

The Protein Challenge 2040: Aquaculture's Role

Global Outlook on Aquaculture Leadership 2015

Global Aquaculture Alliance

29 October 2015

Vancouver, BC

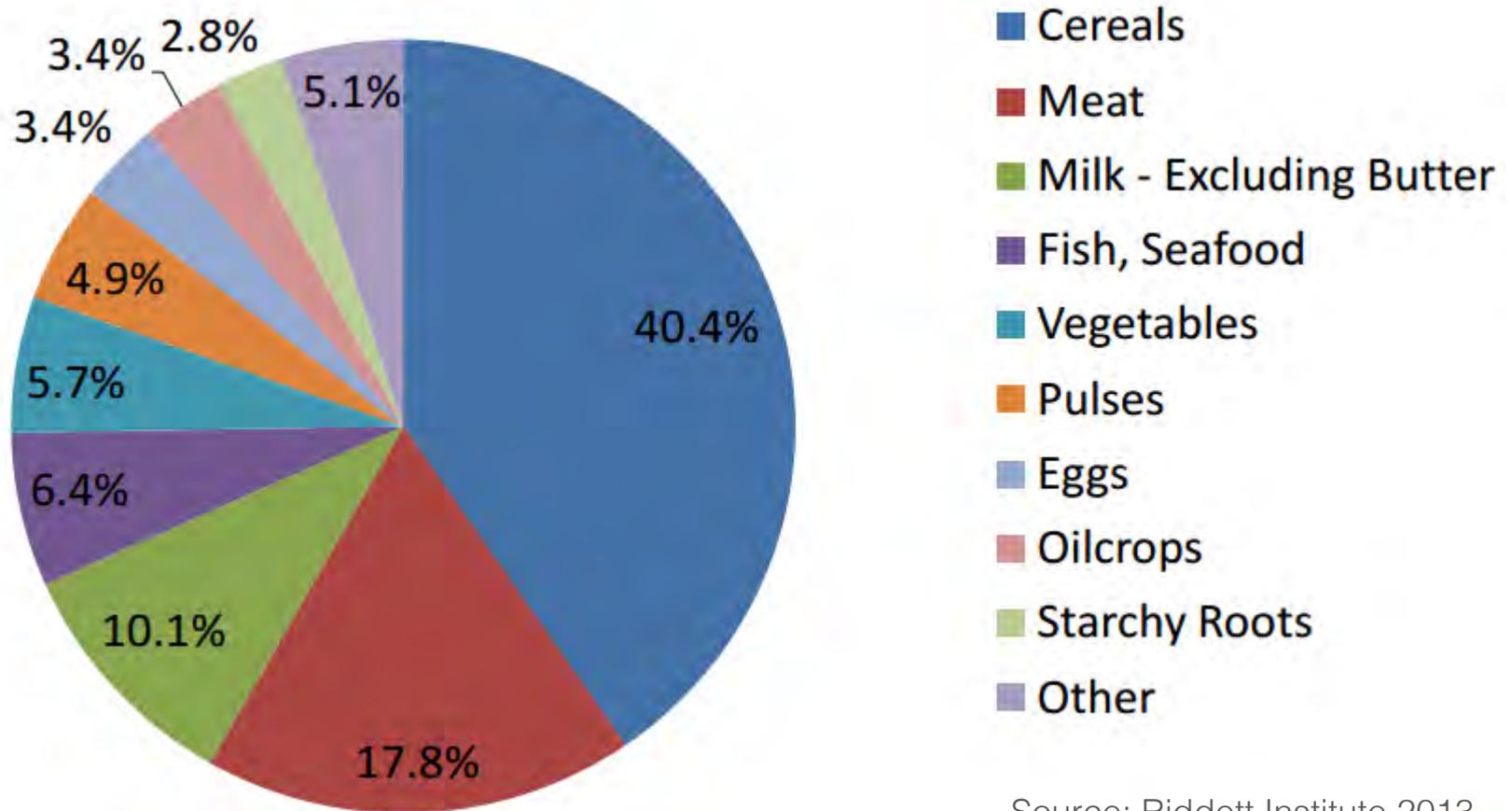


The future of protein

How do we feed 9 billion people protein sustainably by 2040?



