



tfi.org/sustainability

Sustainability

in the Fertilizer Industry

Featuring data from 2022, collected in 2023

a world with fertilizer

FEEDING THE WORLD

Fertilizer is crucial to combating food insecurity and starvation, with more than half of the world's food production depending on its sustainable use.

Understanding how the production and use of fertilizer can be done more efficiently and sustainably is key to addressing the **UN SDG of Zero-Hunger**. From conserving and recycling water to keeping communities safe and providing farmers with products and services to use our products with precision, the industry is engaged in sustainability every day.

TFI is proud of the significant steps the fertilizer industry is taking to make positive contributions to the environment, the economy, and society.

macronutrients

N **P** **K**

secondary nutrients

Ca **Mg** **S**

micronutrients

B **Cl** **Cu** **Fe**

Mn **Mo** **Ni** **Zn**

Fertilizers provide nitrogen, phosphorus, and potassium, among other essential nutrients, necessary for plant growth.

FAMINE LOOMS LARGE

In a world without fertilizer, the very foundation of global agriculture would crumble, sending shockwaves across every aspect of society. Without it, the consequences would be dire, reshaping landscapes, economies, and geopolitics in profound ways.

A Drastic Reduction in Crop Yields and Impacts on the Environment

Crop yields would plummet without the nutrient inputs they need and force farmers to dedicate significantly more land to agriculture to compensate for shrinking crop production. Estimates are that without fertilizer, up to 40% more land would need to be dedicated to agriculture to maintain current levels of food production.

Food (In)Security, National Security, and Geopolitics Strained

Food security impacts would soon follow drastic reduction in crop yields,

particularly in regions already vulnerable to hunger and malnutrition with many countries struggling to feed their populations. Shelves once stocked with an abundance of fresh produce are now empty, the scarcity of food driving prices to unprecedented levels. Malnutrition would quickly become a widespread epidemic.

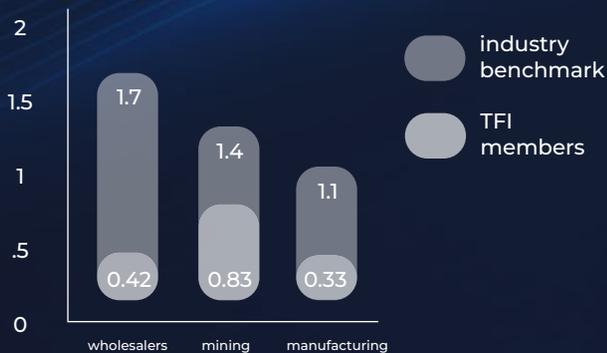
sustainable production

Whether it be developing new products, practices, or more efficient production methods, the industry has made significant investments to not only produce fertilizer more sustainably, but to also grow more food with less environmental impact.

employee safety

Safety is a top priority for TFI member companies, with data from 2022 showing the lowest Lost Time Incident Rate since 2013. TFI members outperform industry benchmarks in every category of the Department of Labor's data.

2022 Lost Time Incident Rate



Lost Time Incident Rate: number of recordable injuries and illnesses per 100 full-time employees that resulted in days away from work, restricted work activity, and/or job transfer.

energy

Fertilizer production is energy intensive, but the U.S. industry is at the forefront of energy efficiency, especially when compared to production in other countries.

29.8%

of the total energy use reported in 2022 was generated using waste heat.

Members have been working to reduce the total amount of energy and water consumed through innovative practices that reuse these resources throughout the manufacturing process. This can be through cogenerated energy or the use of other low-impact energy sources, such as solar or steam from waste heat.

Six TFI member plants earned EPA's prestigious ENERGY STAR certification for superior energy performance in 2022: Iowa Fertilizer Company in Weaver, IA; JR Simplot in Helm, CA, and Rock Springs, WY; and Koch Fertilizer in Beatrice, NB, and Enid, OK.

CF Industries, LSB Industries, Nutrien, OCI, and Yara are leading the way in implementing low-carbon ammonia technologies and are among companies working to develop a low carbon ammonia protocol for North American industrial ammonia and fertilizer production. A precise, unified specification will help consumers understand carbon intensity quickly.

greenhouse gases

TFI members are working towards decarbonizing manufacturing sites, including boosting energy efficiency, carbon capture and sequestration, investing in electrolysis technologies, and more.



12.3 million metric tons of CO₂ equivalent captured and not emitted

innovation in production

The most frequently utilized mineral fertilizer involves nitrogen, which is captured in the production of ammonia. Low-carbon ammonia technologies increase the sustainability of fertilizers while ensuring agricultural productivity.



