Genetic resources for enriching diets and improving nutrition

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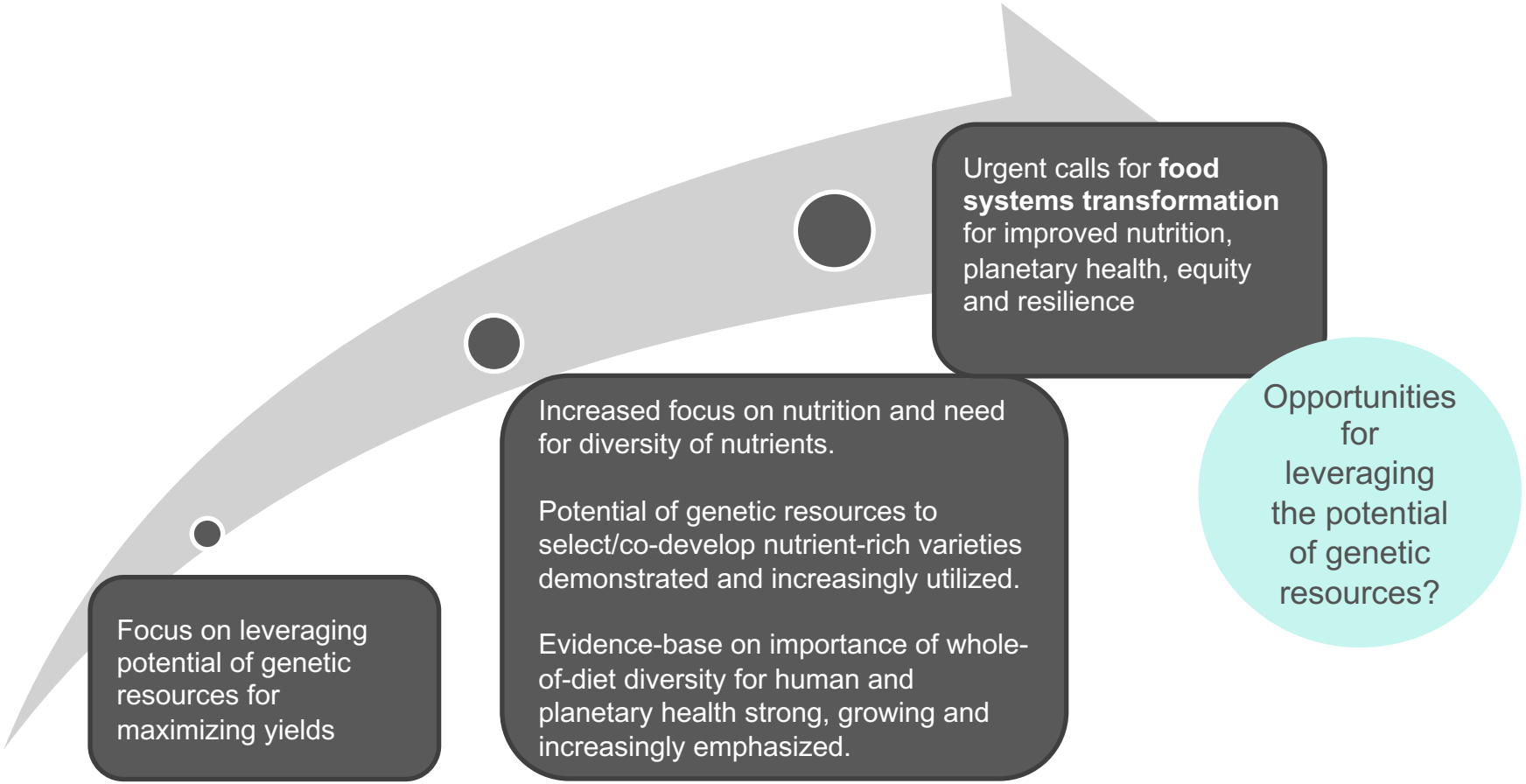
Alliance of Bioversity and CIAT
Virtual Workshop on Unlocking the Value of Germplasm Collections
July 8, 2021

Where we are and where do we want to go?



1. Address the multiple dimensions of malnutrition

We are experiencing a profound paradox

Source: Peter Menzel, Hungry Planet

Global malnutrition is massive, and complex

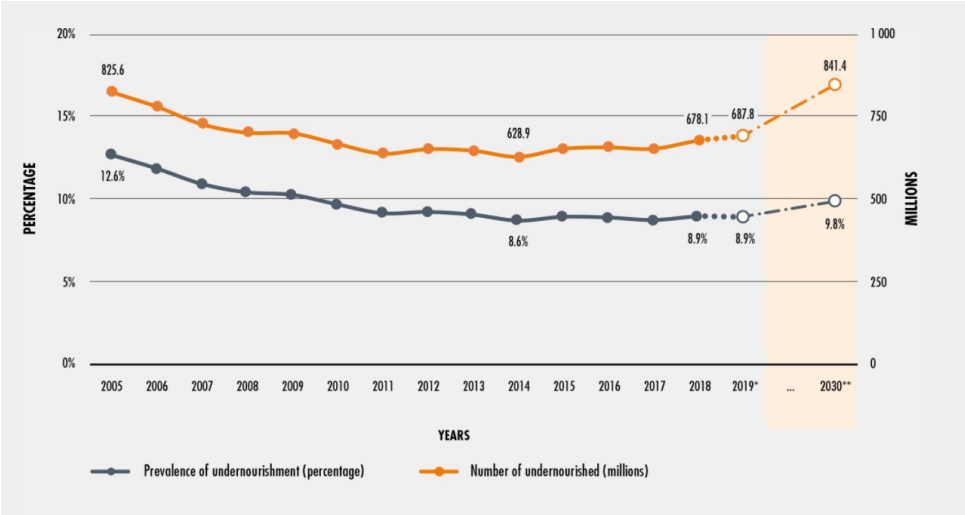
690 million
of the world's population are undernourished

