Geopolitics of Global Fertilizer Supply Chains: Implications of the War in Ukraine

Research Institute for Sustainability Potsdam Webinar

Charlotte Hebebrand
International Food Policy Research Institute (IFPRI)
Communications & Public Affairs

4 October, 2023

Latest Crisis Raises Longstanding Concerns

- Vulnerability of fertilizer sector to price shocks
- Vulnerability of LMICs to fertilizer price shocks
- Need to build greater resilience to shocks

- CGIAR Research Agenda on Plant Nutrition & Soil Health

IFPRI

CGIAR

Fertilizer Sector inherently susceptible to shocks

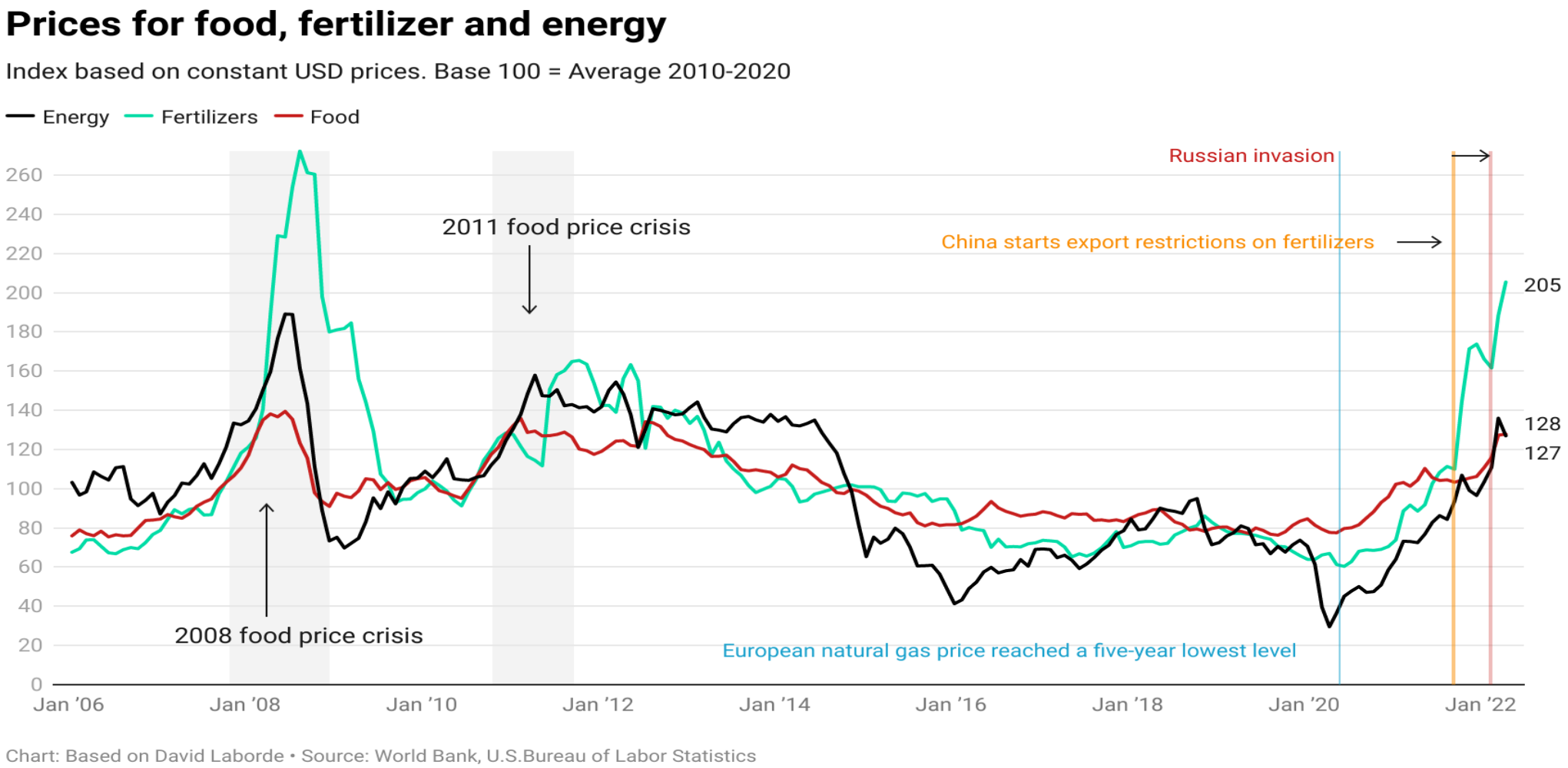


Chart: Based on David Laborde • Source: World Bank, U.S.Bureau of Labor Statistics

