

# **Climate Robust Soil fertility management by smallholders in Africa, Asia, and Latin America**

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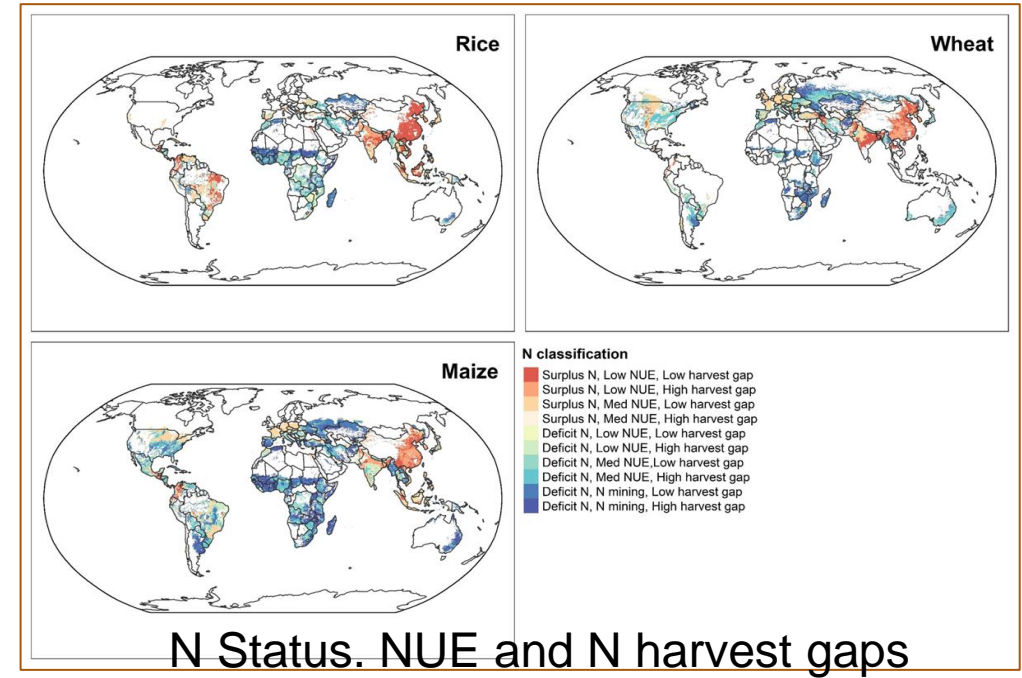
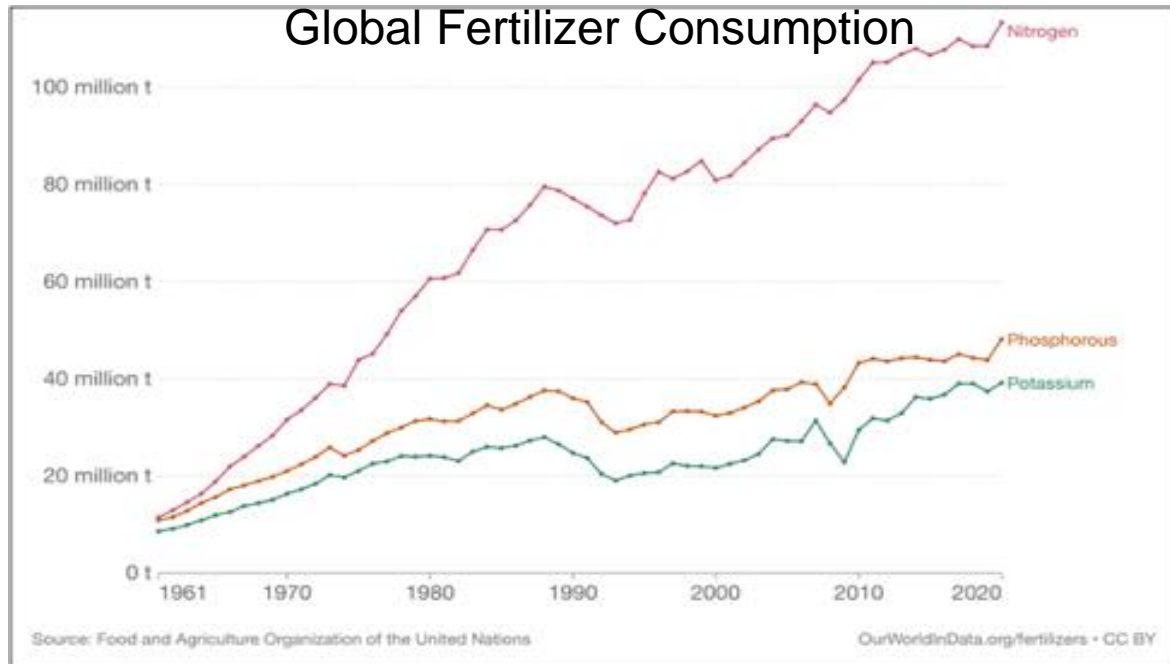
**on behalf of all partners**