142.9 billion gallons of water recycled/reused by TFI members

water

According to the USGS, the average daily water use per person in the U.S. is about 82 gallons. So, 142.9 billion gallons could supply the daily water needs of Washington D.C. for **almost 7 years.**

Five companies reported a total of 25 zero-discharge facilities (at which all wastewater is recycled).

capital investment



\$1.24 billion invested annually from 2020-2022

From 2020 through 2022, companies in this report invested an average of \$1.24 billion annually in new facilities and upgrading existing infrastructure. Capital investments help the industry meet sustainability goals by increasing production efficiencies, reducing energy and water use, and reducing greenhouse gas emissions.

nutrient stewardship

TFI developed the 4R nutrient stewardship framework (using the **right source**, at the **right rate**, and the **right time**, and in the **right place**) to improve farm performance and reduce nutrient loss and has been advocating for the implementation of these practices for over 10 years.

Agricultural land is more productive when fertilizers are used sustainably following the 4Rs, thereby reducing deforestation and increasing carbon preservation in the soil while limiting the impacts on air, water and soil.

46 million
acres under
4R nutrient
stewardship

TFI members have committed to 70 million acres under 4R nutrient stewardship management in the United States by 2030. As of 2023, we are 2/3 of the way to our goal.

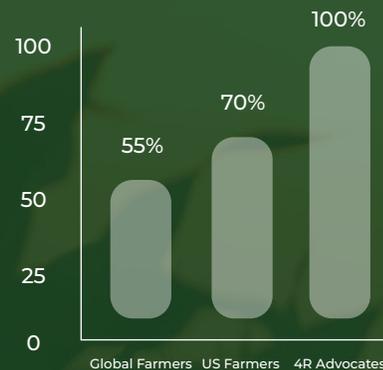
Since 2012, the 4R Advocate Program has recognized 116 ag producers and retailers who use sustainable farming practices including the 4Rs and manage 283,000 acres in 25 states.

4R Advocates



Farmers in the US have a nitrogen use efficiency of 70%, which is much higher in comparison to the world average of 55%. The 2023 4R Advocates had an average of 100% nitrogen use efficiency.

Nitrogen Use Efficiency





innovation in fertilizer products

TFI's Certified Biostimulant Program is a voluntary evidence-based program that awards companies a label indicating that their product meets industry recognized standards for efficacy testing methods, composition, and safety. The program is based on the United States Biostimulant Industry Guidelines, which provide criteria to support adherence to those standards.

In South Dakota, a 4R advocate and fifth-generation farmer used 4R nutrient stewardship practices to preserve the land and water and help to maximize yields. This grower operates 4,500 acres producing row crops, hay, and pasture, and utilizes a three-year rotation of corn, soybean, and wheat. His nutrient use efficiency increased by 42% by using variable rate, and the increased nitrogen (N) efficiency in the field led to a 15% decrease in CO₂ equivalent GHG emissions from 2020 to 2021.



decrease in CO₂ equivalent GHG emissions from 2020 to 2021.

community investment

Today's youth are the leaders of tomorrow, and GROWMARK is committed to the education and development of those leaders. GROWMARK is a long-standing supporter of agricultural youth and young adult programs including 4-H, FFA, Agriculture in the Classroom, and other youth education programs through our partnerships with state Farm Bureaus. Additionally, GROWMARK awards thousands of dollars in scholarships to high school and college students pursuing careers.

The TFI Sustainability Report includes data from 26 companies and gathers data across the entire value chain, representing producers, retailers, wholesalers, and distributors. 12 of these companies manufacture fertilizer and account for 94 percent of total nitrogen, phosphate, and potash production capacity in the United States. Participating companies represent 28 percent of the U.S. fertilizer retail industry.

All quantitative data in this report represent TFI member-related products encompassing nitrogen, phosphate and potash materials produced in, imported to, or transported within the United States.

AdvanSix, Inc.	Harrells	OCI Global
American Plant Food Corp.	Helm Fertilizer Corporation	Rio Tinto
CALAMCO	ITAFOS	Tessengerlo Kerley Inc
CF Industries, Inc.	J.R. Simplot Company	The Andersons, Inc.
Coffeyville Resources	Koch Ag & Energy Solutions	The Mosaic Company
Compass Minerals	LSB Industries	Trademark Nitrogen
Dakota Gasification	MacroSource	Winfield Solutions
Dyno Nobel	Morrall Companies	Yara North America
GROWMARK	Nutrien	

Don't see your company listed? Contact Alice McKinnon at amckinnon@tfi.org to learn how to get involved.