Current global protein supply

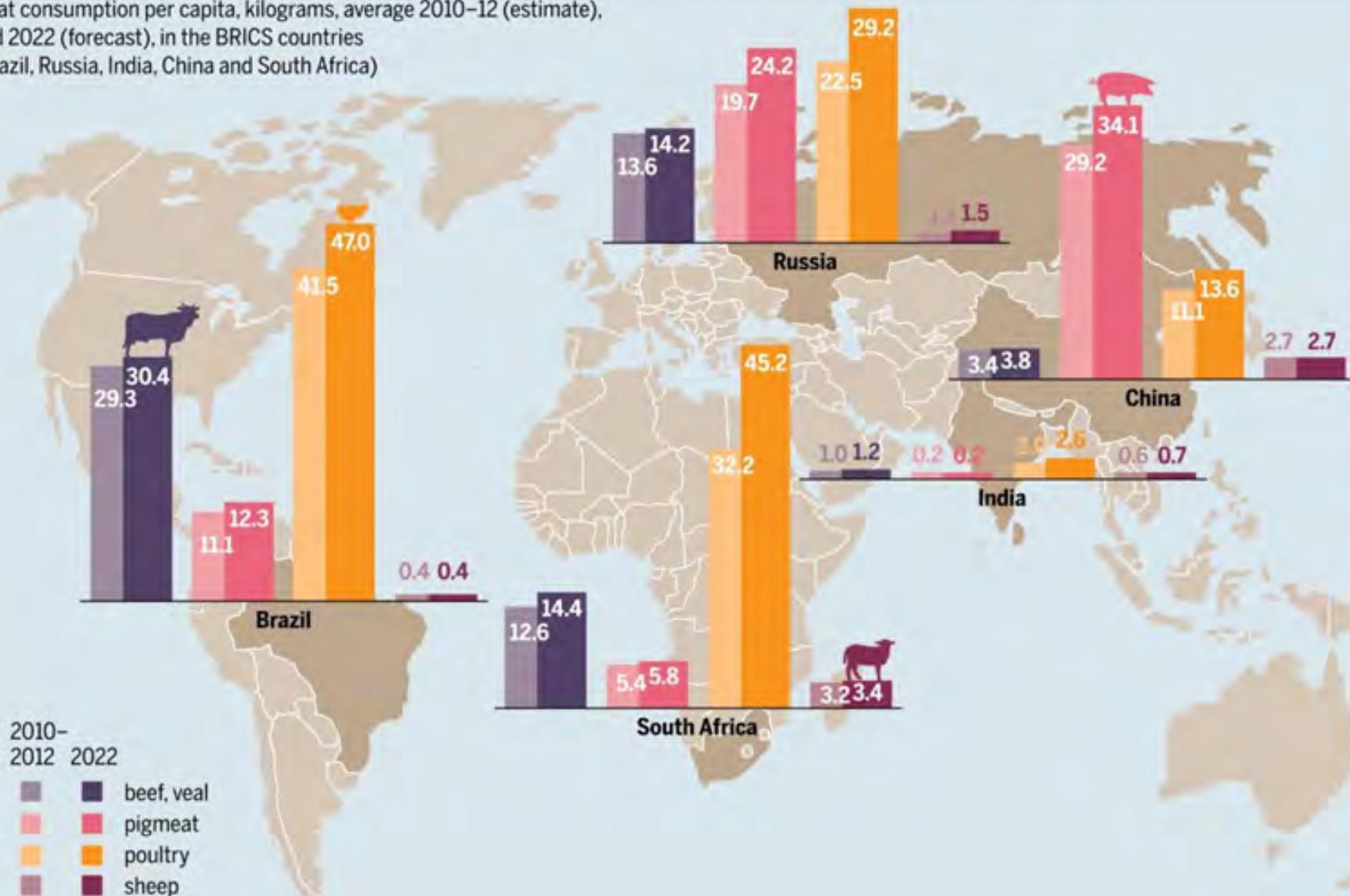


Source: Riddett Institute 2013.

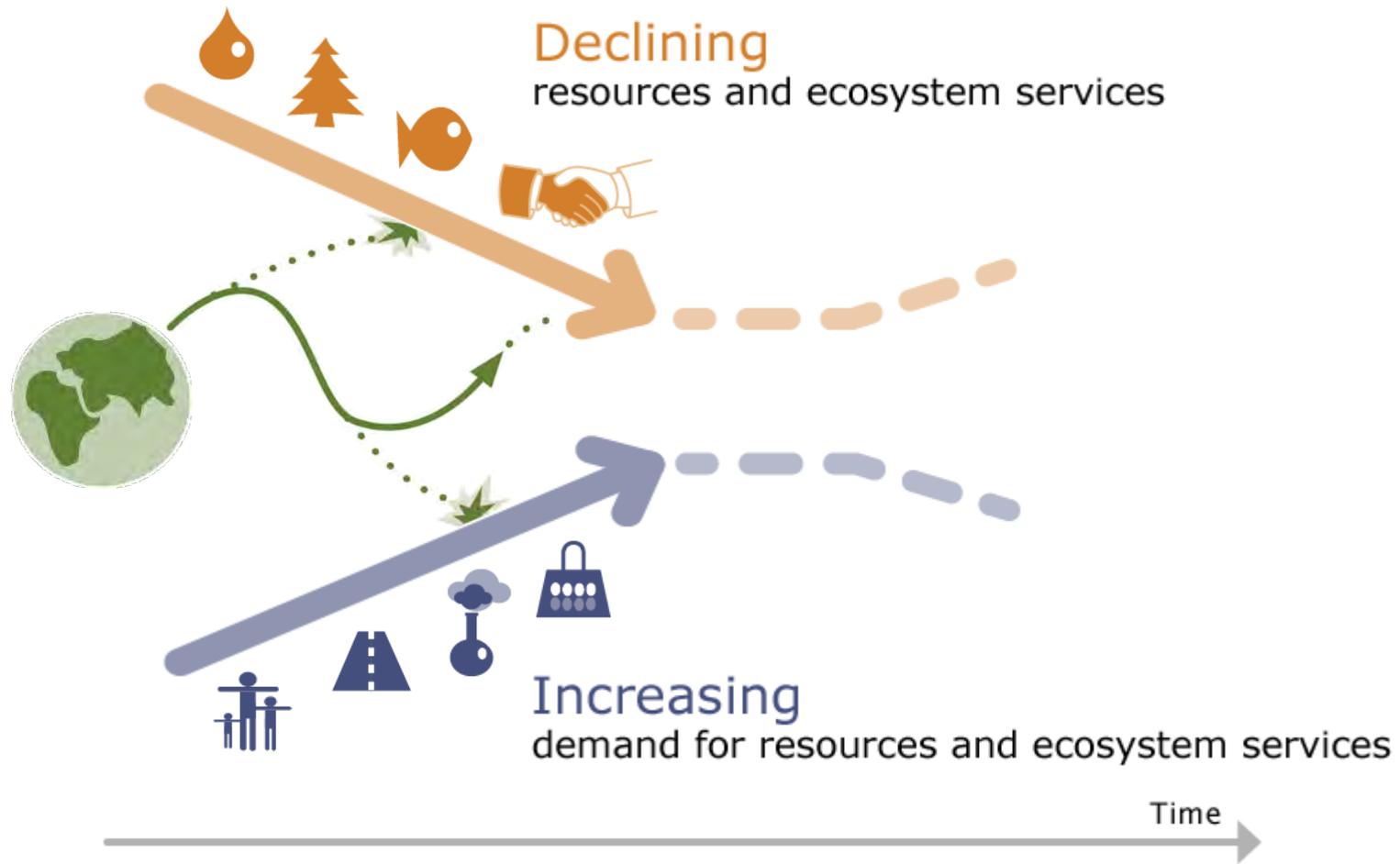
Demand in the developing world is rising steeply

OECD/FAO

Meat consumption per capita, kilograms, average 2010–12 (estimate), and 2022 (forecast), in the BRICS countries (Brazil, Russia, India, China and South Africa)

