

#H2OffThePress

The Green Fertilizers case



July 2023

*Why does green hydrogen
make sense for
decarbonising
the food value chain?*



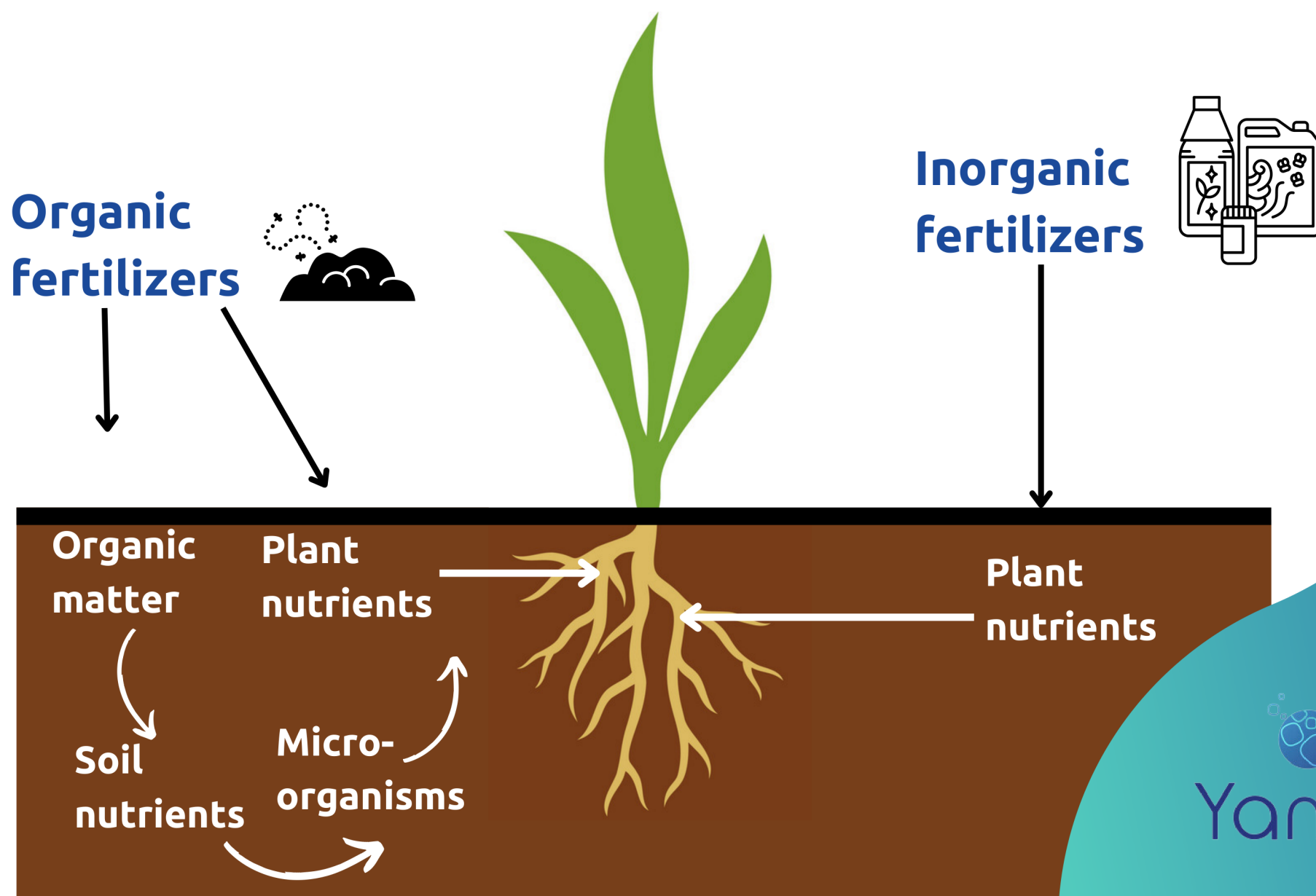
Yamna

A critical product for food security



Fertilizers are key to achieving food security via

- **Bettering** crop quality
- **Increasing** the crop production
- **Maintaining** the soil nutrition balance



A fossil-fuel linked industry ...