144 million
children under five years of age are stunted

47 million
children under five years of age are wasted

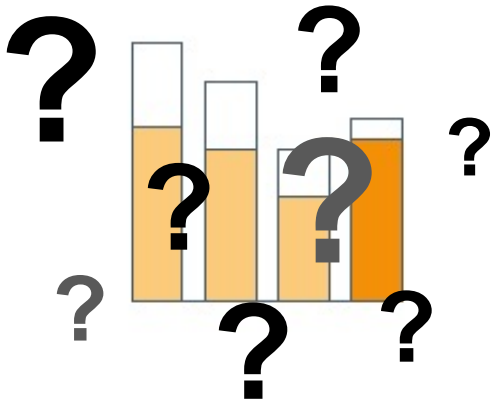
38 million
children under five years of age are overweight

2.1 billion
adults are overweight or obese



Development Initiatives: 2020 Global Nutrition Report; WHO/UNICEF/World Bank Group. Joint Malnutrition Estimates 2020; FAO, IFAD, UNICEF, WFP and WHO. 2020. The State of Food Security and Nutrition in the World 2020. Rome, FAO.

Hidden hunger remains significant but is shrouded in mystery



It's often cited that:

> *"Over 2 billion people worldwide suffer from a chronic deficiency of micronutrients, a condition known as hidden hunger."* -- World Health Organisation, 2006

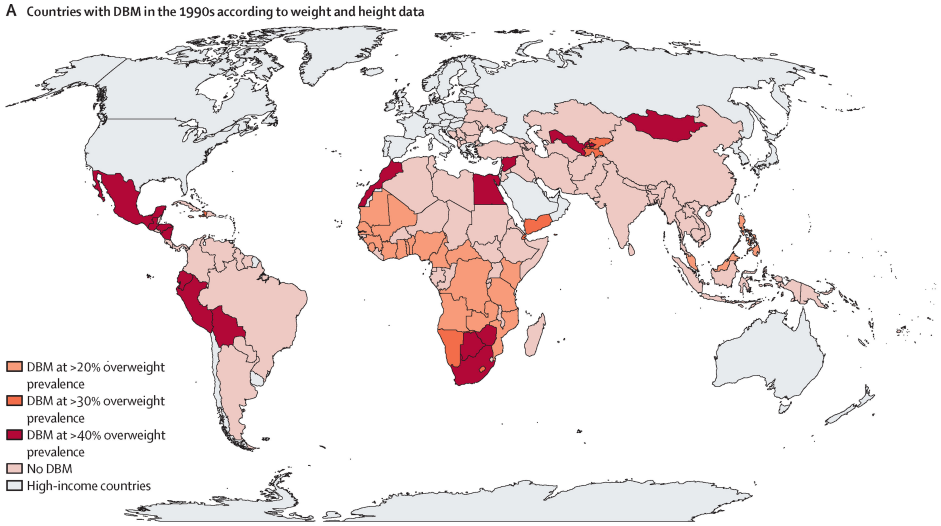
Yet we don't know the state of micronutrient deficiencies in nutritionally vulnerable populations, such as children under five years of age, women and adolescent girls

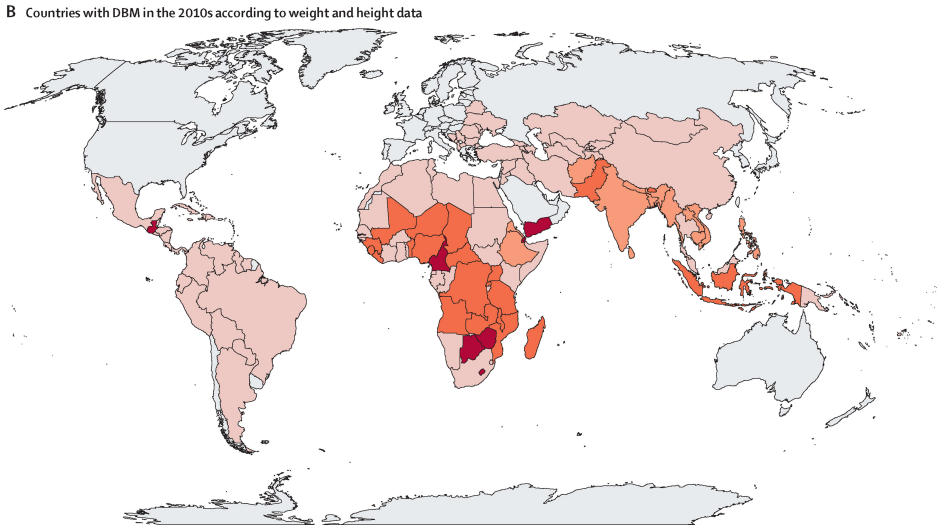
Source: Development Initiatives: 2018 Global Nutrition Report