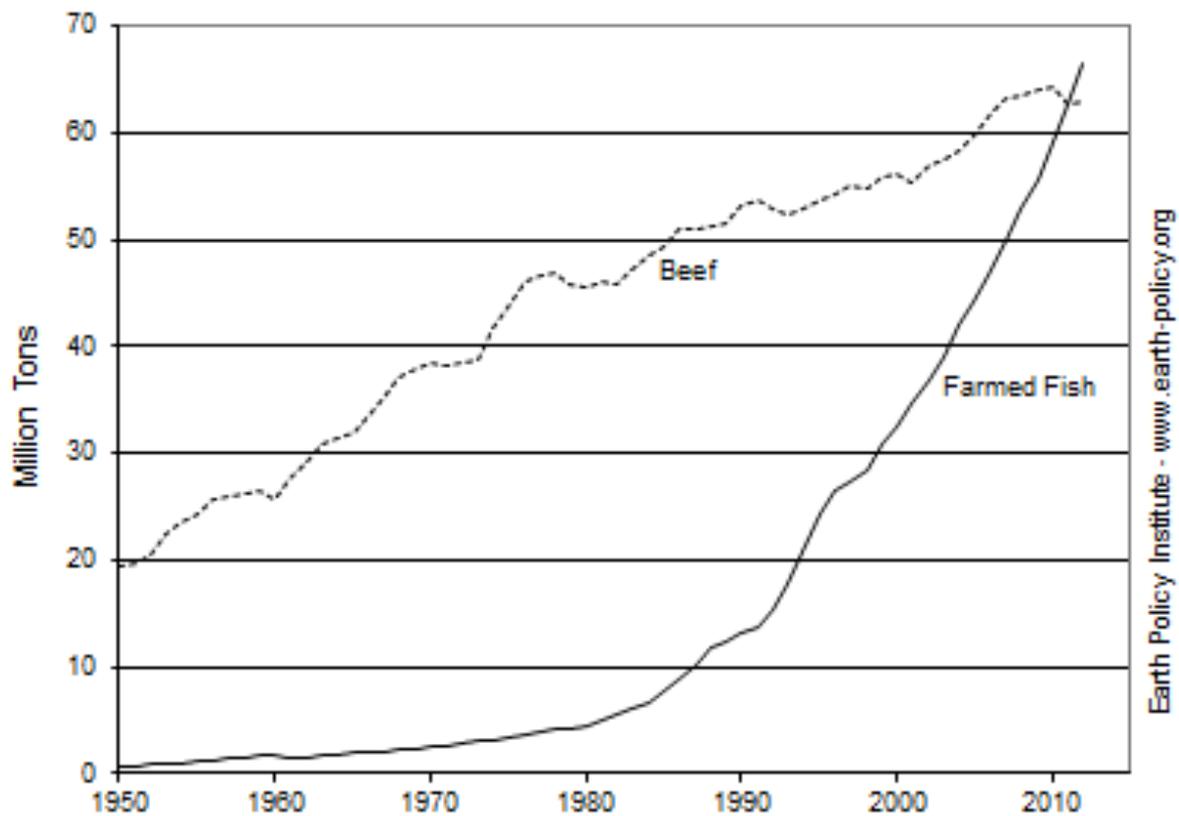


Source: OECD/FAO



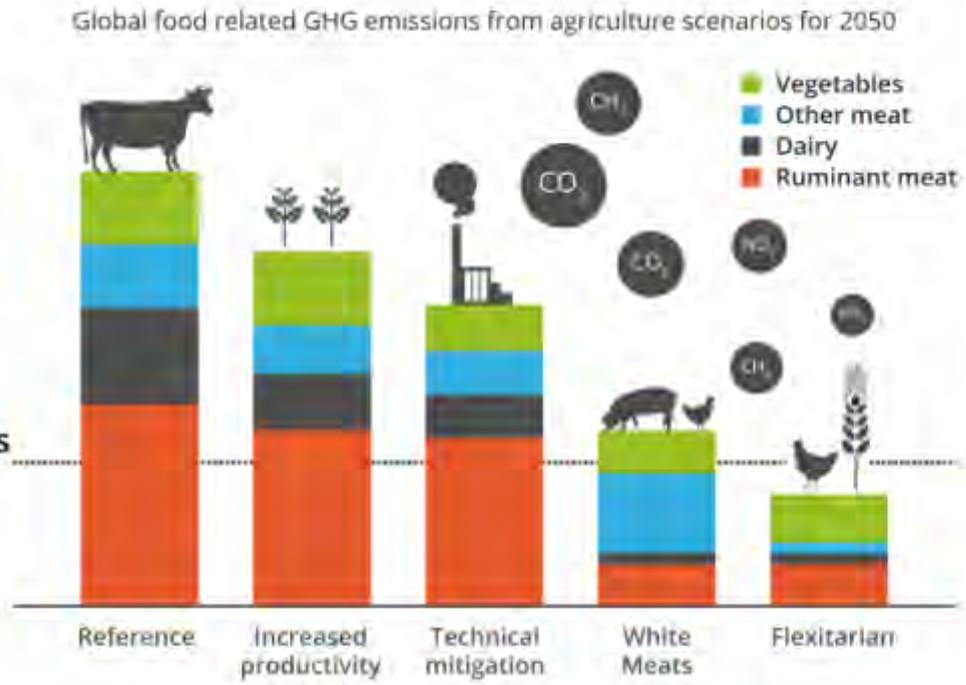
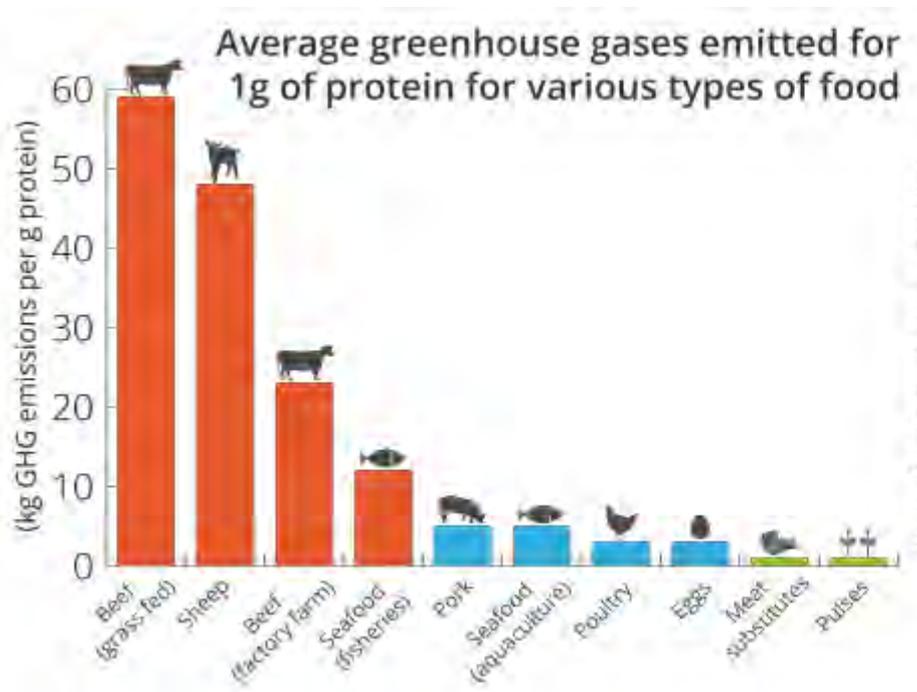
Shift in diets