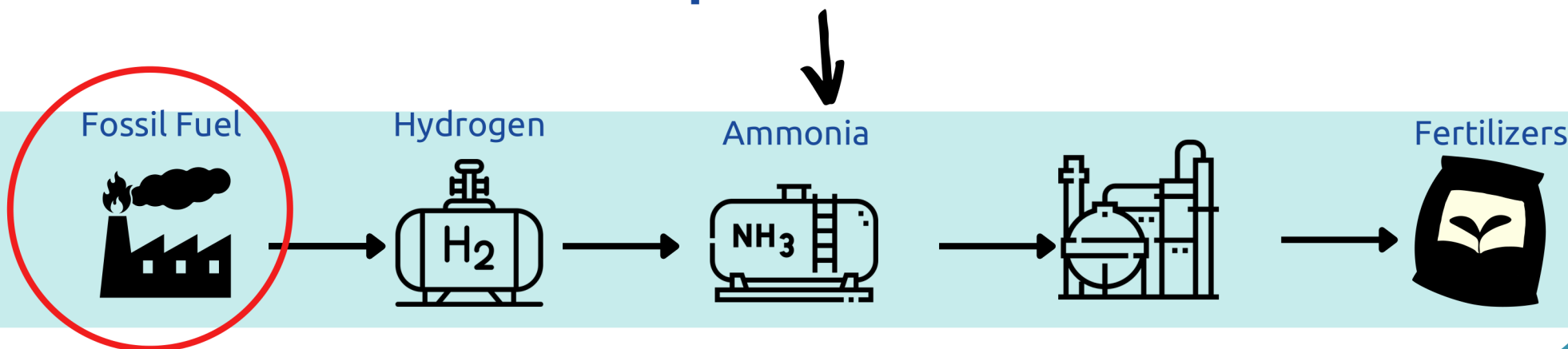


→ Among inorganic fertilizers, Nitrogen-based (or '**N based**') fertilizers dominate the market



→ **The problem?**

Currently, the primary feedstock for N based fertilizer is **Ammonia produced via fossil fuels**

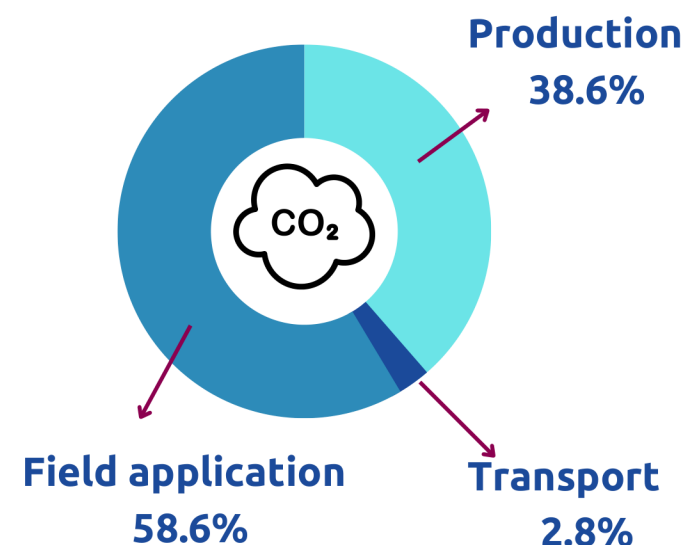


... which brings a dual problem



✓ The CO₂ problem

→ Synthetic N-fertilizer:
10.6% of agricultural emissions
(≈ 2% of world GHG)



✓ The Price problem

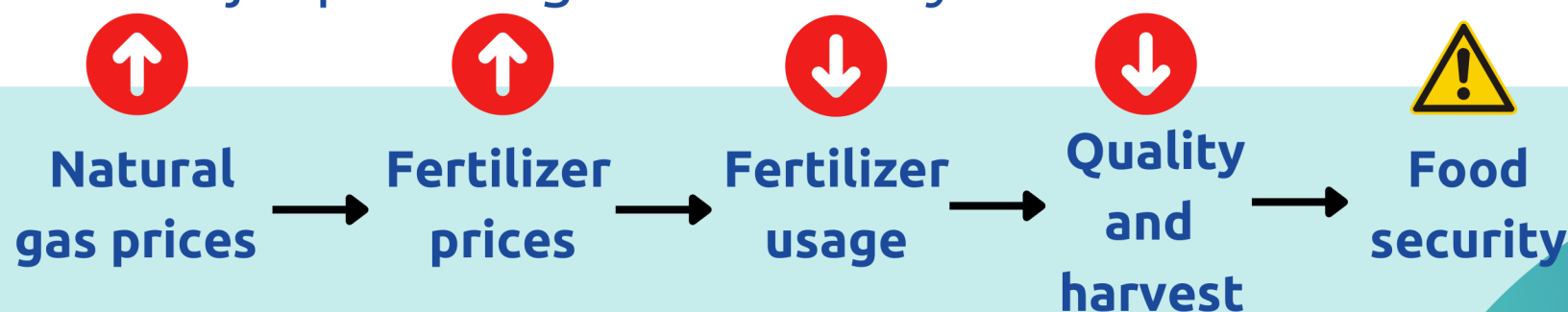
→ Fertilizers price heavily linked to highly-variable fossil fuel prices

