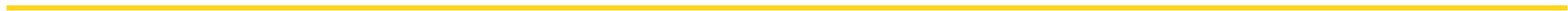
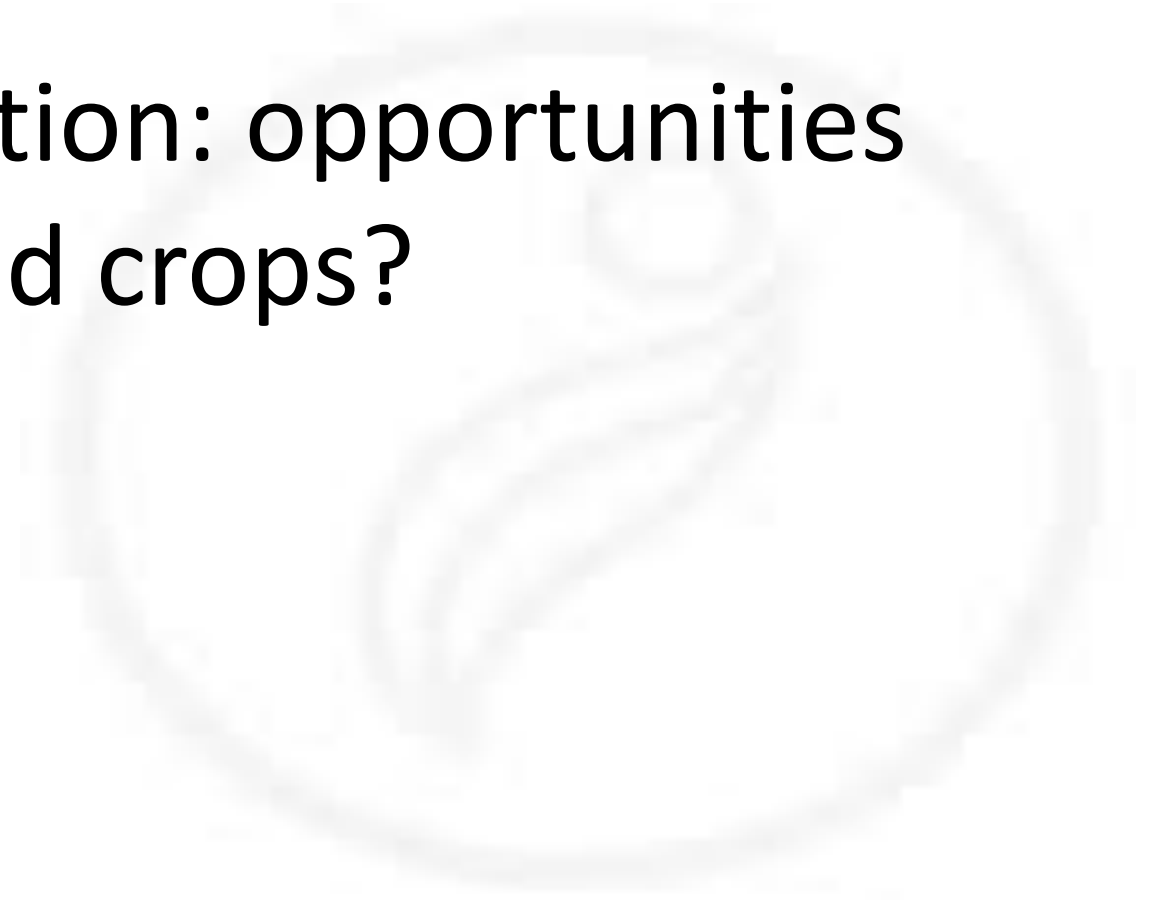


Plant breeding innovation: opportunities for vegetables and field crops?