World Farmed Fish and Beef Production, 1950-2012



Source: EPI based on FAO, USDA

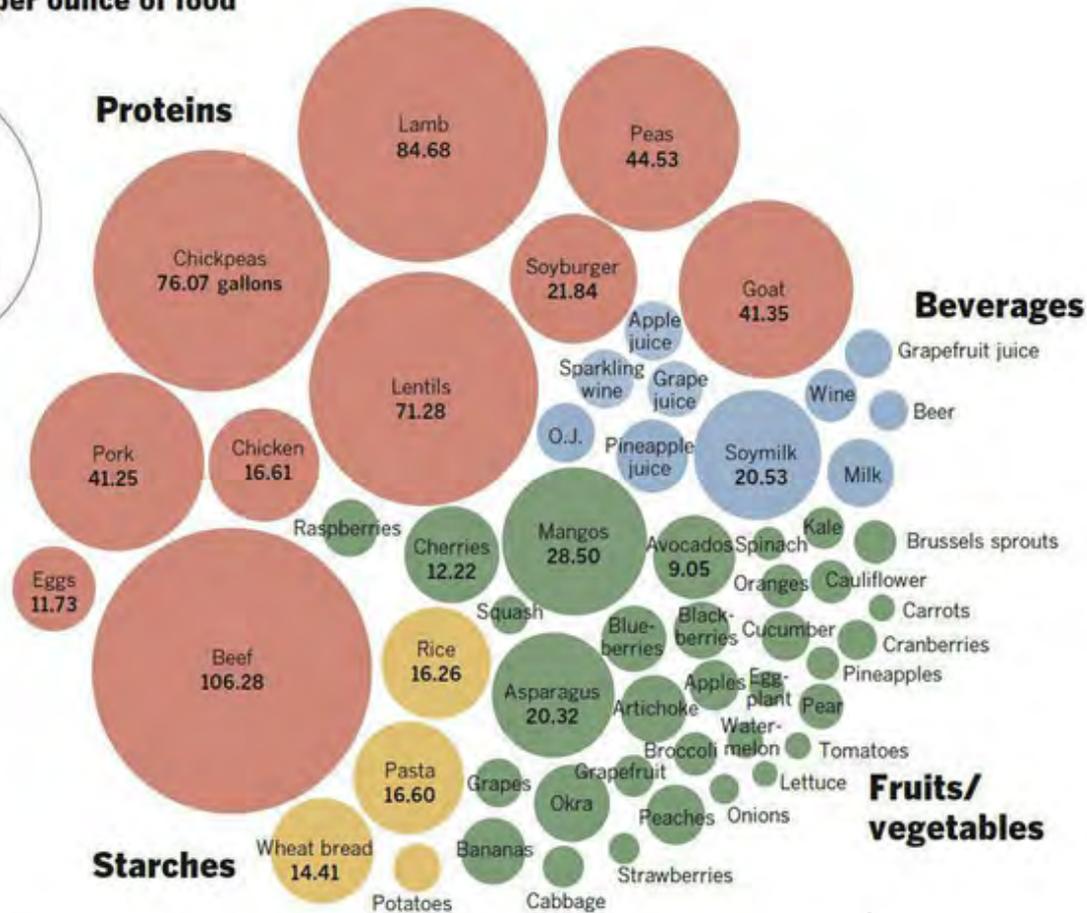
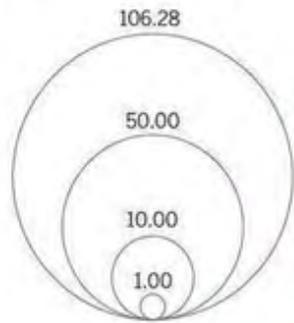
GHGs & climate targets