2022 Ammonia Price Trend

Europe 270% ↑

Middle East and India 140% ↑

→ Thus jeopardizing food security...



Case Study

Sub-Saharan Africa



- **90%** of the fertilizers are imported even though **23%** of the **Sub-Saharan Africa** (SSA) economy depends on agriculture
- Such heavy import reliance leads to ...

1. A very low fertilizer usage



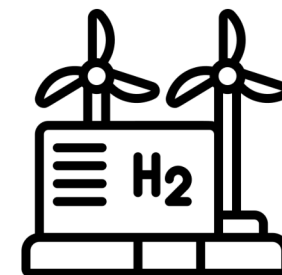
2. High price fluctuations

Sub-Saharan Africa (2022) **+60 to +115%** ↑

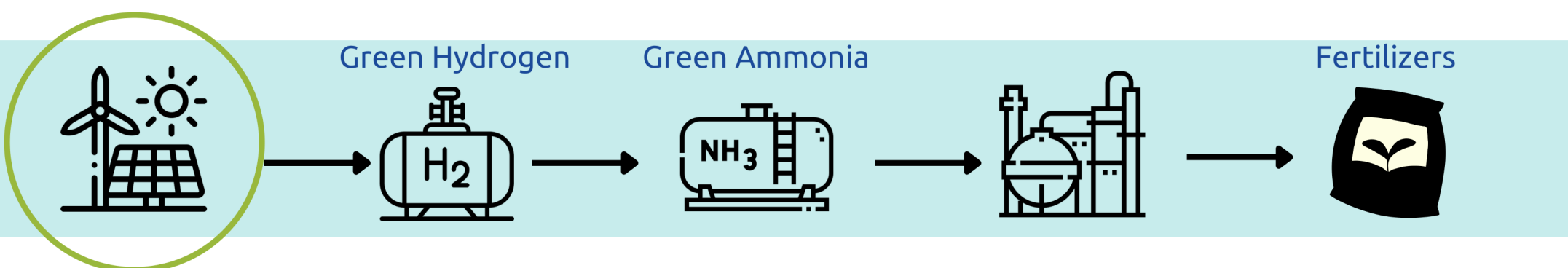
3. Reduction in crop harvest

Kenya (2022) **-12%** ↓ Ethiopia (2022) **-21%** ↓

The role of Green Hydrogen



Green hydrogen replaces natural gas in the production of ammonia



→ Green hydrogen can decarbonize the most prominent fertilizers at different levels

	Fertilizer Type	Decarbonising potential	Other feedstock to be decarbonised to reach net zero
Green Hydrogen	Urea		CO ₂
	Ammonium phosphates (DAP/MAP)		Phosphate
	Nitrates (AN/CAN)		n.a.

A necessary move for food security ...



Green Fertilizers come with several positive impacts

- ✓ **Emission reductions:** Sustainable procurement of feedstock along with green ammonia reduces the *GHG footprint* of N- based fertilizers
- ✓ **Sovereignty:** Regions with *abundant renewable energy* can become green fertilizer producers and cut imports and possibly **market leaders**
Examples: *Middle-East & Africa*
- ✓ **Reliability:** Becoming self sufficient also means less volatile prices, correlating to higher fertilizer usage and *enhanced food security*



... but not the complete picture



The path to Net Zero also includes other routes

- **Enhanced fertilizer efficiency:** Increased usage of *nitrification inhibitors* and expanded adoption of *slow release and controlled fertilizers*
- **Efficient fertilizer application practices:** Following the *4R principle* along with *preventing overapplication* and *improved fertilization practices*

The adoption of these '**non-capex intensive**' steps, coupled with the **uptake of green fertilizers projects** are necessary to make the fertilizer industry a truly **green and sustainable market**