The double burden of malnutrition is rising in low- and middle-income countries

Countries with DBM in the 1990s

Countries with DBM in the 2010s

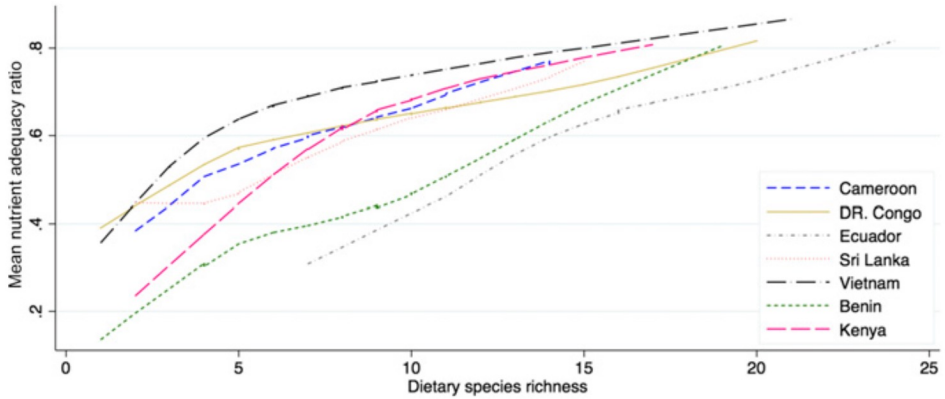




Popkin, B.M., Corvalan, C. and Grummer-Strawn, L.M., 2020. Dynamics of the double burden of malnutrition and the changing nutrition reality. *The Lancet*, *395*(10217), pp.65-74.

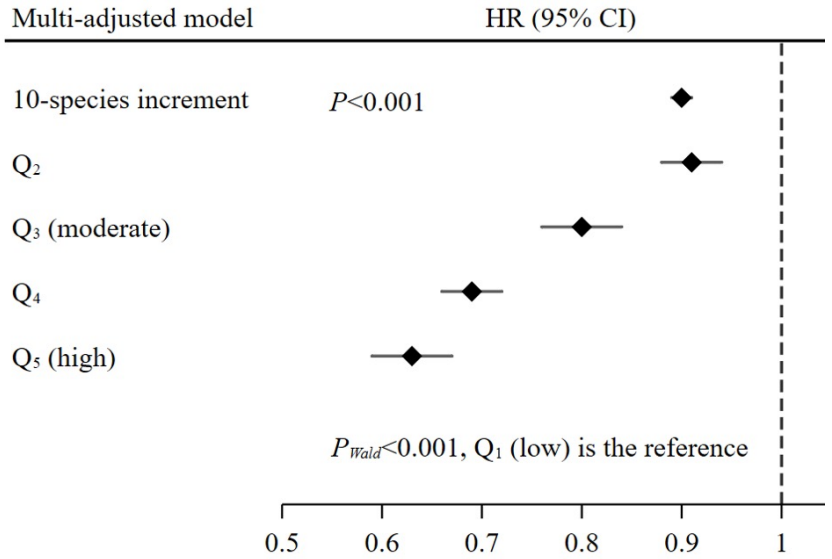
Evidence-base that species and genetic DIVERSITY can address multiple dimensions of malnutrition