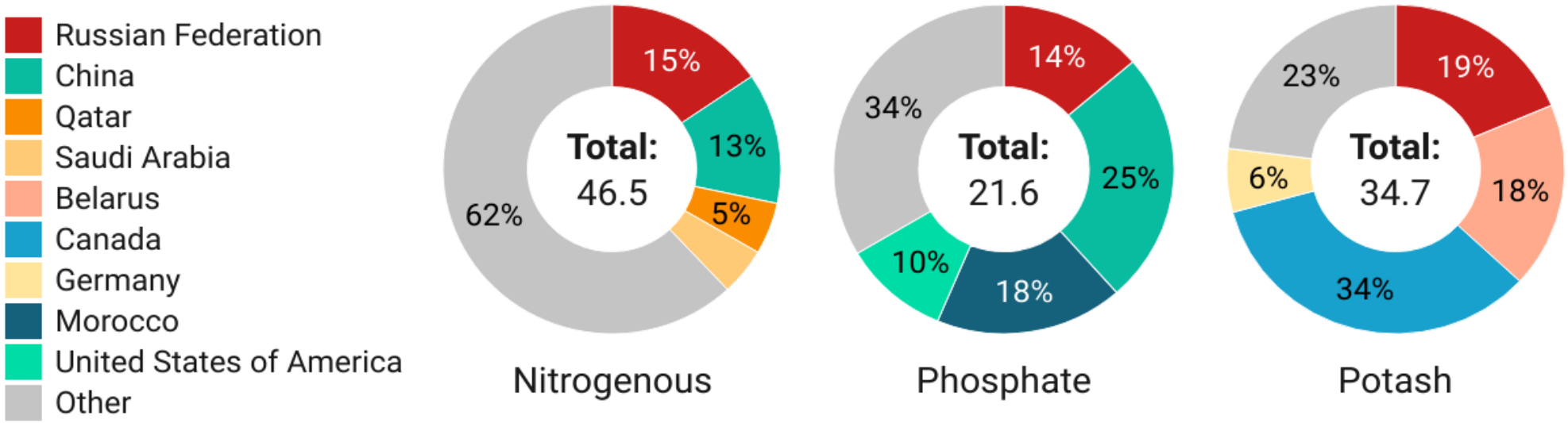
IFPRI

CGIAR

Few suppliers dominate production and trade, esp for P&K

Global markets of fertilizers in 2019

Market shares of main exporters and total amount of traded nutrients in metric tons.



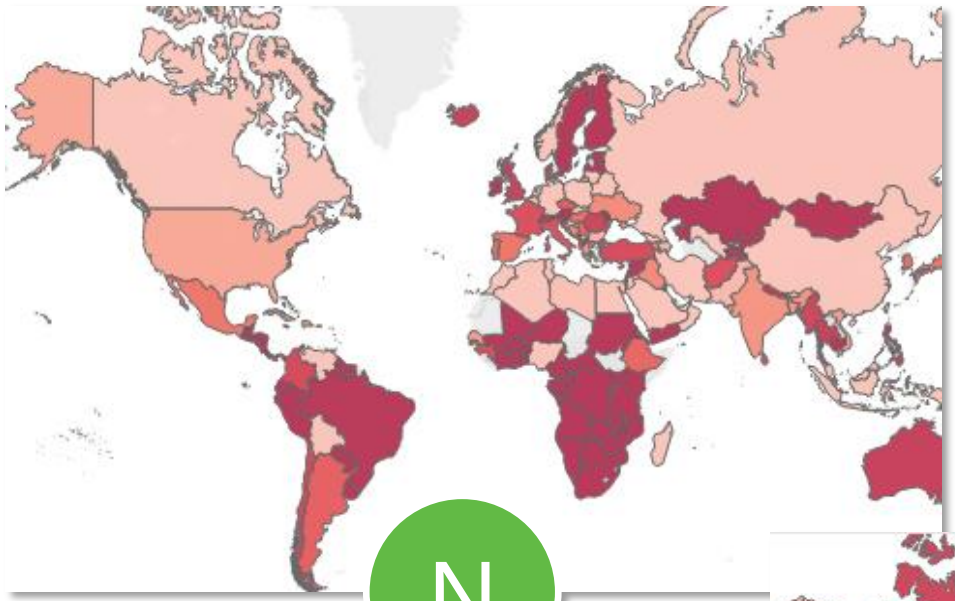
Global production of N is estimated at 123 mio MT, of P2O5 44 mio MT, and of K2O 44 mio MT.