**International Maize and Wheat Improvement Center (CIMMYT)**

**AIM for Climate Summit**

**May 8-10, 2023**

# Why Smart Fertility Management?



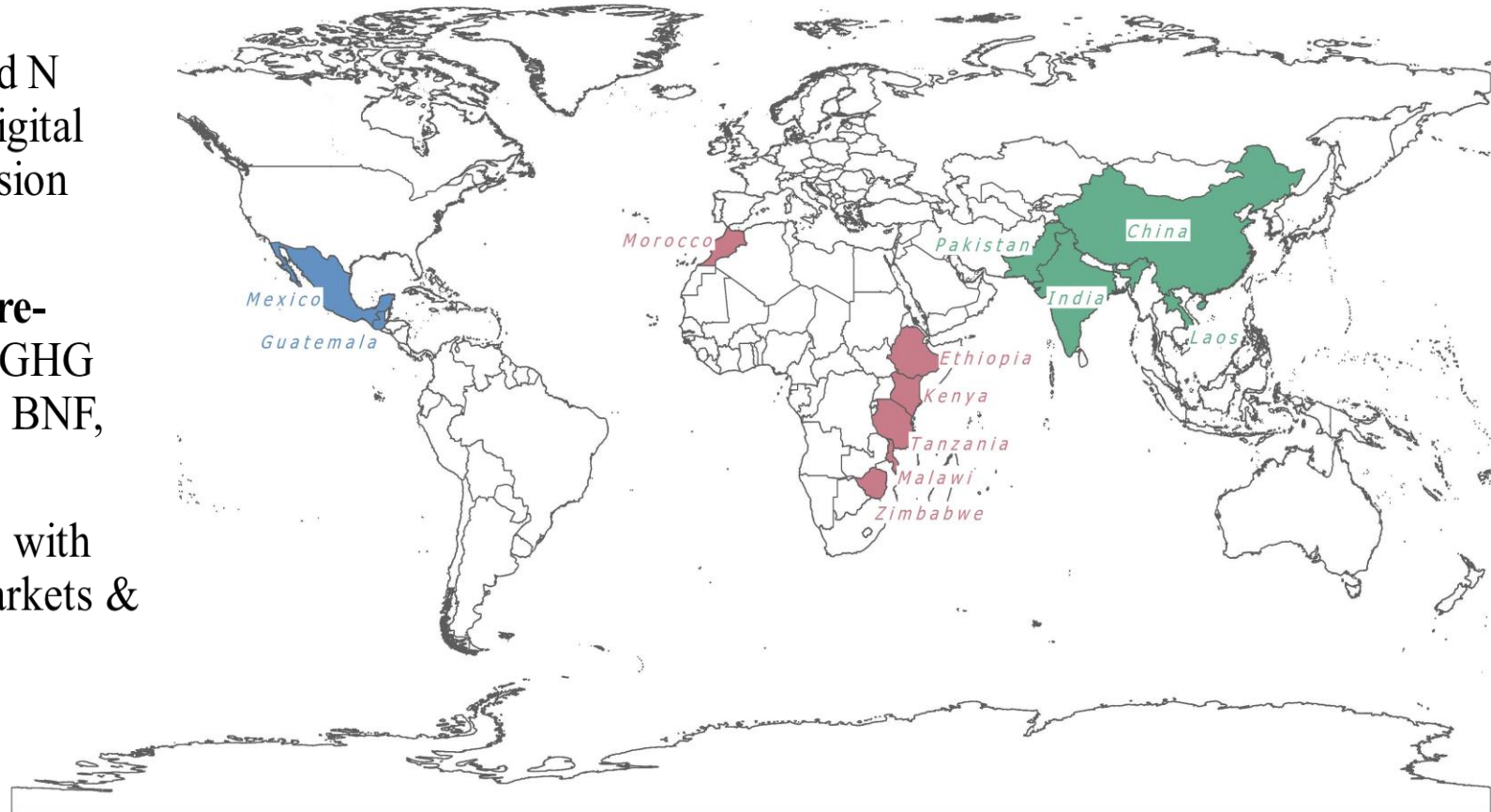
- Rapidly increasing inorganic fertilizer (N increased by 400% in last 60 yrs)
- Inequality is the core of the problem
- Nutrient mgmt. challenges: surplus, inefficiencies as well as mining
- Need targeted nutrient management strategies