Increased adequate nutrient intake



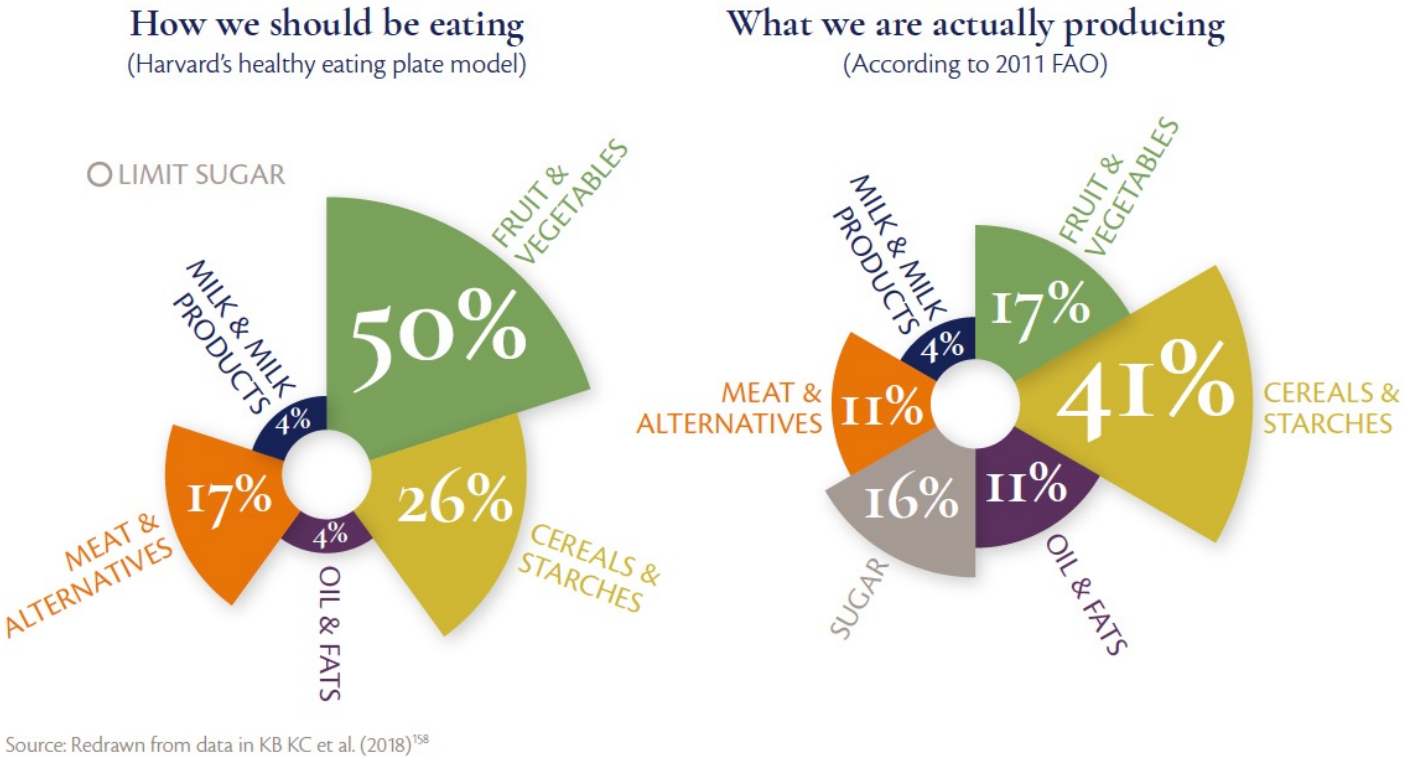
Lachat et al. 2018, PNAS

Reduced mortality rate



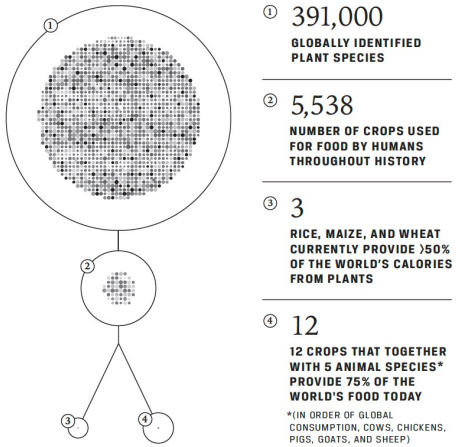
Giles-Hanock et al. 2021, forthcoming

Support access of genetic resources for a diversity of food types



Global Panel on Agriculture and Food Systems for Nutrition. 2020. Future Food Systems: For people, our planet, and prosperity. London, UK.

Strengthen non-staples genetic resources work



① 391,000
GLOBALLY IDENTIFIED PLANT SPECIES

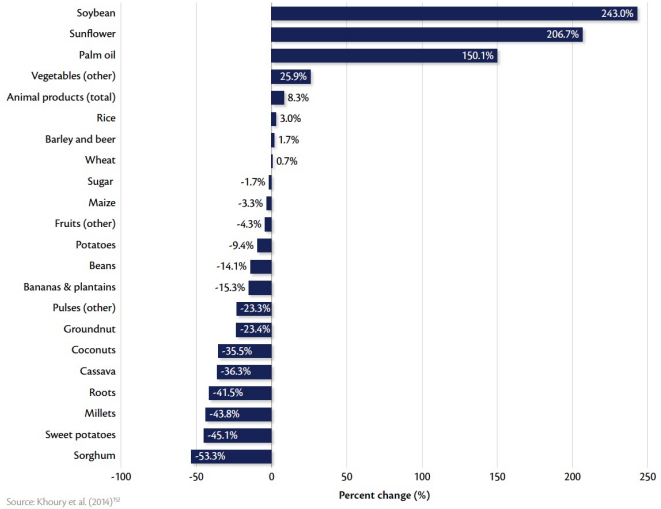
② 5,538
NUMBER OF CROPS USED FOR FOOD BY HUMANS THROUGHOUT HISTORY

③ 3
RICE, MAIZE, AND WHEAT CURRENTLY PROVIDE >50% OF THE WORLD'S CALORIES FROM PLANTS

④ 12
12 CROPS THAT TOGETHER WITH 5 ANIMAL SPECIES* PROVIDE 75% OF THE WORLD'S FOOD TODAY

*(IN ORDER OF GLOBAL CONSUMPTION, COWS, CHICKENS, PIGS, GOATS, AND SHEEP)

Changes in relative abundance of crops
(1960–2009 in terms of calories)



Source: Khoury et al. (2014)[52]

