



Agroscope

Good food, healthy environment



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Federal Department of Economic Affairs
Education and Research EAER

Agroscope

Research and Innovation: Meeting Society's Expectations

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Future Vision for Agriculture: Determines the Need for Research along the Time Axis

Expected agriculture and food sector services

- Safeguarding the food supply
- Reduction of negative impacts at home and abroad

Environmental / background conditions

- Climate-change impacts
- Biodiversity impacts
- Availability of resources
- Land-use impacts
- Impacts on non-agricultural use
- Availability of labour

Consumers & demand

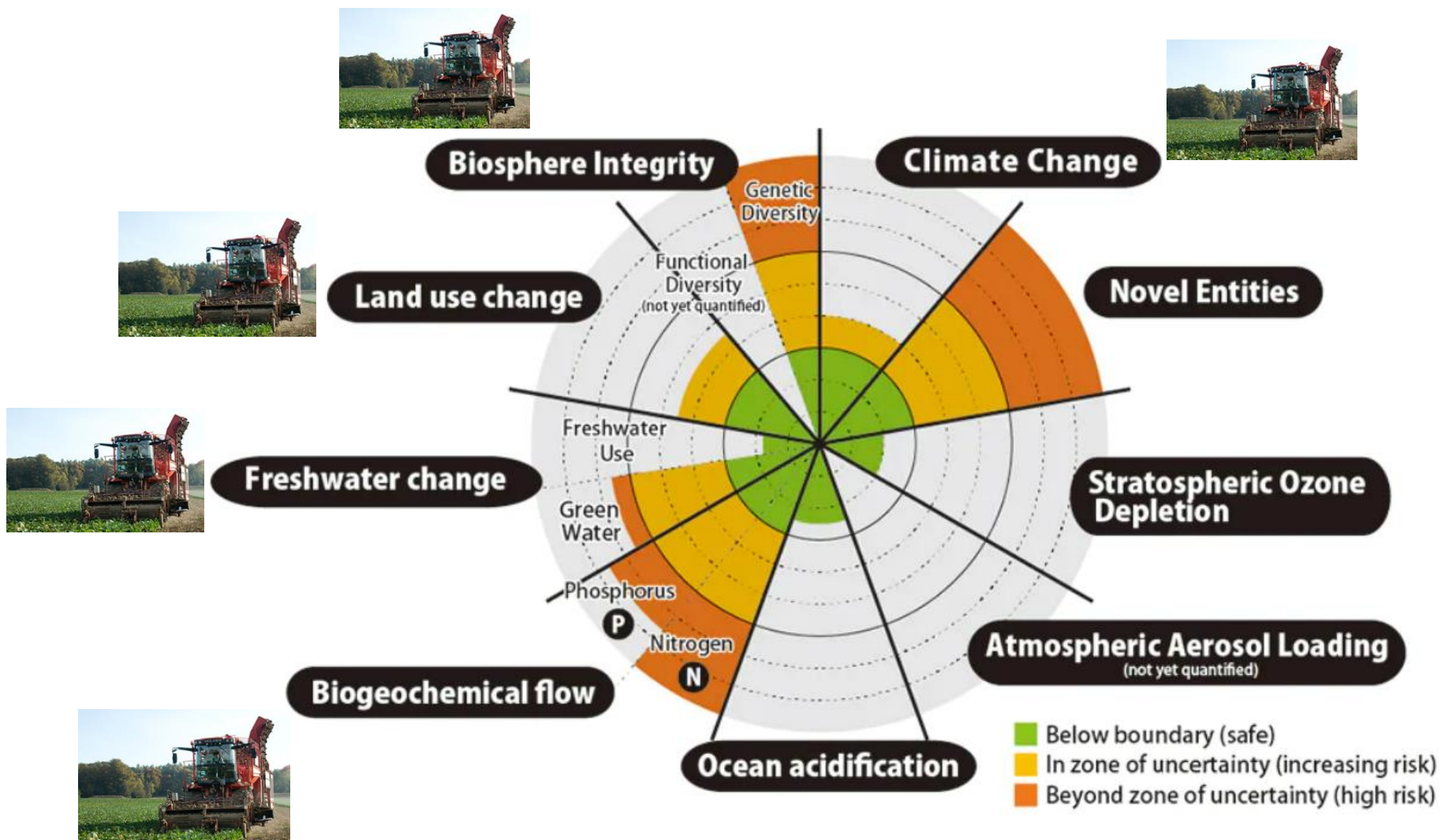
- Dietary habits
- Swiss demographic trends

Society

- Ensuring the economic sustainability of Swiss agriculture
- Fairness and ethics in the value chain



