

# Fertilizer *facts*

## Nitrogen use efficiency in different parts of the world

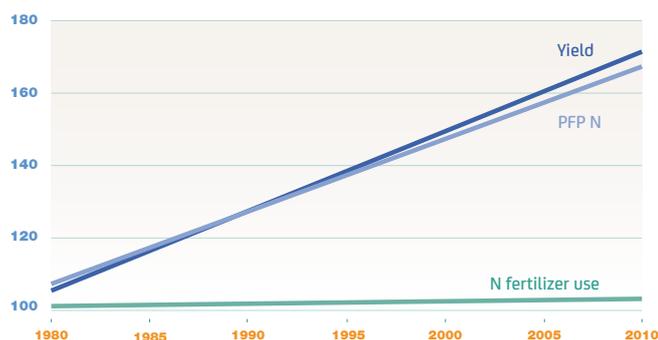
**N**itrogen Use Efficiency (NUE) is an expression of the efficiency of uptake by crops of the applied nitrogen (N) fertilizer in a crop production system. Improving NUE optimizes farming productivity and profitability and reduces risks of nutrient losses to the environment and associated impacts on the air, water and soils.

**NUE can be measured by Partial Factor Productivity (PFP) ( $\text{kg harvested product} / \text{kg N applied}$ ) and output / input ratio ( $\text{kg N in harvested product} / \text{kg N applied}$ ) among other indicators.**

NUE trends vary widely between regions and countries because of the diversity of soils, crops, climate, farmers' access to technology and knowledge, and policy priorities. For sound interpretation, it is important that any monitoring of NUE be combined with complementary indicators of nutrient effectiveness such as crop yield and soil nutrient levels.

### USA

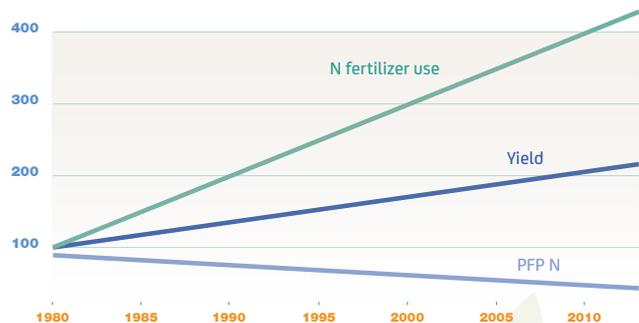
In the USA, NUE (expressed as PFP for fertilizer-N applied to maize) has undergone steady improvement over the past three decades, driven by the adoption of fertilizer best management practices. Similar trends are observed in other developed countries, for instance for wheat in West Europe and rice in Japan.



Evolution of maize yield, N fertilizer use and PFP for fertilizer-N applied to maize in the USA (1980 = 100)

### India

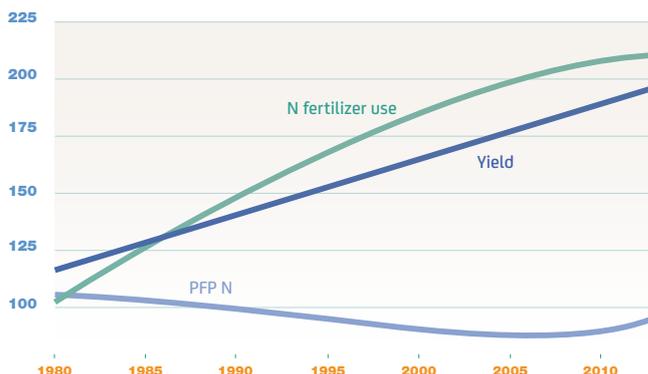
In India, N fertilizer applications to cereals are increasing faster than cereal yields, resulting in declining NUE. This trend can be explained by a fertilizer subsidy regime that has contributed to unbalanced and inefficient fertilizer use.



Evolution of cereal yield, N fertilizer use and PFP for fertilizer-N applied to cereals in India (1980 = 100)

### China

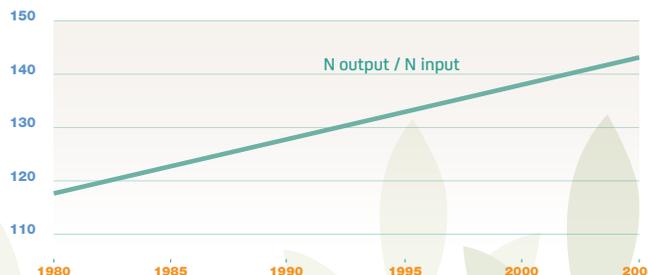
In China, N fertilizer consumption has been increasing faster than cereal yield gains, due to the government's national objective of achieving self-sufficiency in grains. With the government's new focus on resource efficiency, NUE has improved in recent years.



Evolution of cereal yield, N fertilizer use and PFP for fertilizer-N applied to cereals in China (1980 = 100)

### Sub-Saharan Africa

In Sub-Saharan Africa, farmers use less than 10 kg of nutrients per hectare, less than one tenth of the world average, which results in greater amounts of nitrogen being taken up by crops than what is being applied in the fields, causing widespread soil nutrient depletion, land degradation and low agricultural productivity.



NUE trends (all crops) in Sub-Saharan Africa expressed as output/input ratio (%)