Sources: Nijdam et al. 2012;
Mekonnen & Hoekstra 2012

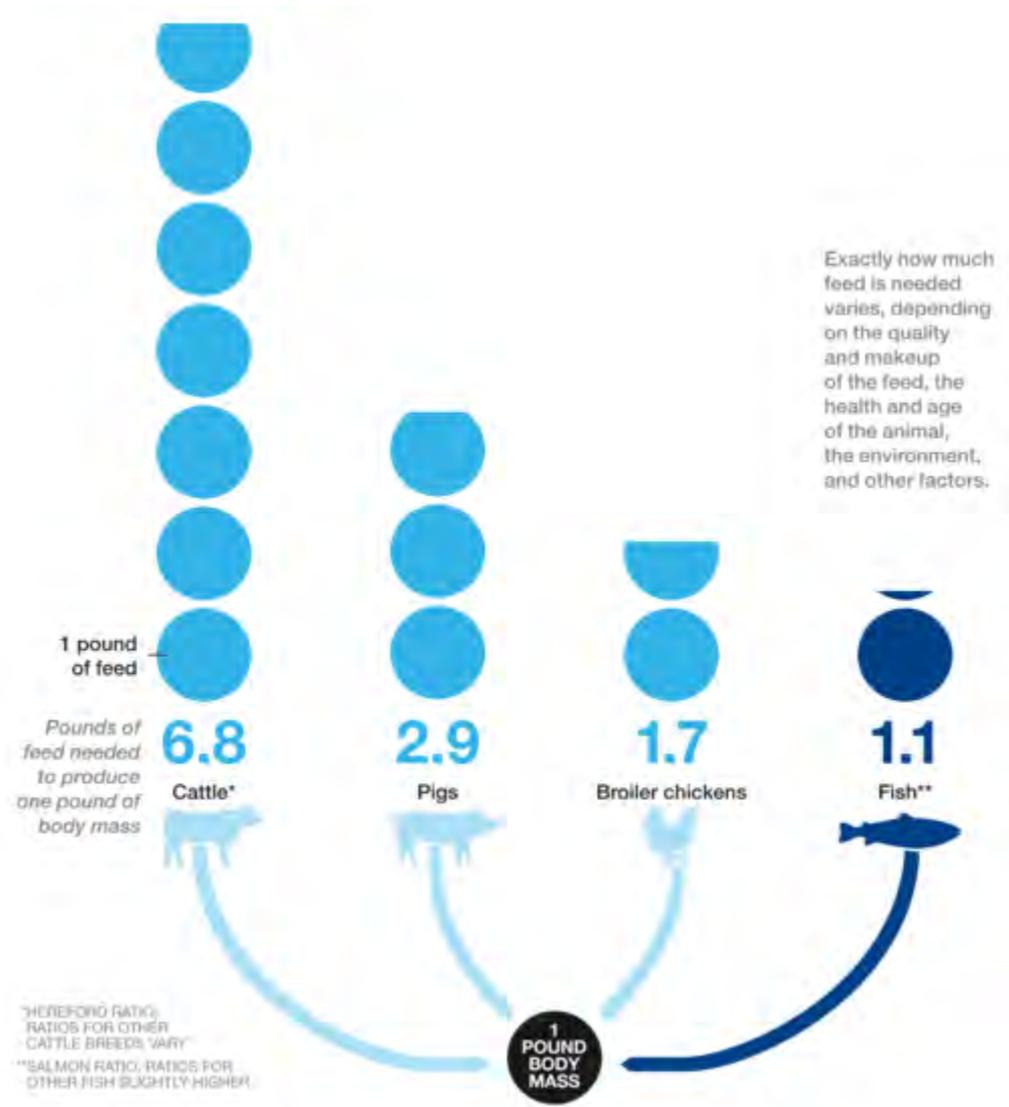
Water for protein production

Gallons of water per ounce of food



Source: Los Angeles Times

Feed conversion ratio



Crickets Or Cultured Beef Anyone? 5 Proteins Of The Future

Volume 33 Issue 6 pp. 8-13
Issue Date: February 9, 2015

COVER STORY Calling On Plants To Fulfill Protein's Promise

As foodmakers add protein to more of the things we eat, could a switch to plant-based proteins help our health and the planet?

By Melody M. Bomgardner

Department: Business

Keywords: food ingredients, proteins, sustainability, agriculture, GMOs

Faeces, bacteria, toxins: welcome to the chicken farm

George Monbiot



Huge Fish Farm Planned Near San Diego Aims To Fix Seafood Imbalance

SEPTEMBER 01, 2015 5:50 PM ET

Cargill Buys Norwegian Fish-Feed Producer EWOS for \$1.5 billion

The Future of Protein Will Not Be Animal Meat

Edible cricket farm coming soon to Van Nuys

Hot dogs, bacon and other processed meats cause cancer, World Health Organization declares

Congress To Nutritionists: Don't Talk About The Environment

DECEMBER 15, 2014 3:25 AM ET



UN urges global move to meat and dairy-free diet

Lesser consumption of animal products necessary to save the world from the worst impacts of climate change, UN report says



13 Startups Pioneering the Future of Protein

Home BY NINA MEIJERS 29 SEP 2015

Lab-grown meat would 'cut emissions and save energy'

techniques, so-called 'cultured' or greenhouse gas emissions according to a new study.