Planetary Resilience Limits - Diet Plays a Key Role



Source: Azote for Stockholm Resilience Centre, based on analysis in Wang-Erlandsson *et al.* 2022



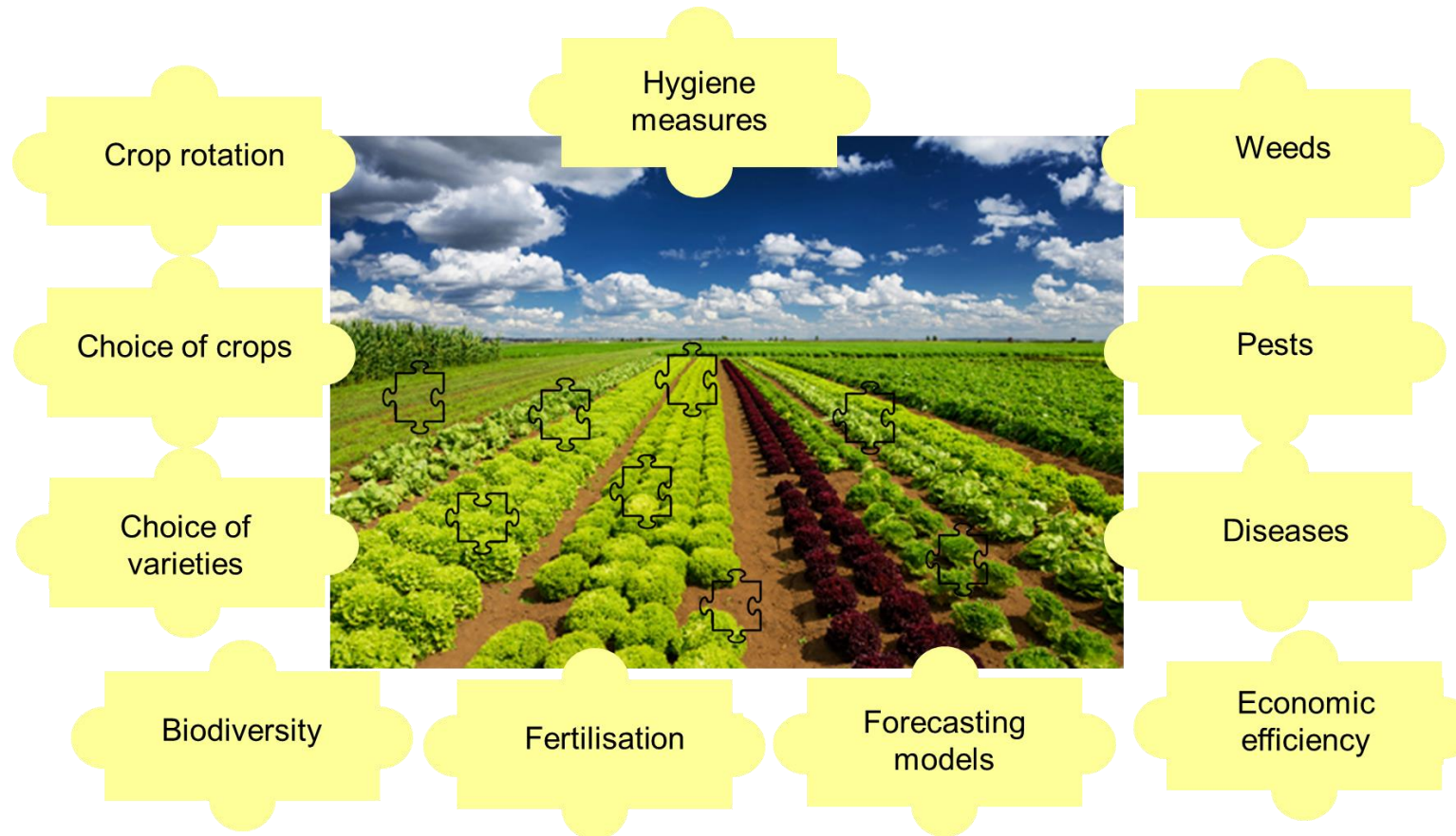
Agroscope's Organization and Strategy





Systems Research in Vegetable Production

- Combining several methods with a partial effect is essential
- Research and production is becoming more demanding and more complex





Research Activities «Then and Now»