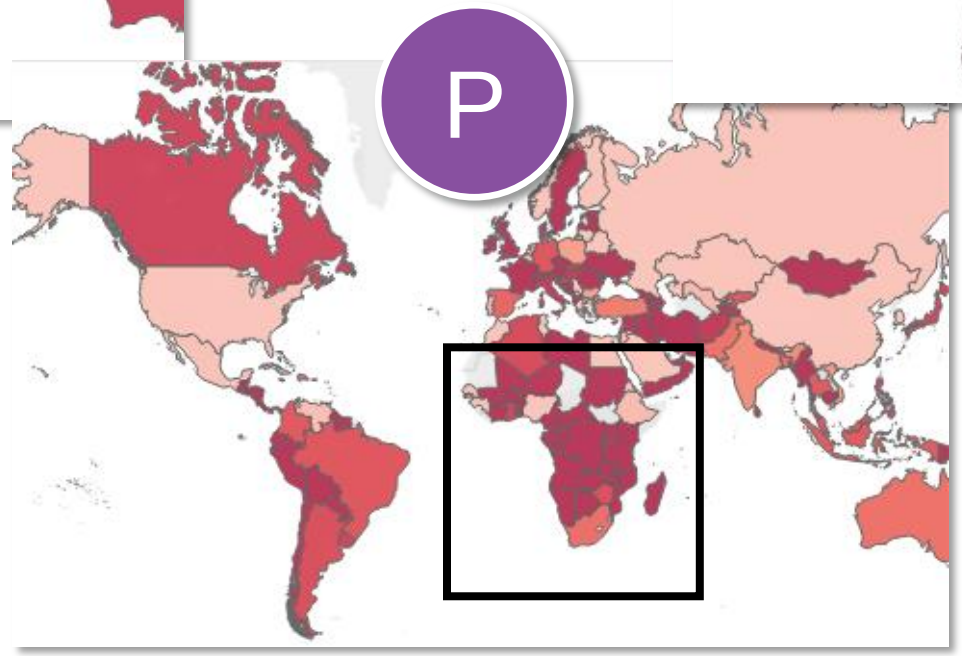
Chart: David Laborde • Source: FAOSTAT

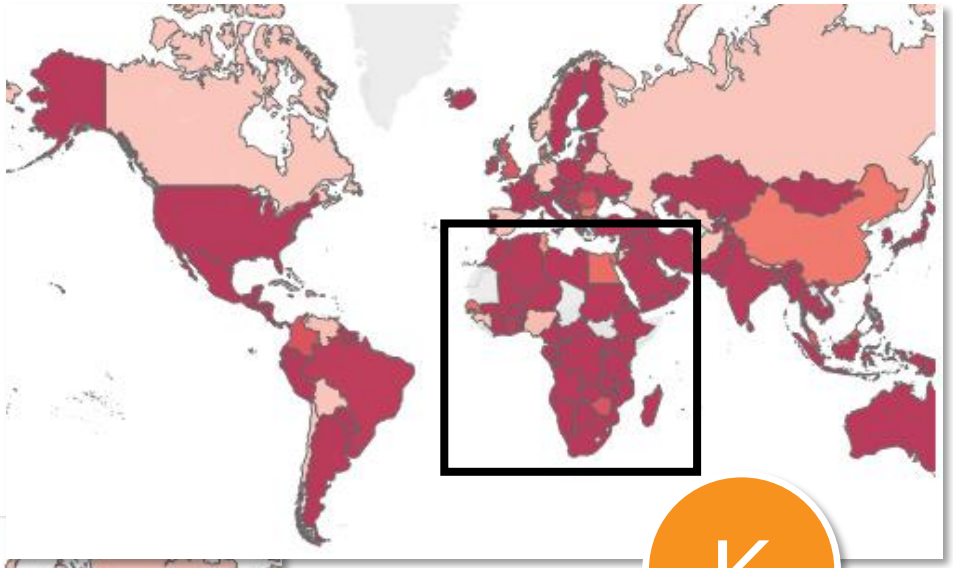
IFPRI

CGIAR

High import dependence (Imports / Agricultural use ratio)