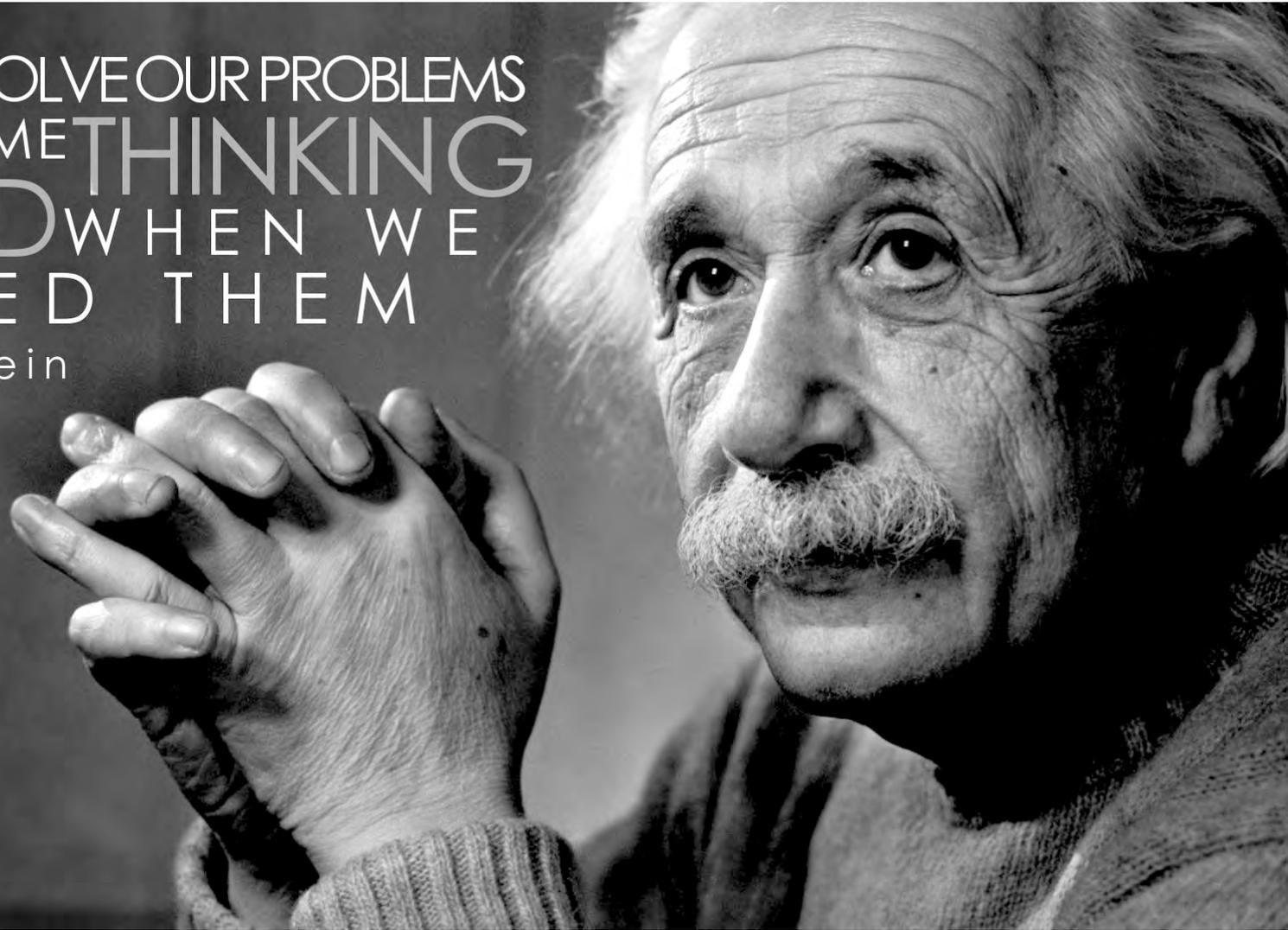
Our approach



Scoping study findings

- The complexity and scale of the challenge – protein is at the heart of many sustainability challenges today, but there is very little consensus or coordination across sectors
- The siloed nature of the protein sector – a need for more pre-competitive collaboration
- The ongoing, polarized debate between animal vs. plant-based diets
- Missing an understanding of interrelations between production and consumption and the environment and human health – opportunities to address the challenge systemically and holistically

WE CANNOT SOLVE OUR PROBLEMS
WITH THE SAME THINKING
WE USED WHEN WE
CREATED THEM
- Albert Einstein





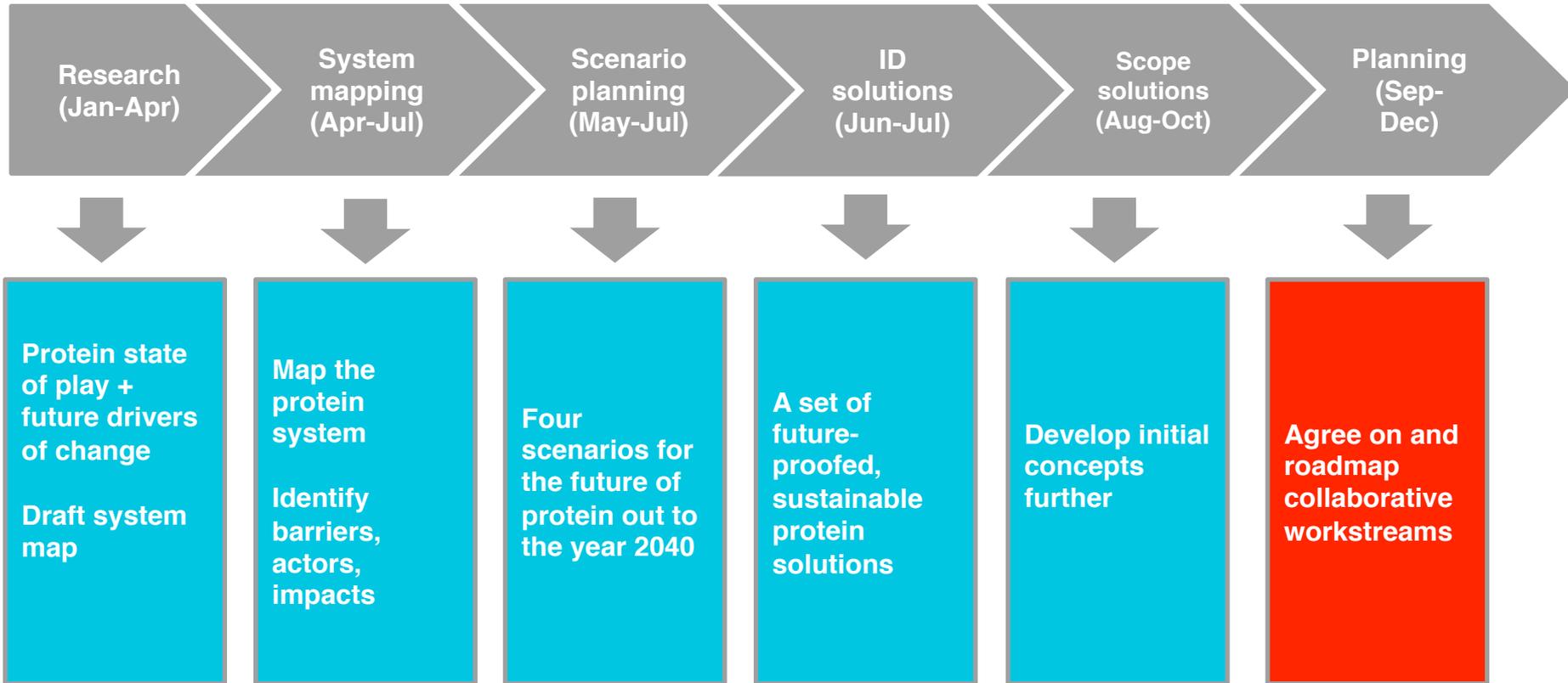
The Protein Challenge 2040 is an international innovation partnership to explore how we balance supply and demand of protein for a growing population, in a way that is affordable, healthy, and good for people and the environment.

