambitions. The HR organization was redesigned to simplify contact with internal stakeholders and enable HR to focus on driving operational performance by having dedicated HR managers in each region or country. This transformed the HR organization from a functional to geographical structure supported by three global centers of expertise. The reorganization will facilitate the implementation of the HR strategy, closer alignment with business priorities and efficient deployment of HR resources according to local needs.

## Workforce by region



## Yara's global workforce

Our contingent in Latin America including Brazil has grown rapidly in recent years, and accounts for more than 40% of our employees.

## Diversity

Yara is aware that organizations with more women in leadership positions achieve better financial results. Despite the aspiration to have more diverse leadership teams, there are still too few women who occupy senior leadership positions in Yara. The share of women is only 10% among the key position holders in the company, compared with 19% in the company overall. Yara's ambition is to increase the proportion of women in management positions.

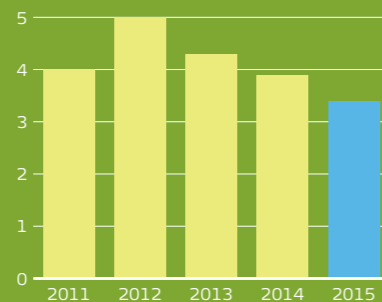
Yara has therefore decided to address the gender diversity imbalance more assertively, as we believe in creating an equal opportunity workplace and that gender diversity can help drive a high performance organization. It simply makes moral and business sense. In 2015, all business segments have started working on their gender diversity strategies. This work will be finalized in 2016 and will result in action plans both on corporate and business segment levels.

# 12,883 employees

In 2015, Yara's workforce grew by 7%, now totaling almost 13,000 permanent employees. The increase was mainly due to a reclassification of employee status in Brazil, and also some increase in Africa due to greater ownership in an Egyptian company and the Yara Dallol operations in Ethiopia.

## Green leaf award

Yara Brunsbüttel was selected by an independent review panel as the 2015 winner of the IFA Green Leaf Award for health, environment and safety in fertilizer production. In the award ceremony at the IFA Global Safety Summit in Canada, March 2015, Yara Brunsbüttel came out on top in a field of 25 applications from around the world.



## TRI rate

In 2015 our TRI (Total Recordable Injury) rate was 3.4 for employees and contractors combined, an improvement compared to 3.9 in 2014. We target a TRI rate of below 3.0 – towards the ultimate goal of zero accidents.



## Leadership initiatives

Several leadership development efforts were initiated in 2015 as part of this shift in strategy. In Europe, the Middle East and Africa (EMEA), the Tertre Management Team offered the "Orpheus Leadership Journey" to newly recruited engineers.

The "Leadership Academy" in Brazil was offered to Yara leaders in preparation for their new roles. Yara Brazil HR also facilitated a high performance culture initiative, focusing on behaviors that promote innovation, knowledge sharing and excellence. In Asia, the a leadership program provided a forum for Yara Asia leaders to discuss leadership challenges, share ideas and create solutions.

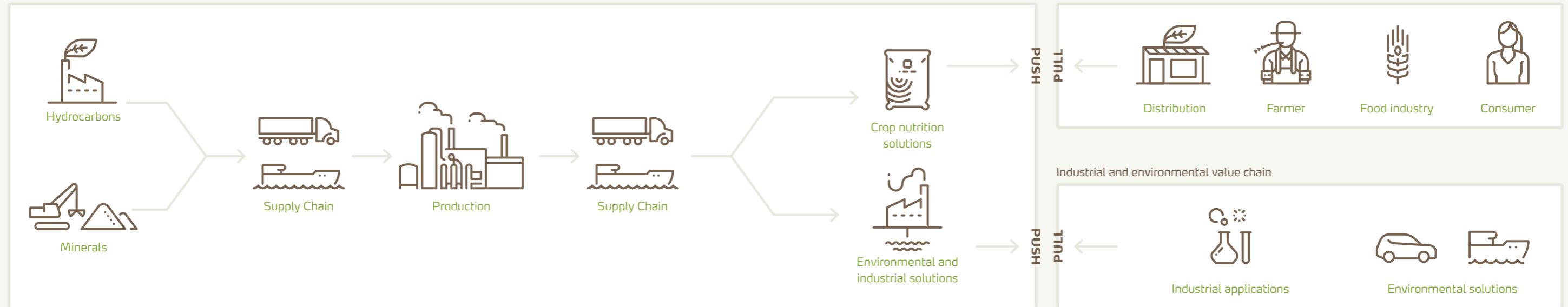
# 60 nationalities

More than 60 nationalities are represented in our workforce – a great set of diverse skills and knowledge.

# Leveraging scale and knowledge

Our strategy rests on a unique integrated business model and global presence, giving us a strong position for profitable growth. The business model provides scale advantages, extensive flexibility and global optimization.

## Our Business model



## Knowledge drives business



### Industrial experience

We pioneered the production of nitrogen fertilizer more than a century ago. Since then, we have continuously advanced our industrial processes, setting standards for greenhouse gas emissions and energy efficiency.

Yara has grown – and still grows – through a combination of commercial daring, scientific research and market knowledge. We foster a culture that values expertise and encourages the search for improved methods and new solutions.



### Business model

We are the world's largest producer of nitrogen fertilizers, building on a unique, integrated business model. With our operational flexibility, supported by global ammonia trade, we pursue optimization and scale advantages, creating a competitive edge.

Yara consistently executes a strategy of sustainable, profitable growth. Knowledge is a major strategic asset. We build on a strong competitive edge in which our knowledge margin plays an important role, adding to our competitiveness and ability to serve our customers.



### Agronomic expertise

We have developed crop-specific nutrition concepts tailored to local conditions and farmers' needs. Employing our expertise in precision farming, we deliver knowledge and solutions to improve agricultural productivity and farming profitability.

Yara invests in R&D activities to deliver improvements in process technology, crop nutrition strategies and environmental solutions. In collaboration with partners and customers we provide farmer centric solutions that optimize yields and agricultural quality while minimizing the use of resources like water and nutrients.



### Global engagement

We invest in developing solutions that address global challenges such as climate change, resource scarcity and food security. By engaging in partnerships, we leverage our knowledge, products and solutions to create shared value for shareholders and society.

Yara develops knowledge and commerce, sharing ideas and experience with a purpose. Our strategy bridges business and global challenges and allows us to create value for shareholders, customers and society.





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## About Yara

Yara's knowledge, products and solutions grow farmers, distributors and industrial customers' businesses profitably and responsibly, while protecting the earth's resources, food and environment.

Our fertilizers, crop nutrition programs and technologies increase yields, improve product quality and reduce the environmental impact of agricultural practices. Our industrial and environmental solutions improve air quality by reducing

emissions from industry and transportation, and serve as key ingredients in the production of a wide range of goods. We foster a culture that promotes the safety of our employees, contractors and societies.

Founded in 1905 to solve emerging famine in Europe, today, Yara has a worldwide presence, with close to 13,000 employees and sales to about 160 countries.



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