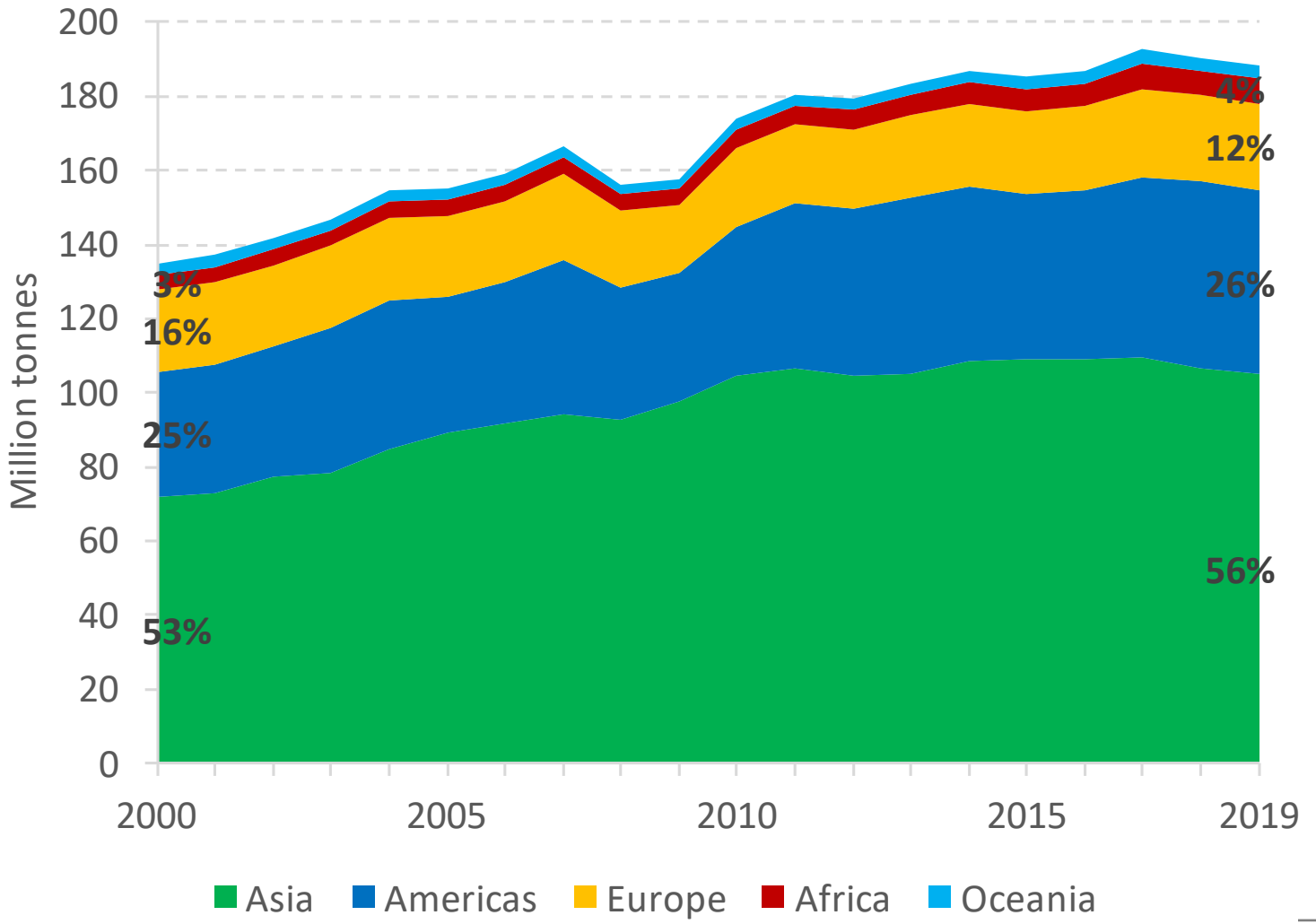






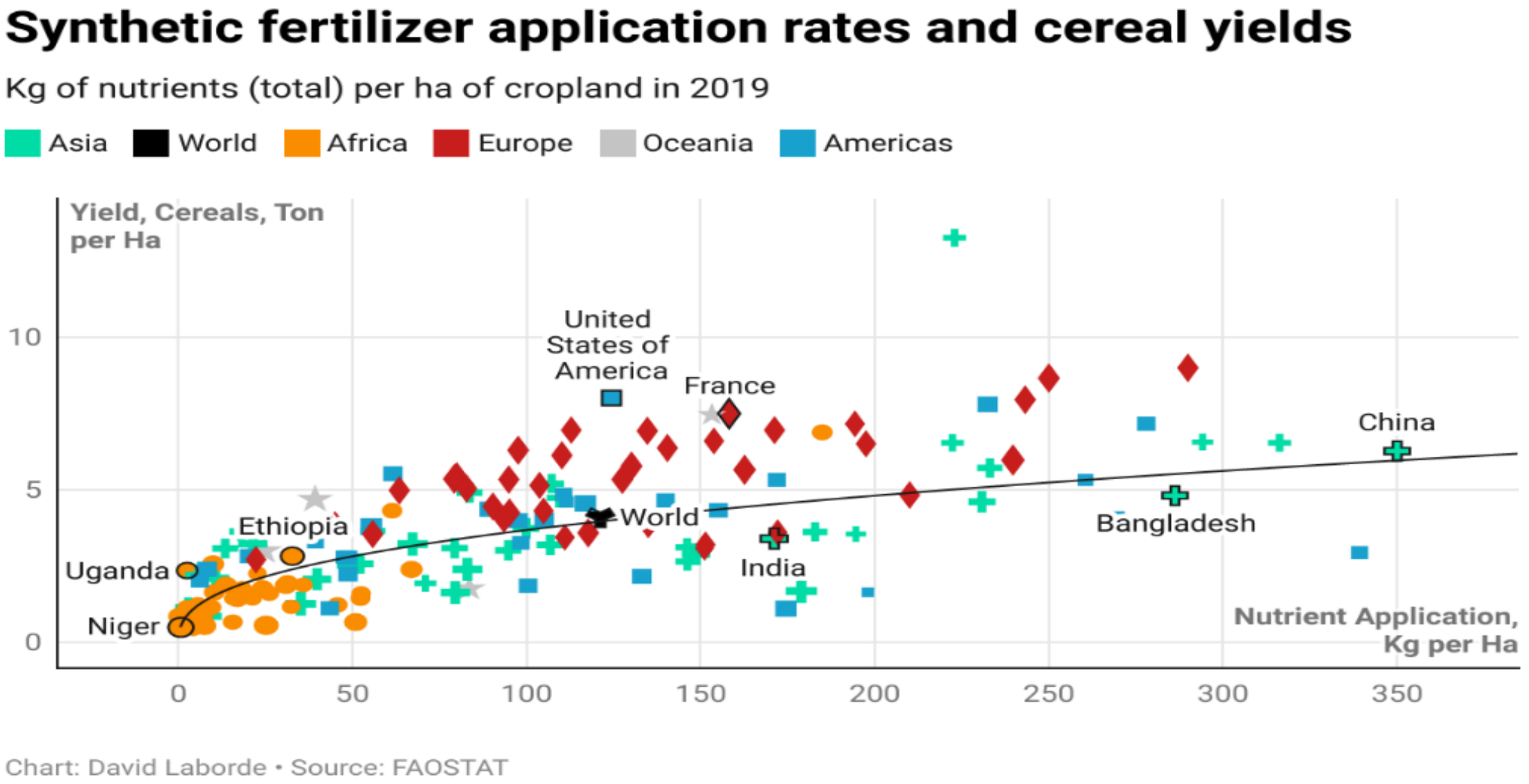