**Herbicide testing
lamb's lettuce 2005**



Evaluation of effectiveness and compatibility with the crop

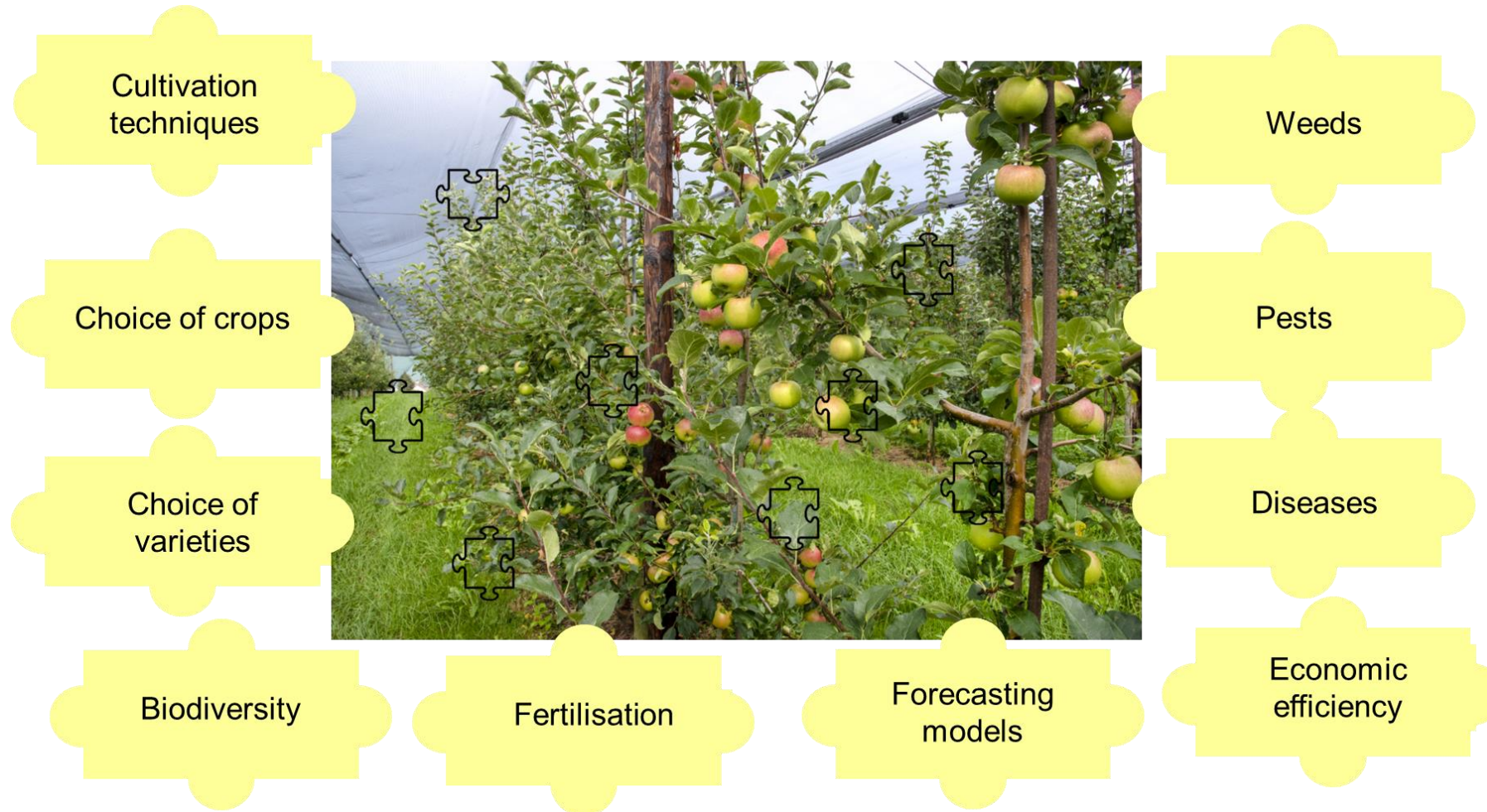
System development 2022: banker plants and flower strips for aphid control in salad crops