# CIMMYT-led AIM for Climate Sprint on Fertilizer Management

Implement and scale-up range of climate robust nutrient management strategies in 12 countries to reach millions of smallholder farmers

- **Increasing the uptake** of tried and tested N management practices (e.g. living lab, digital extensions, citizen science, ICT and decision support systems)
- **Continuous R4D on cutting-edge nature-based solutions** for Managing N, C and GHG simultaneously for net zero farming (e.g. BNF, BNI, ISFM)
- **Market and Policy:** Connecting farmers with Carbon credit and ecosystem services markets & repurposing subsidies

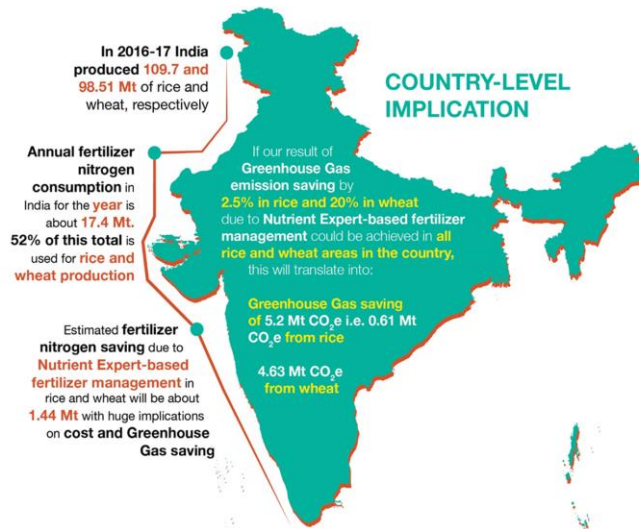


# Some Examples of our NM Strategies

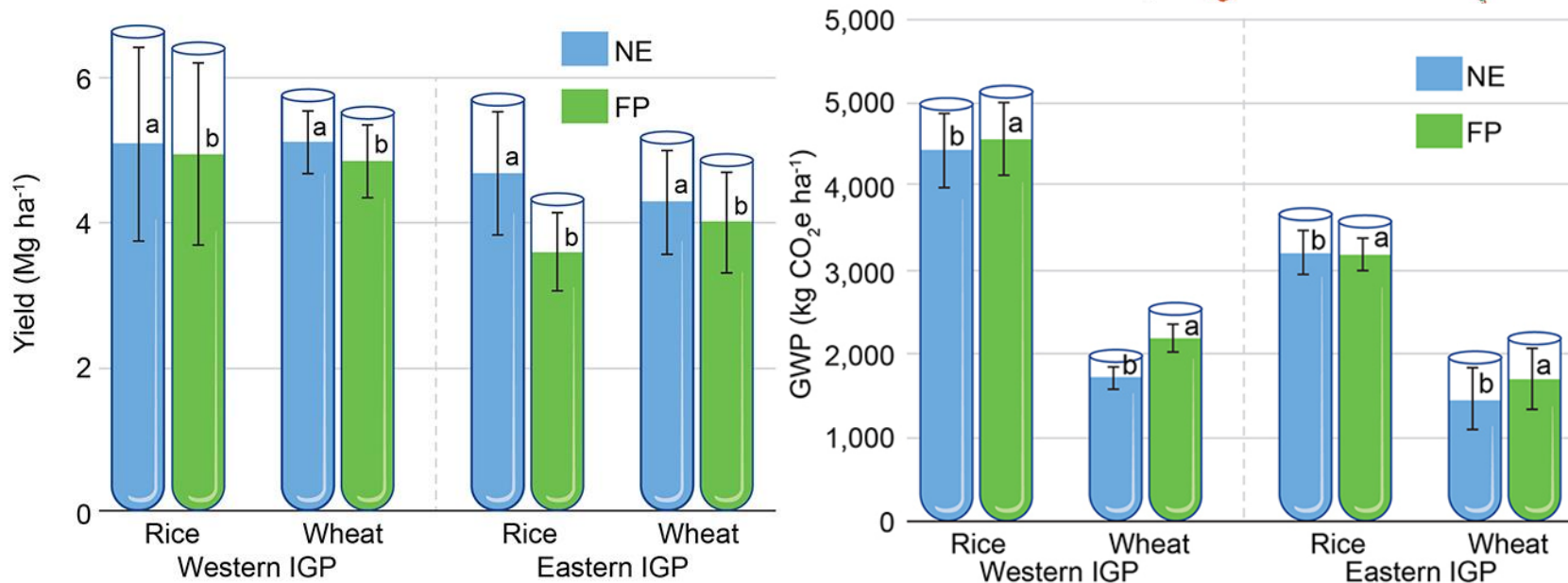
- Precision nutrient management (4Rs, SSNM)
- Decision support systems (Nutrient Experts, Crop Manager etc)
- In-season N management (e.g using sensors in hand, drone etc)
- Nitrification inhibitors (chemical and biological)
- Low Emission fertilizer including slow/controlled release fertilizers
- Biological sources of N (legumes, biofertilizers and genetic engineering)
- Organic inorganic integration
- Using high N-containing fertilizer
- Repurposing public subsidies
  
- 6000 ha under drone-captured NDVI based NM
- 3000 ha for responsible sourcing



# Impact of Nutrient Expert: Evidence from India



NE adoption in Indian RW systems provides 14 Mt extra grain with 5.34 Mt less CO<sub>2</sub> Emission (eq 1.2 M passenger car)



# Conclusion

- Fertilizers play a significant role to address both **food security and climate crisis**
- **Inequality is the core** of the problem in fertilizer management: some regions apply more than required amount contaminating aquatic, terrestrial, and atmospheric systems whereas in some regions fertilizer application is insufficient for plant needs leading to low yield and soil mining
- **Fertilizer saving high application areas and shifting it to deficient areas:** increase global crop yield by 30% while reducing N<sub>2</sub>O emission
- **Targeted nutrient management challenges:** Surplus, inefficiencies, or deficit is key to addressing food security climate crisis