This is the first time that the animal, plant, and novel protein industries are working together on a global level to tackle the issue of sustainable protein.

The Protein Challenge...

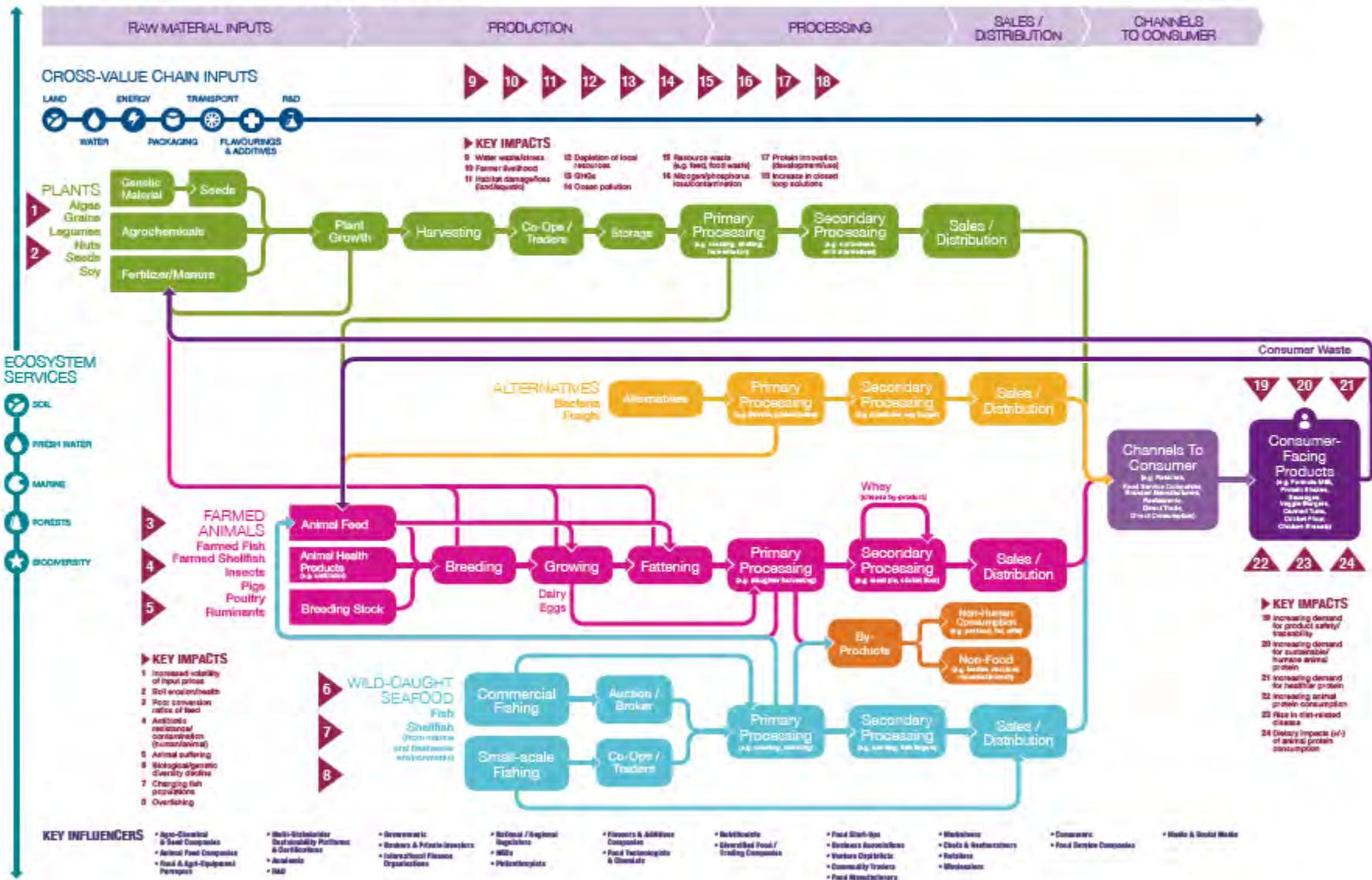
- Is a global leadership project to catalyze innovation towards sustainable protein production and consumption
- Brings together the whole protein system (e.g. meat, fish, plant, novel) to think long-term and systemically about the challenge
- Looks at the whole picture of protein sustainability (e.g. social, environmental, and economic)
- Aims to add up individual action to be more than the sum of its parts and address interrelated challenges across the system collectively

Phase I: Jan-Dec 2015





PROTEIN SYSTEM MAP 2015



The role for aquaculture



Collaborative workstreams

Scaling up
herbivorous
aquaculture

Tackling protein
losses

Sustainable feed
innovation

Scaling up plant
proteins:
developed world

Scaling up plant
proteins:
developing world

Restoring soil
health

PROTEIN SYSTEM MAP 2015

Tackling protein losses



- KEY IMPACTS**
- 9 Water wastefulness
 - 10 Farmer livelihood
 - 11 Habitat damage/loss (and/soy)
 - 12 Depletion of local resources
 - 13 GHGs
 - 14 Ocean pollution
 - 15 Resource waste (e.g. feed, food waste)
 - 16 Nitrogen/phosphorus loss/contamination
 - 17 Protein innovation (bioengineering)
 - 18 Increase in closed loop solutions



Restoring soil health

Scaling up plant protein: developed world



Sustainable feed innovation

Scaling up plant protein: developing world



- KEY IMPACTS**
- 1 Increased volatility of input prices
 - 2 Soil erosion/health
 - 3 Feed conversion ratios of feed
 - 4 Antibiotic resistance/contaminants (human/animal)
 - 5 Animal suffering
 - 6 Biological/genetic diversity decline
 - 7 Changing fish populations
 - 8 Overfishing