Optimising and combining the individual process steps

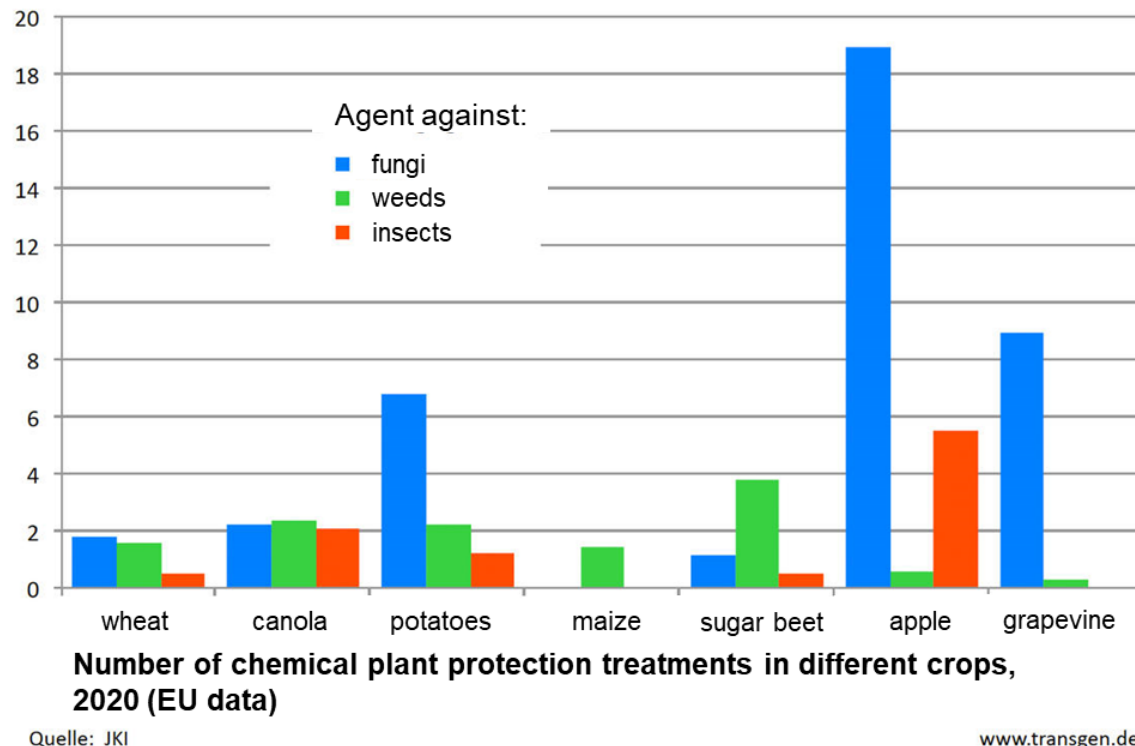


Systems Research in Fruit Production





Disease Resistant Varieties are Needed: Breeding could be a powerful tool



Classical breeding for resistant varieties:

- Cannot directly improve traditional, well-known varieties → market acceptance lacking
- Takes a very long time, usually >20 years

 **Use of Genome editing / CRISPR/Cas?**



Disease Resistance in Apple and Grapevine

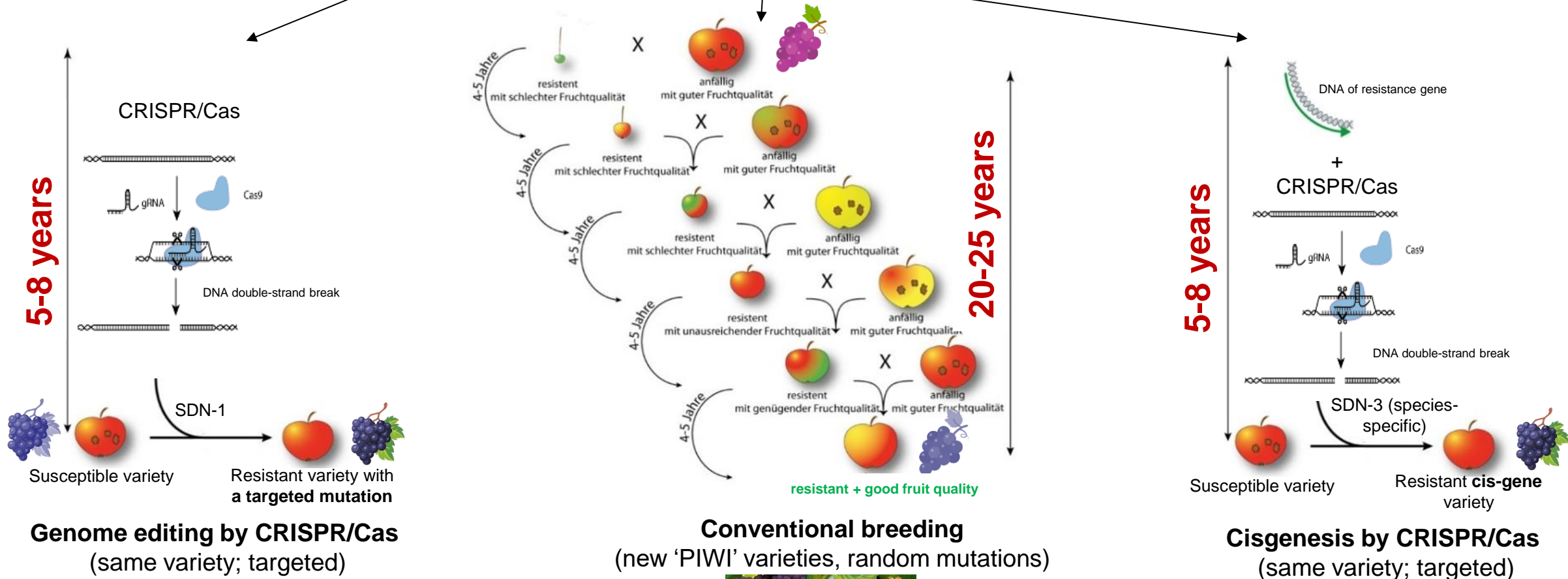
CRISPR/Cas for fast and targeted changes