Based on FAOSTAT, IFA

N,P,K Use by Region



Based on FAOSTAT

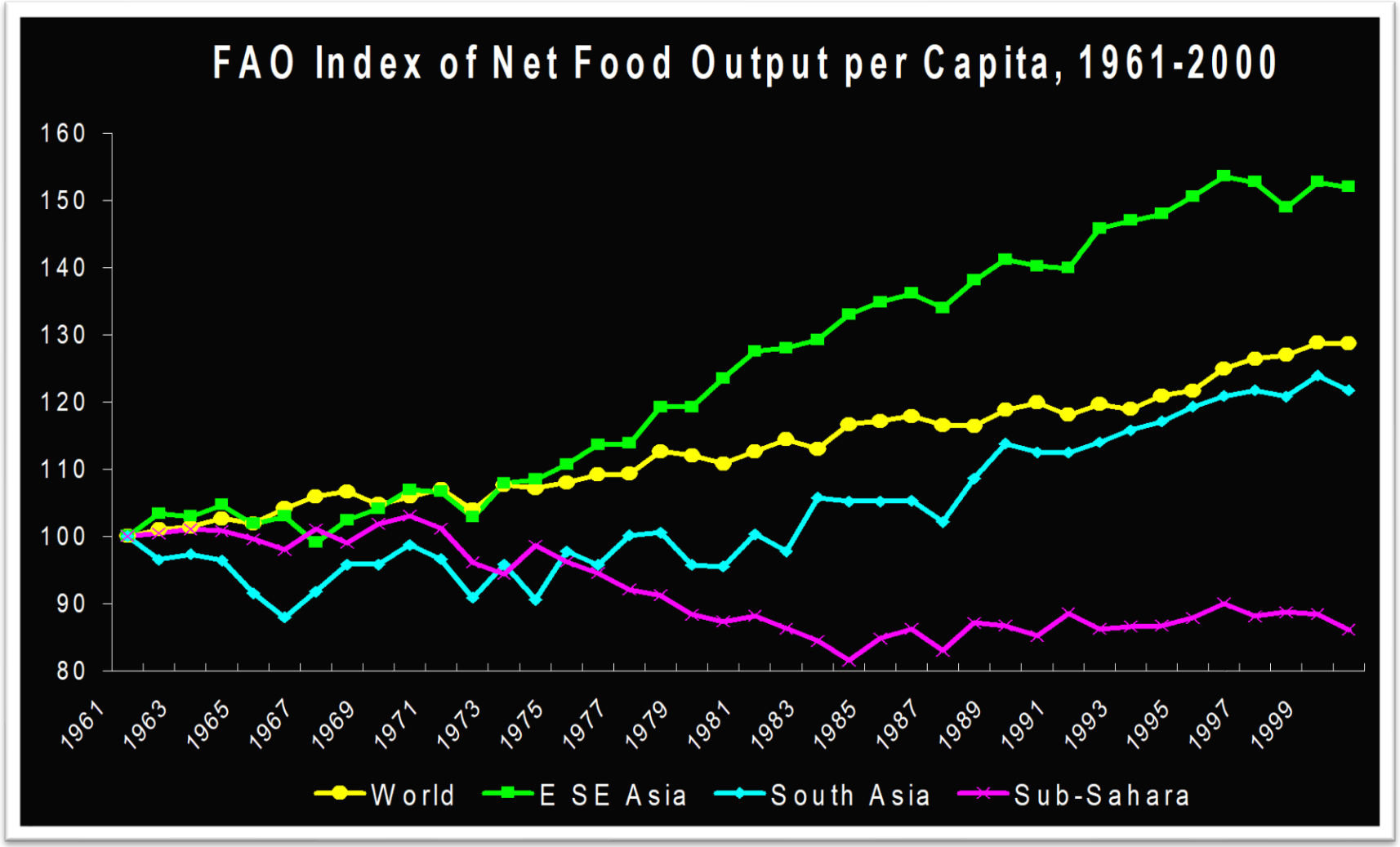
Low Fertilizer Application Rates and Yields