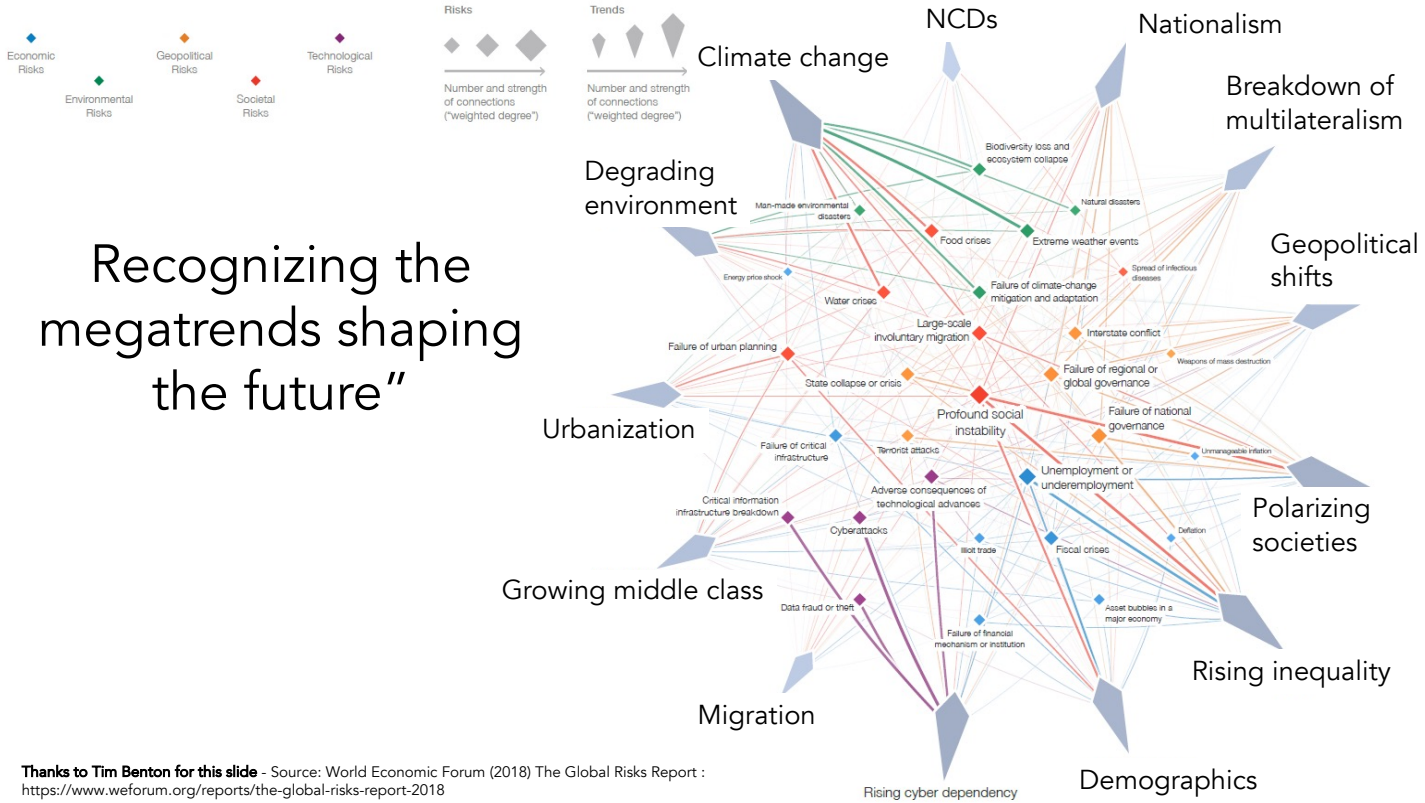
Most research on the impact of climate change on the nutrient content of crops has focused on staple crops; to date, very few studies have examined how climate change may influence changes in production and consumption of non-staple food groups. More research is needed on how different kinds of crops – particularly those that are nutrient-dense such as fruits, vegetables, and legumes – will fare in a +2 C degree world.

Khoury, C.K., Bjorkman, A.D., Dempewolf, H., Ramirez-Villegas, J., Guarino, L., Jarvis, A., Rieseberg, L.H. and Struik, P.C., 2014. Increasing homogeneity in global food supplies and the implications for food security. Proceedings of the National Academy of Sciences, 111(11), pp.4001-4006; Global Panel on Agriculture and Food Systems for Nutrition. 2020. Future Food Systems: For people, our planet, and prosperity. London, UK.