Leaf blight- and scab resistance in apple



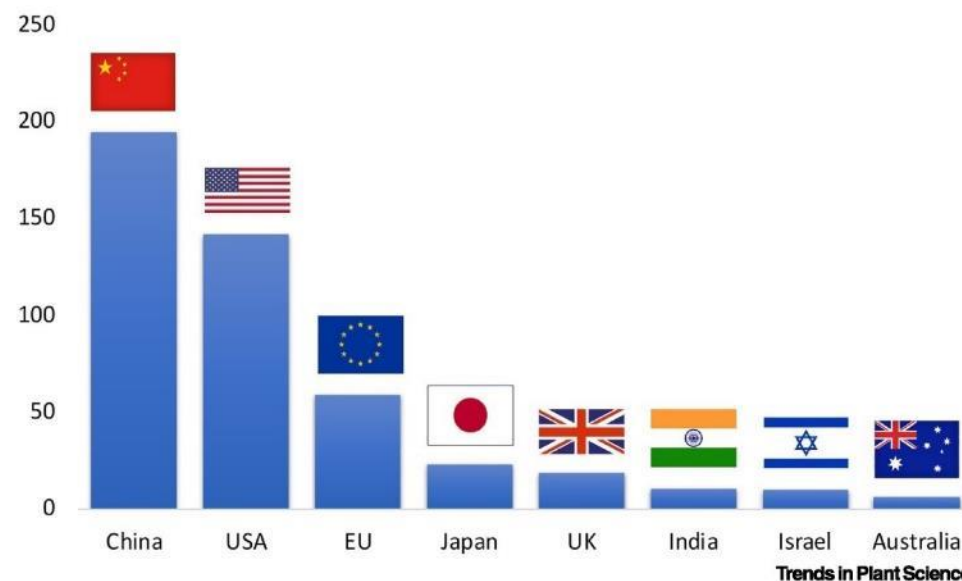
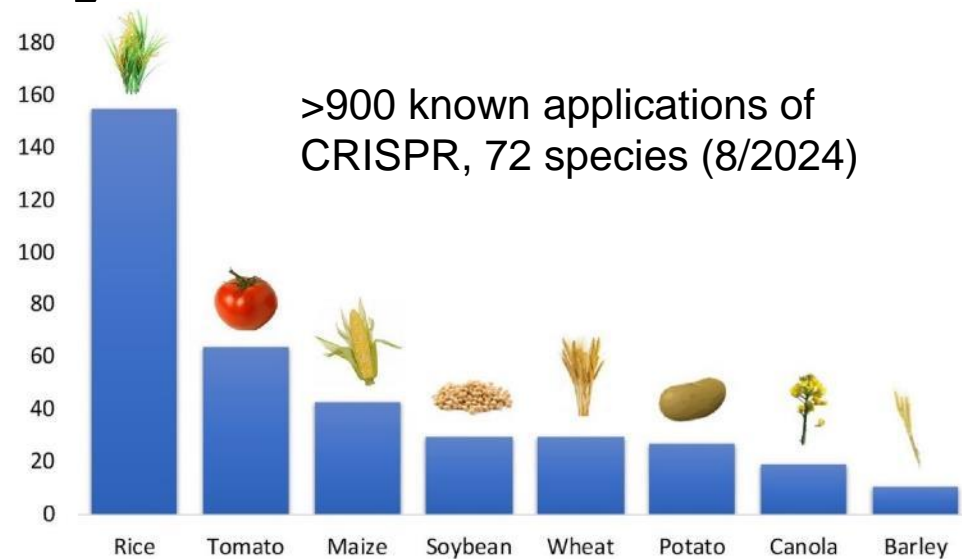
Powdery mildew resistance in grapevine