IFPRI

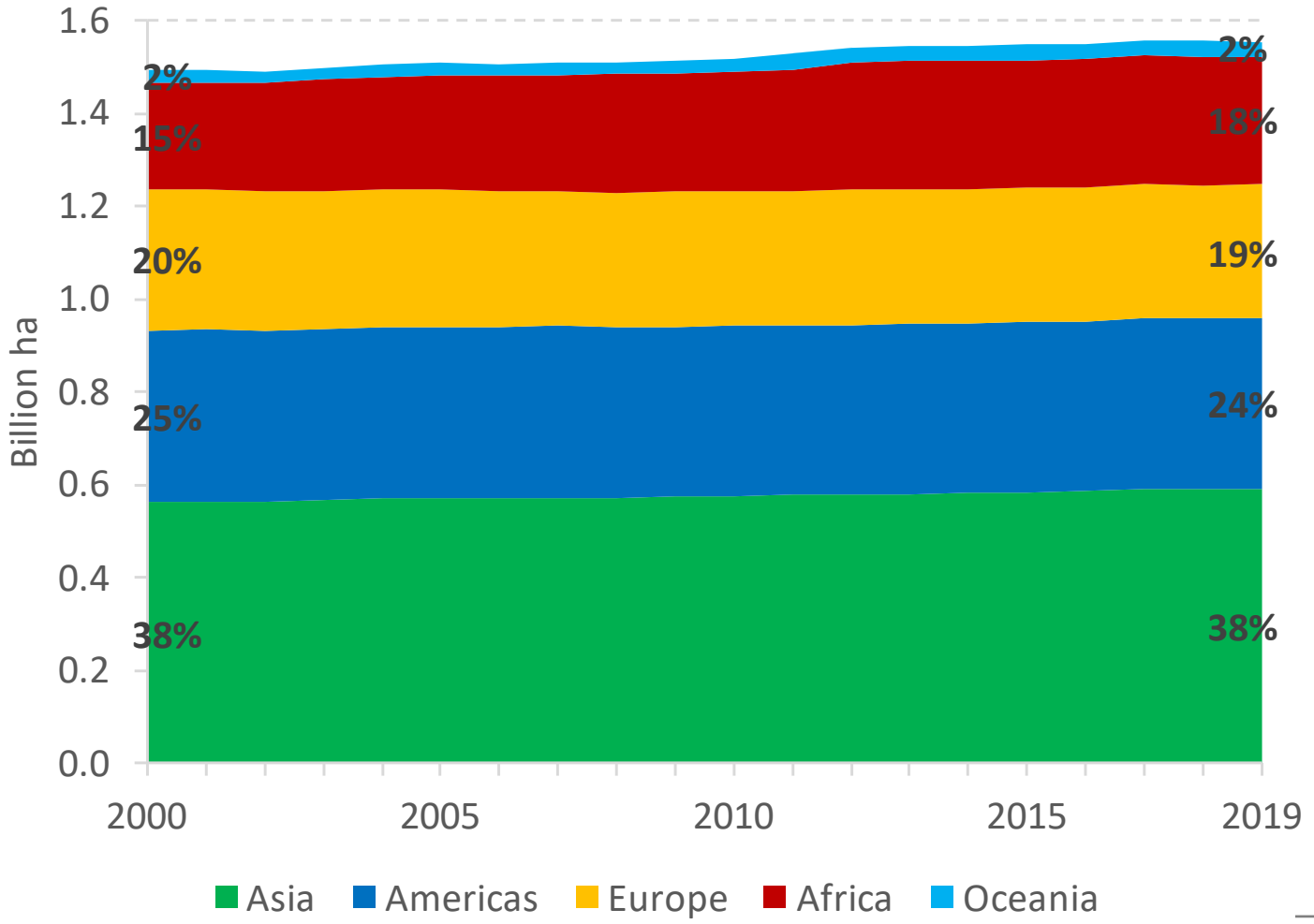
CGIAR

FAO Index of Net Food Output per Capita, 1961-2000



Based on FAOSTAT

Cropland Area by Region



Based on FAOSTAT

Building Resilience to Shocks

- Diversify Fertilizer Production
- Diversify Imports
- Profitable agricultural systems and functioning markets
- Enhanced access to Finance (distribution, SMEs, farmers)
- Address other bottlenecks which lead to higher prices
- Scale up extension & knowledge transfer
- Trade Disciplines / Export Restrictions
- Alternative Products (microbial, recycled, breeding, green ammonia…)

IFPRI

CGIAR

CGIAR Research Agenda

- CGIAR Research on National Policies and Strategies (led by IFPRI)
- CGIAR Research Initiative Excellence in Agronomy (led by IITA)
- CGIAR chapter on agriculture in Breakthrough Agenda Report

(IEA, IRENA, UN CC High Level Champions):

- Chemical fertilisers play a critical role in ensuring agricultural production and food security.

- Both over-fertilisation and under-fertilisation across global croplands have resulted in numerous environmental issues, including climate change and soil degradation.

- Various technologies can be adopted (during both the production process and the field application of fertilisers) to sustainably increase agriculture production and income, build resilience to climate change and safeguard natural resources while reducing GHG emissions.

- There is a need for greater funding, enhanced global collaboration and partnerships for knowledge generation and exchange, improved data infrastructure, standardisation of market regulations/standards and redirection of subsidies towards these low-emission technologies.

IFPRI

CGIAR

Reducing Emissions from Fertilisers

- Technologies that reduce emissions from fertilisers while maintaining positive productivity include slow-release fertiliser, chemical and biological inhibitors and coated fertilisers; precision nutrient management such as sensor-based fertiliser management, and use of decision support systems for fertiliser recommendations.
- The production of alternative fertiliser has not yet achieved significant scale, meaning that economic viability versus conventional fertiliser is likely to remain an issue until increased uptake drives costs down.
