Industry Position on Water Resilience

The Issue

Globally, approximately 70% of freshwater withdrawals are used for agriculture[1]. Producing food requires water: on average, it takes about 3,000 liters of water per person to produce our daily food, 1,500 liters of water from rainfall or irrigation for one kg of wheat and 2,500 liters for one kg of rice. The development of irrigation and water management technologies has significantly contributed to enhancing agricultural production over the past decades. At the same time, water withdrawals for irrigation have increased by more than 60% since the 1960s.

Water scarcity and water-related hazards (such as floods, droughts, and water quality) have been exacerbated as rising temperatures disrupt precipitation patterns and the entire water cycle. This has put agricultural systems, both rainfed and irrigated, under growing pressure, with multiple consequences for food security, farmers' livelihoods and the economic development of entire regions.

Hence, water management strategies and practices must adapt to support sustainable agriculture. Fertilizer management has a meaningful role in agricultural water optimization strategies.

Position / Key Messages

The fertilizer industry recognizes that water security and food security are interconnected.

The industry advocates for the efficient use of fertilizers and water resources with appropriate integrated, synchronized management systems that contribute to reduce the water footprint of food crops, and increase economic well-being, environmental protection and climate mitigation and adaptation.

The industry implements water reduction and recycling strategies on their production sites, in mining and throughout their operations.

Increasing Water Efficiency and Resilience in the Field

The fertilizer industry recognizes the relation of water resource management with ecosystems, biodiversity, energy, climate change, food security and nutrition. Improving access to water for agriculture and empowering farmers to use water more efficiently are also determining factors for poverty reduction.

When increasing water efficiency and resilience, the fertilizer industry supports an **integrated approach** that considers soil health, nutrient use, plant varieties, crop protection systems, and land management tools and practices.

Water and nutrient management are intimately linked: Water is critical to improving the plant's ability to use nutrients, and nutrients can importantly help the plant regulate its use of water. Water Use Efficiency (WUE) is defined as the amount of carbon assimilated as biomass or grain produced per unit of water used by the plant.[1]

[1] Gleick, P.H et al. (2014). The World's Water: The Biennial Report on Freshwater Resources. Washington, DC: Island Press). Cited in Our World in Data: https://ourworldindata.org/water-use-stress

Nutrient and Water Use Efficiency management strategies should be synchronized for an optimized use of both resources: Nutrient-deficient crops can only absorb about 10 – 15 % of the total rainfall. Fertilizers help the plant absorb better water by increasing its root depth and density and ability to access deeper soil moisture levels.

The implementation of Nutrient Use Efficiency strategies (defined as the proportion of nutrients from all sources that are absorbed by the crop) through the 4R principles (applying the right source, dose and amount and the right time) has not only proven to increase yields, but the uptake of water by the plant.

The industry therefore recommends that **Water Use Efficiency and nutrient management be addressed jointly** through the following policy frameworks, technologies and practices:

- Systematic inclusion of Nutrient Use Efficiency (NUE) into agricultural water policies and capacity building programs. National water management programs, combined with NUE goals, contribute to sustainable intensification and can be part of an incentive program for climate mitigation and adaptation.
- Fertigation (adding fertilizers to irrigation systems) maximizes the synergies between these two inputs by ensuring a sufficient and timely water supply to the crops. In particular, micro-and drip irrigation delivers water directly to the plant root zones, thereby reducing evaporations and run-offs. Micro – and drip irrigation have proven to achieve up to 95% water efficiency and contribute to consistent soil moisture levels in regions with unstable rainfall.
- The use and re-use of safe wastewater.
- Precision farming to ensure better fertilizer management practices and tailored use.
- Conservation agriculture and soil moisture management to prevent erosion and aid water absorption.
- Rainwater harvesting, though the building of small dams or ponds.
- When and where feasible and necessary, the stepwise substitution of vulnerable commodity crops with climate-compatible salt and drought-tolerant crops.

The industry recognizes the **potential of** the **re-use and recycling of wastewater**:
As climate change progresses and water stress increases, governments, NGOs and the private sector should focus on facilitating technical developments to optimize the use of recycled city sewage water and the desalination processes of seawater. This ensures that the local agricultural and horticultural sector benefits from good water quality for its cereals, fruits, and vegetables.

Prioritizing Water Management Strategies on Fertilizer Production Sites

Recognizing that water use efficiency should happen across all sectors, fertilizer companies have made water management an essential part of their sustainability commitments.

Whether operating in water-stressed regions or regions where freshwater withdrawals for industrial uses remain high[2], many fertilizer-producing companies are setting ambitious targets to reduce their water consumption and implementing water reuse and recycling strategies. Among them are:

- closed-loops water systems that have allowed for processed and excess water to re-enter the production processes,

[2] Many countries across the Americas, Europe, and East Asia & Pacific regions use more than one billion m^3 for industrial uses per year, source: https://ourworldindata.org/water-use-stress

- the treatment of wastewater and sewage through new technologies and equipment, thus reducing reliance on freshwater.

In recent years, environmental reporting has demonstrated impressive results across the industry, with some companies achieving 0% of freshwater withdrawals from water-stressed areas or others operating with 87% recycled water. (Source: IFA Environmental Benchmark)