2. Take a food systems approach, engaging with multiple actors and policies and bundling solutions

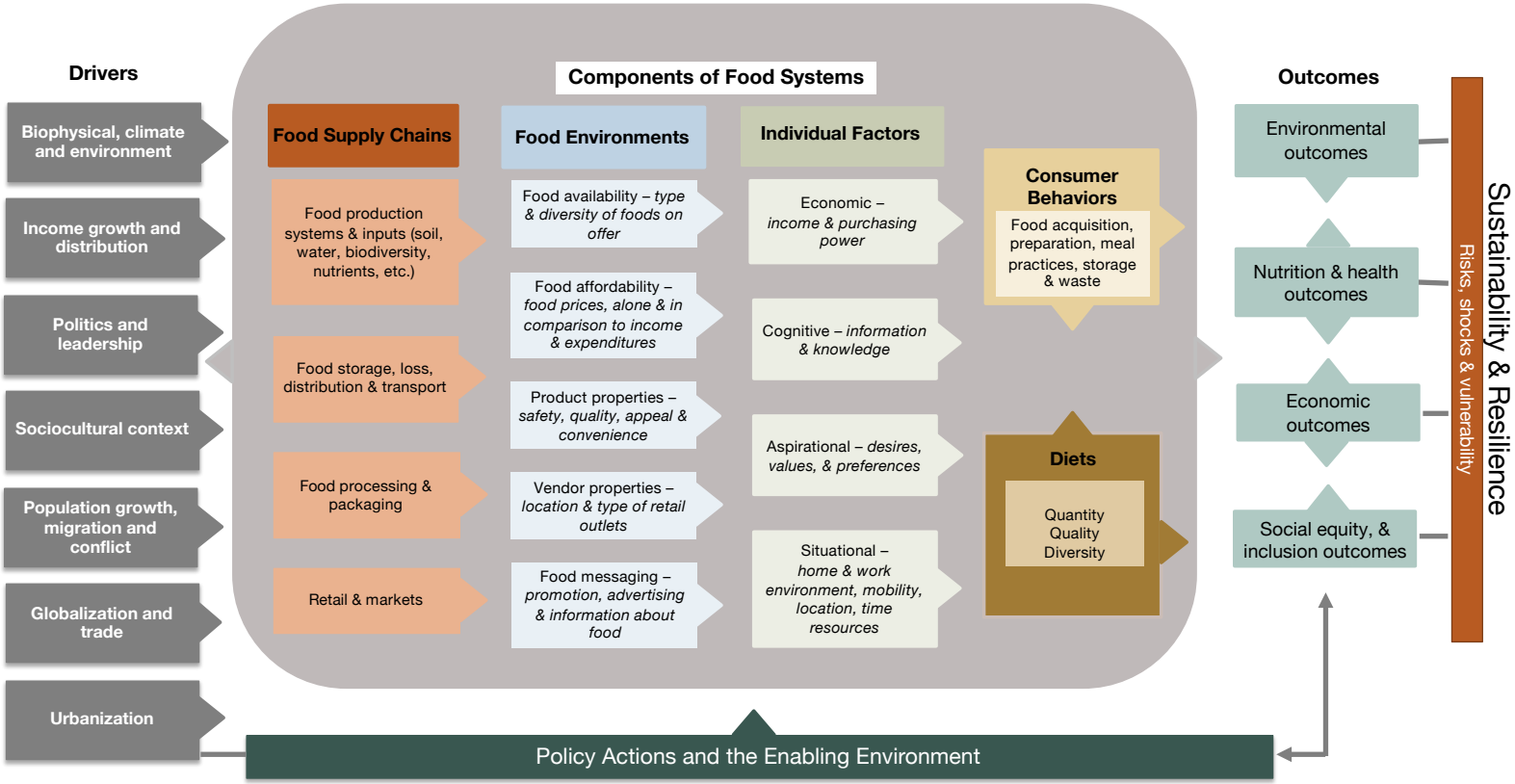
The strength of multi-functionality of genetic resources

Recognizing the megatrends shaping the future”



Thanks to Tim Benton for this slide - Source: World Economic Forum (2018) The Global Risks Report : https://www.weforum.org/reports/the-global-risks-report-2018

Food systems approach and genetic resources



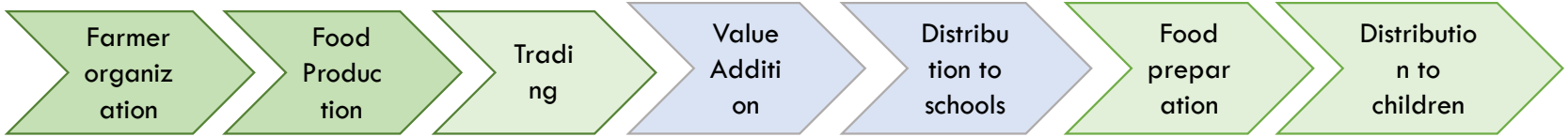
Fanzo, J., et al, 2020. The Food Systems Dashboard is a new tool to inform better food policy. *Nature Food, 1*(5), pp.243-246.

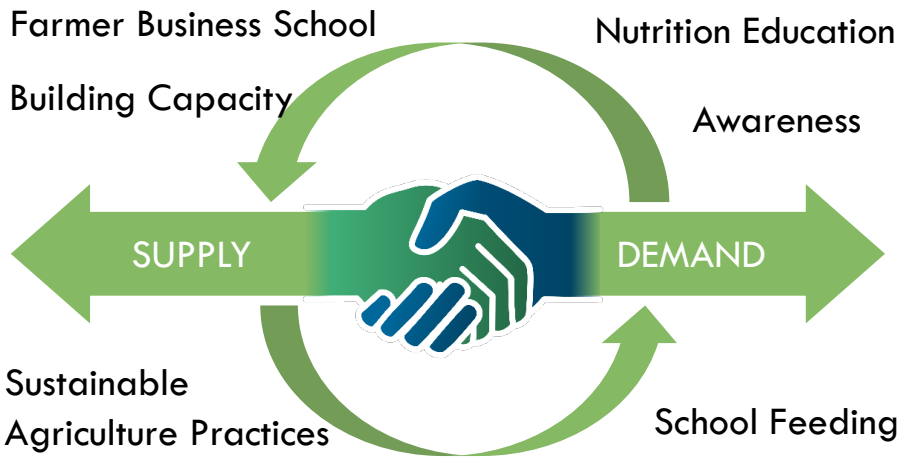
Biodiversity for Food and Nutrition Project