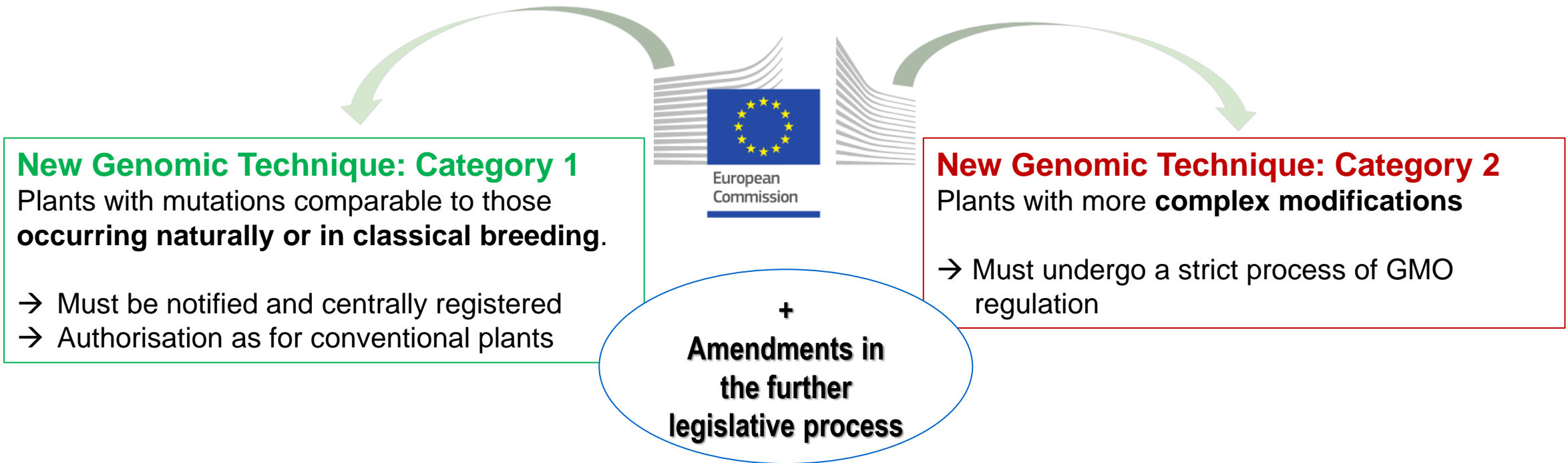
Applications from Genome Editing Becoming Internationally Available

- NBTs can resolve trade-offs:
e.g. minimal plant protection vs. productivity
- Products from NBTs (no transgenic DNA) approved without declaration in various countries:
USA, Argentina, Japan, Australia, etc.
- EU:
 - Potentials in Green Deal highlighted
 - Commission tabled proposal in 2023
- CH: The moratorium and the old Swiss Genetic Engineering Act slow down R&D for tailor-made products





EU Commission Proposes 2 Categories of NGT Plants

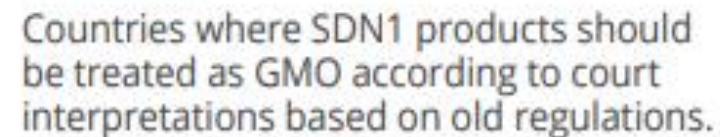


➔ Approach is generally welcomed by research and breeding (more science-based)