Scaling up herbivorous aquaculture



KEY INFLUENCERS

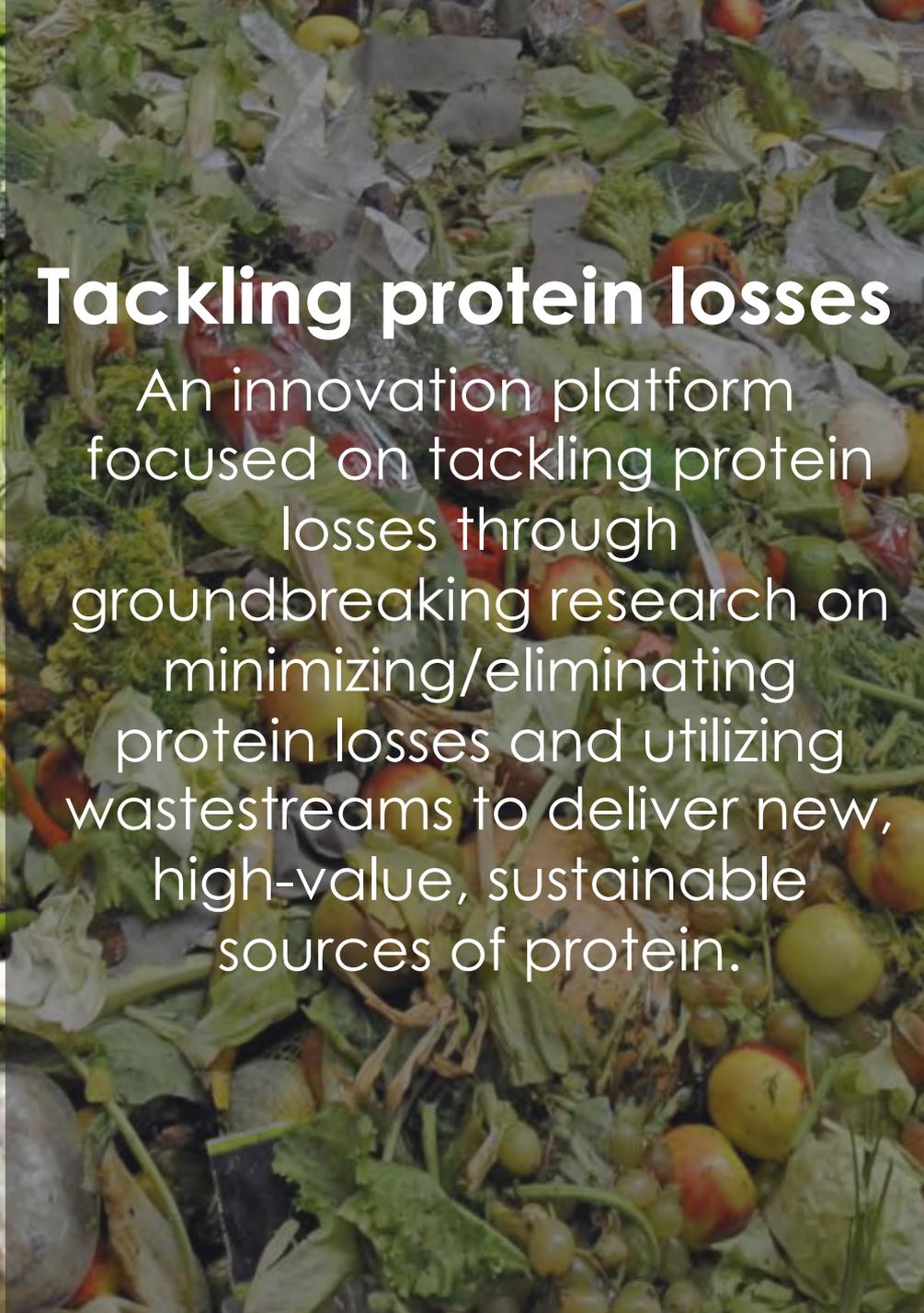
- Agro-Chemical & Seed Companies
- Animal Feed Companies
- Food & Agri-Equipment Providers
- Multi-Stakeholder Sustainability Platforms & Coalitions
- Investors
- NGOs
- Government
- Bankers & Private Investors
- International Finance Organizations
- National / Regional Regulators
- NGOs
- Multinational
- Companies
- Food Technologists & Scientists
- Diversified Food / Feeding Complexes
- Start-Ups
- Business Associations
- Venture Capitalists
- Commodity Traders
- Food Manufacturers
- Wholesalers
- Chefs & Restaurateurs
- Retailers
- Wholesalers
- Consumers
- Food Service Companies
- Media & Social Media

- 19 Protein innovation
- 20 Increasing animal protein consumption
- 21 Rise in diet-related disease
- 24 Dietary impacts (M) of animal protein consumption



Tackling protein losses

An innovation platform focused on tackling protein losses through groundbreaking research on minimizing/eliminating protein losses and utilizing wastestreams to deliver new, high-value, sustainable sources of protein.





Sustainable feed innovation lab

An innovation lab for sustainable feed where all stakeholders engaged in sustainable feed initiatives would come together to track the latest developments, understand gaps and barriers, and explore potential for scale.



Scaling up the consumption of plant-based proteins

A coalition of the world's leading food and beverage manufacturers, retailers, and food service companies, working with other stakeholders (NGOs, governments, academia, investors, etc.), to encourage the consumption of more plant-based proteins.

Next steps

- Further development of the six workstreams (Sep-Nov 2015)
- Workshop with US stakeholders around prioritized workstreams (Nov 2015)
- Consultation with key stakeholders; confirmation of partners and fundraising for the workstreams (Oct-Dec 2015)
- Set up governance & launch first 2-3 platforms (early 2016)
- **Get involved!**

Thank you!

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Check out:

The Protein Challenge project webpage:
<https://www.forumforthefuture.org/project/protein-challenge-2040/overview>

The Future of Protein topic hub on the Futures Centre:
<http://www.thefuturescentre.org/topic-hubs/protein>

[#futureofproteins](#) on Twitter



www.forumforthefuture.org

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