- Context and partner-based approach – **unique/novel**
- Demonstrating value of nutrient-rich species
- Mainstreaming biodiversity across sectors
- Awareness

Biodiversity for Food and Nutrition Project

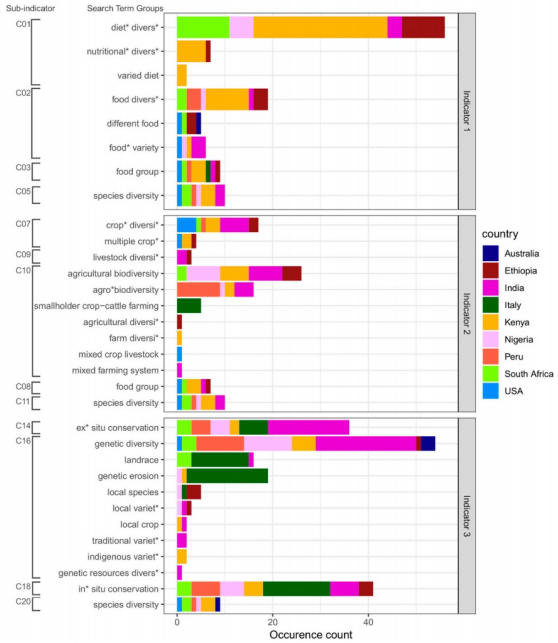
- E.g. Kenya
  - Farmer Business School: training, linking farmer groups directly to schools
  - Home-Grown School Feeding



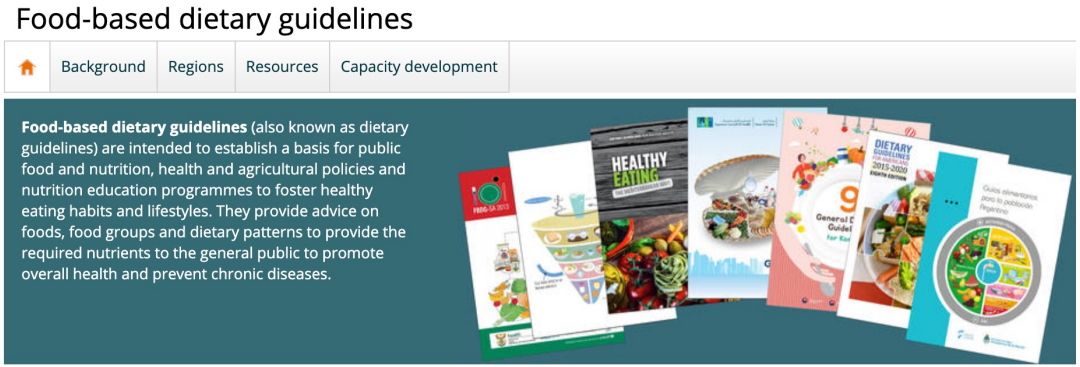


Leveraging the potential of genetic resources potential in food-based dietary guidelines and nutrition policies

Analysis of nutrition and agricultural policies for agrobiodiversity inclusion Juventia et al. 2020

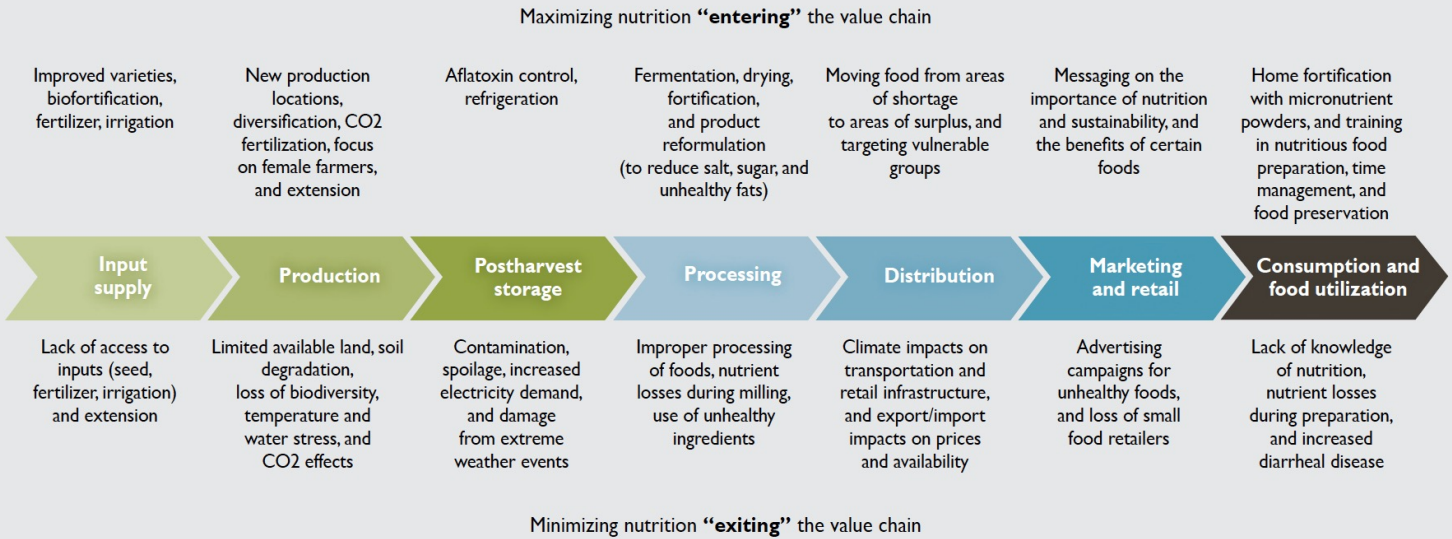


Increased attention for food-based dietary guidelines as connector between different food system related policies and guidelines