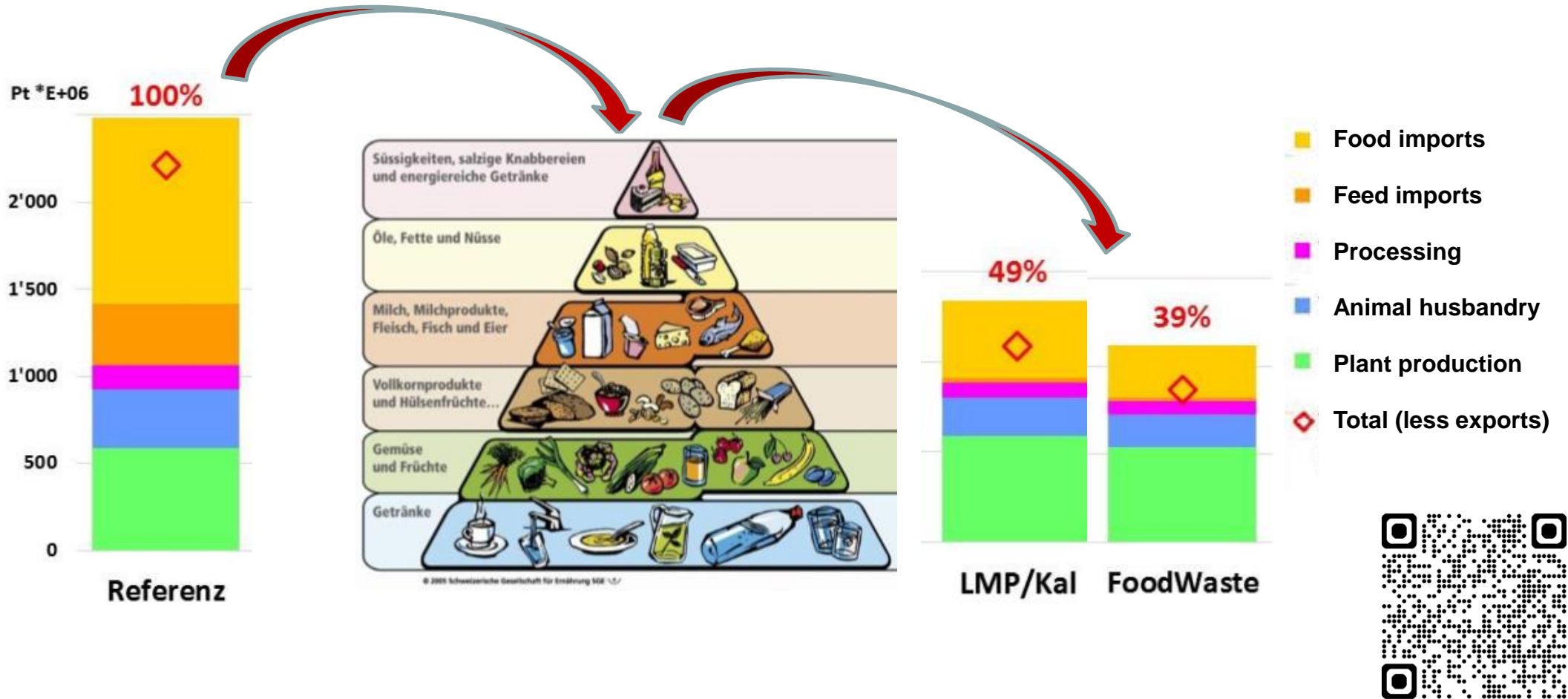
Red line in Switzerland: “Genetically modified organisms without foreign genetic material (created using NGTs)”

- different regulation required (proposal tabled in 2024)