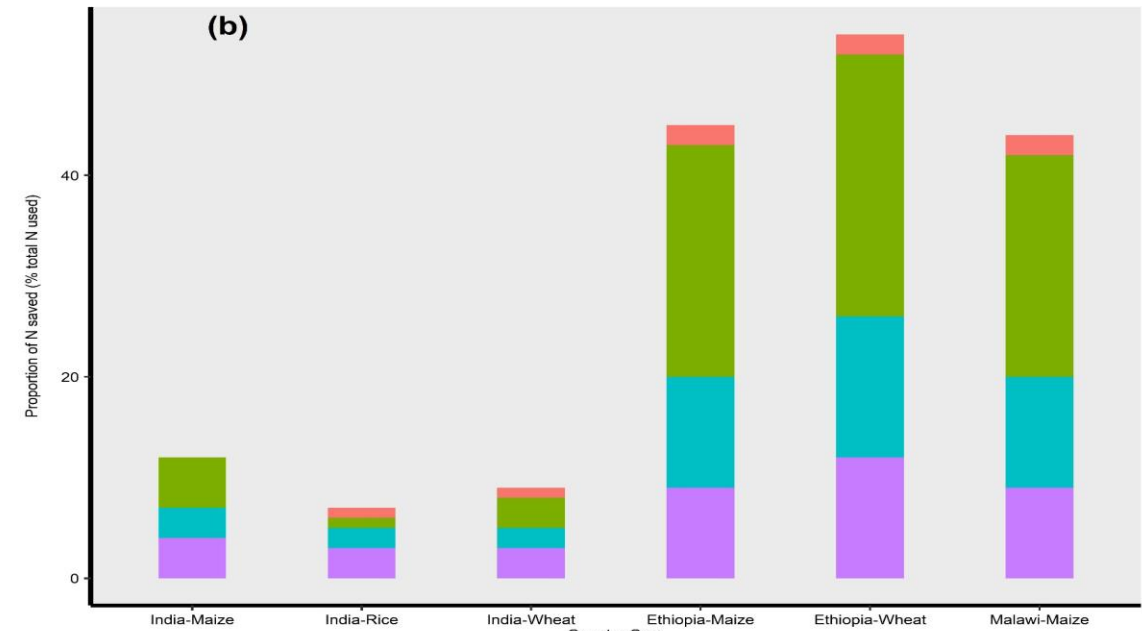
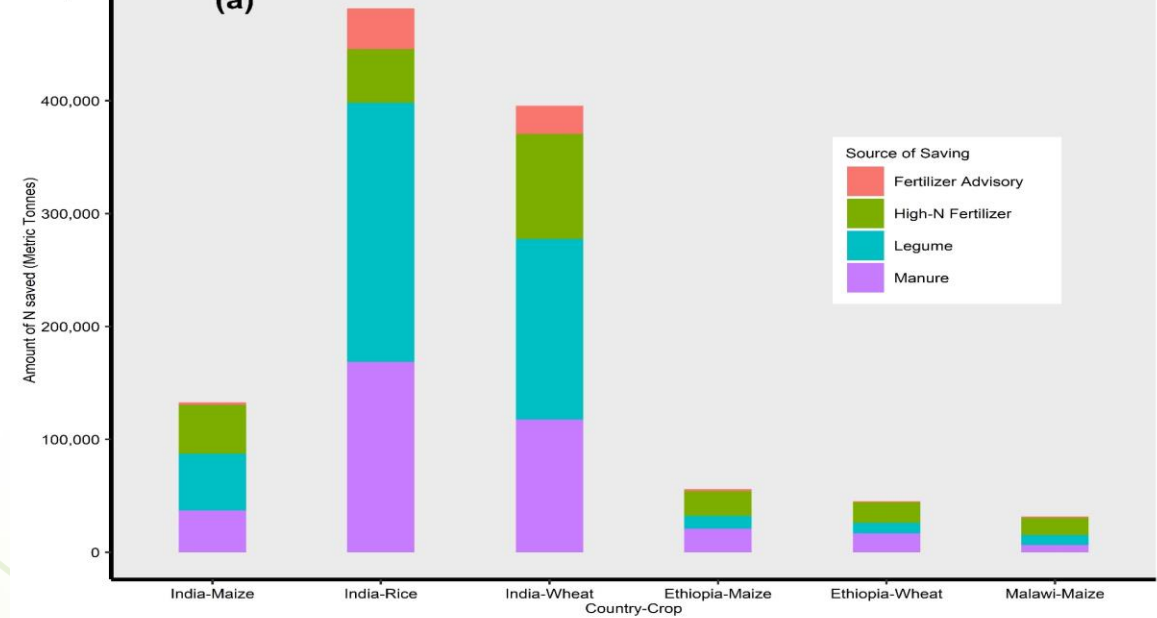


# Differentiated Strategies based on nutrient management challenges

**N-deficient/low-yield systems:** Supply of high-N fertilizer

**High-yield systems:** balanced fertilization

**Shifting N from high application fields to N-deficient fields:** increase global crop yield by 30% while reducing N<sub>2</sub>O emission (Breakthrough agenda report, 2022)



Snapp et al., 2023 (Nat Sus, in Press)