Bundling of solutions

FIGURE 1. Entry and exit points for increasing net nutrition along the food value chain under climate change



Source: Fanzo et al. (2017b).

Fanzo, J., Davis, C., McLaren, R. and Choufani, J., 2018. The effect of climate change across food systems: Implications for nutrition outcomes. *Global food security*, *18*, pp.12-19.

Bundling of innovations

NUTRITION CONNECT

About | Priority areas | What's new | Resource centre | Events and webinars | Get involved

3. Monitor indicators on genetic resources along the food system
‘to manage it, we need to measure it’

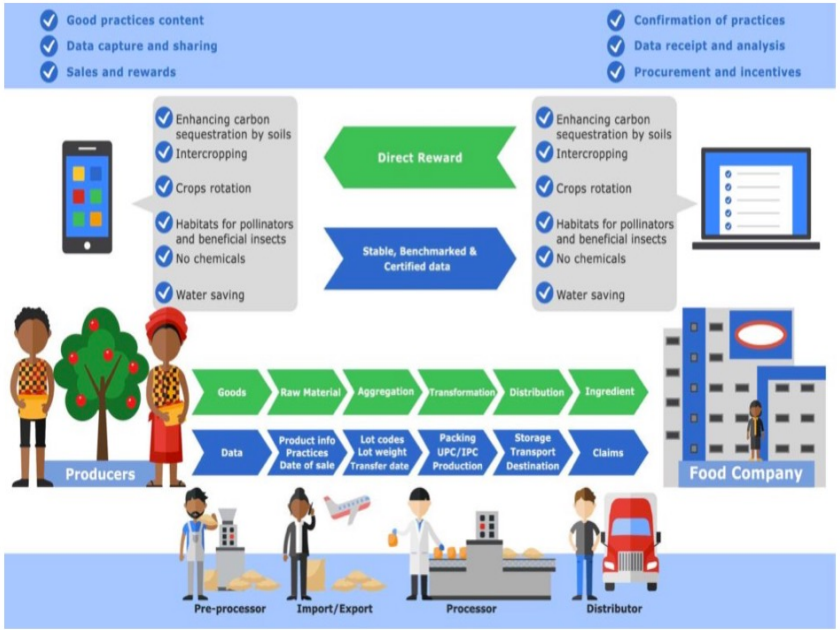
‘Movement’ of increasing transparency and traceability

FACT
FOOD AGROBIODIVERSITY CLARITY & TRANSPARENCY

Better Supply Chains for People and the Planet

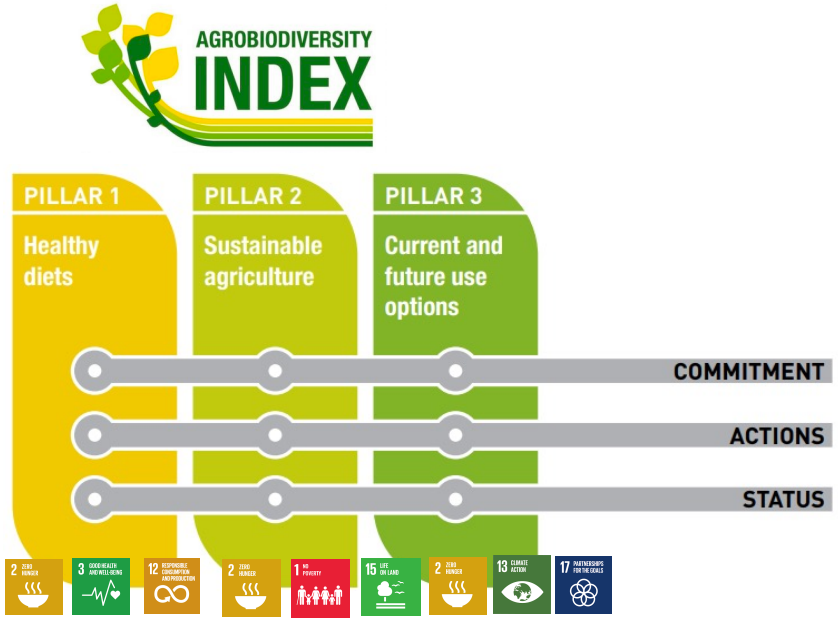
Traceable supply chains mitigate operational and financial risk from systemic shocks like recalls, outbreaks and climate events.

PRODUCER



CONSUMER

Link to nutrition and food systems approaches for monitoring and tracking change



1. Consider the multiple dimensions of malnutrition
2. Take a food systems approach, engaging with multiple actors and policies and bundling solutions
3. Monitor indicators on genetic resources along the food system

Thank you