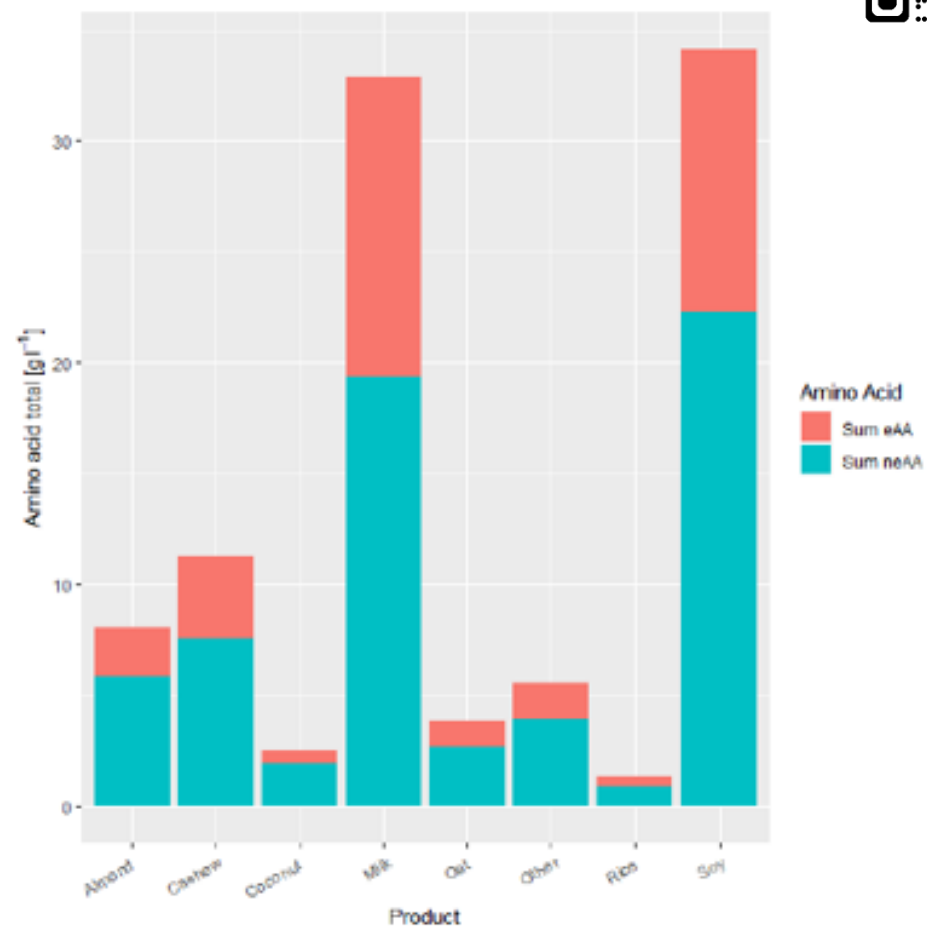
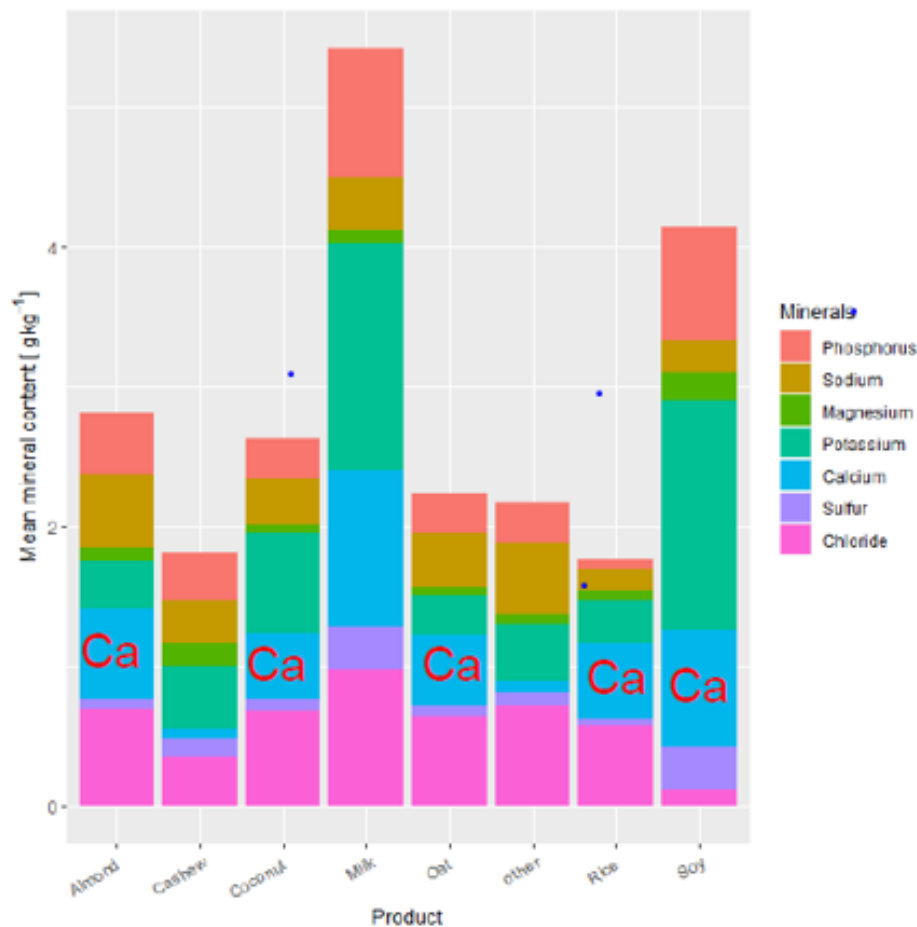
Consumers Influence Environmental Impact – An Optimised Diet Protects the Environment





Diets Need to Change

but plant protein drinks \neq milk





Microalgae – alternative Feeds?



Nutrient source of the future?

- Decentralised production of nutrient-rich food and feed
- Cultivated hydroponically
- Resource-efficient downstream process for direct use or wet extrusion
- Photoautotrophic cultivation for maximum carbon capture
- Mixotrophic cultivation for optimised utilisation of side-streams in food processing



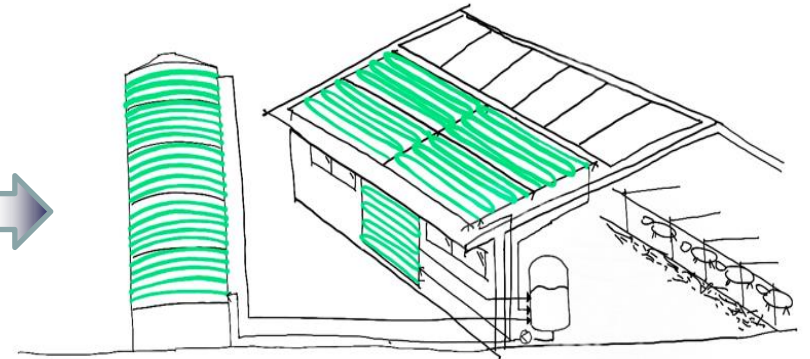
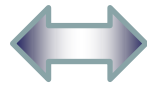
Our Vision: From Lab to Practice?



x100



x20





Making Use of Our Opportunities



Bildquelle: Kommunikationsagentur Maybaum



Bild: Le1930



Bildquelle: el Patrol art+advertising GmbH



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