- The same type of early-stage public finance that has supported demonstration projects, or technical assistance for policy reforms for alternative energy technologies, could be used to support the market development and deployment of alternative fertilisers.

IFPRI

CGIAR

Pathway 1: Reduce unsustainable consumption where such consumption has harmful effects on health, climate, and the environment

- Reduce *fertiliser* use by improving NUE in high use areas
- Reduce unsustainable intake of ASF in HIC contexts by partial replacement with *alternative proteins*
- Reduce *food waste*
- Use *digital services* to aid all of above
- Promote sustainable healthy diets with low carbon footprint

Pathway 2: Increase production of sustainable, healthy and nutritious food, particularly in LMICs, without expanding agriculture into new lands

- Increase production through optimal application of low emissions *fertilisers* in areas of underuse
- Increase production through *crop breeding* in areas of low productivity
- Increase production through climate-smart *livestock* practices and *agroecological* and other sustainable approaches
- Use *digital services* to aid all of above

Pathway 3: Reduce damage to natural resources such as soil, water, and biodiversity

- Improve NUE of *fertilisers* allowing less pollutants to leach into water bodies
- Adopt low external input *agroecological and other sustainable approaches*
- Reduce *food waste and loss*
- Use *digital services* to aid all of above
- Improve agricultural water management

Pathway 4: Reduce emissions, either absolute emissions or emissions intensity with the ultimate aim of reducing absolute emissions

- Improve NUE and adoption of low emissions *fertilisers*
- Reduce methane emissions from *livestock* sector; and promote adoption of *alternative proteins*
- Reduce *food waste and loss*
- Use *digital services* to aid all of above
- Reduce methane emissions from rice paddy

Pathway 5: Prioritise the needs and interests of smallholder producers

- *Digital services*, e.g. climate advisory and indexed based insurance for smallholder producers
- Increase productivity and incomes through *crop and livestock breeding* for smallholder farmers
- Improve resilience of small holder production systems by adoption of *agroecological* and other sustainable approaches
- Invest in social safety nets for smallholder producers

IFPRI

CGIAR