Michael Keller, Secretary General

International Seed Federation

AFSTA, Congress Thursday 2 March 2017



Seed sector trends: On the increase

- global seed market
- number of regulations
- speed of breeding/commercial processes
- counter season breeding/ production
- focus on abiotic tolerance
- spread of diseases
- fluctuation of commodity prices
- re-export
- phytosanitary measures
- use of plant variety protection (UPOV members/ applications)

Seed sector trends: On the increase

- availability and adoption of international certificates: varietal identification – quality testing
- illegal seed practices
- consolidation of the sector
- ageing population in developed countries – impacts flowers
- consumer taste/ preferences
- farm size – farmers' information on seeds
- recognition of the importance of seed sector in agriculture by international organizations, donors, etc...
- public/private partnerships

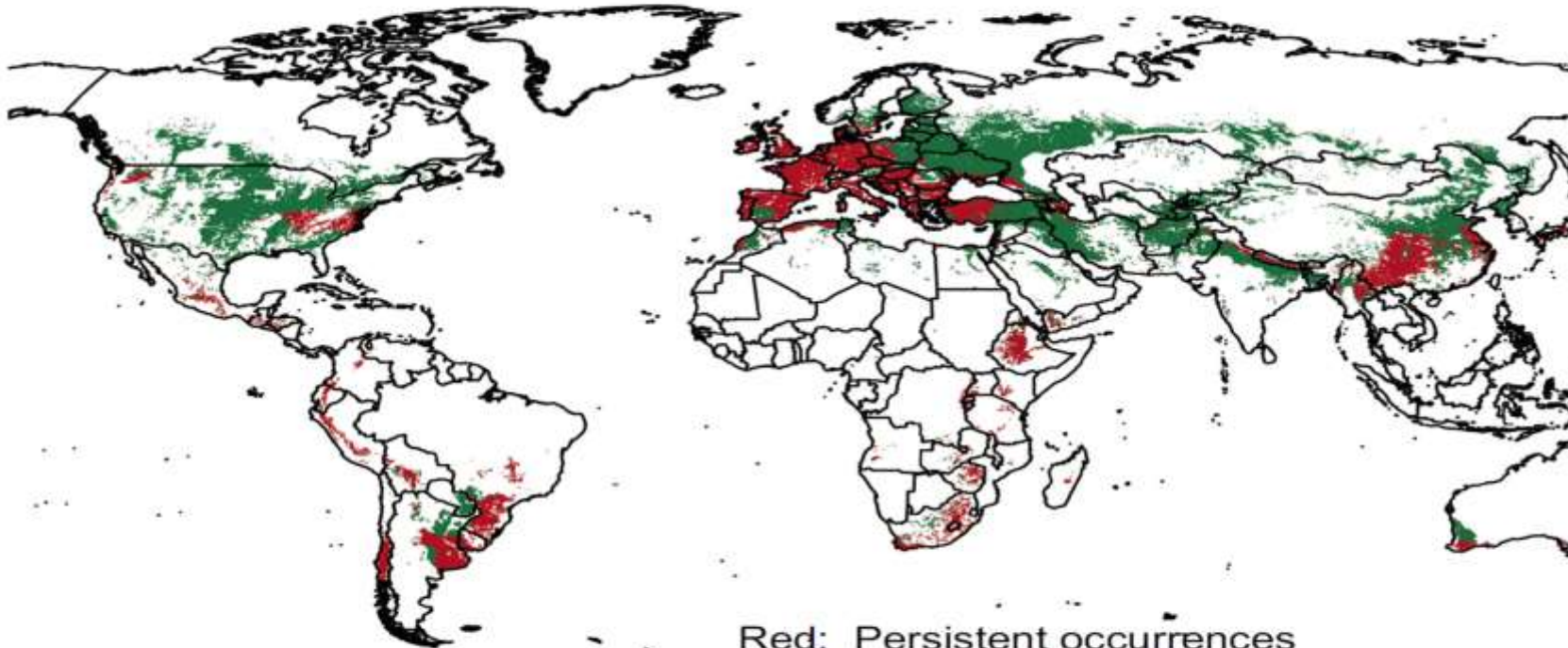
Seed sector trends: On the decrease

- price of transportation
- variety life time
- students of plant breeding/plant physiology/agronomy /genetics
- investment in public breeding
- smallholder farmers
- number of seed companies

Crop pests and diseases – a global issue

Global vulnerability for yellow rust

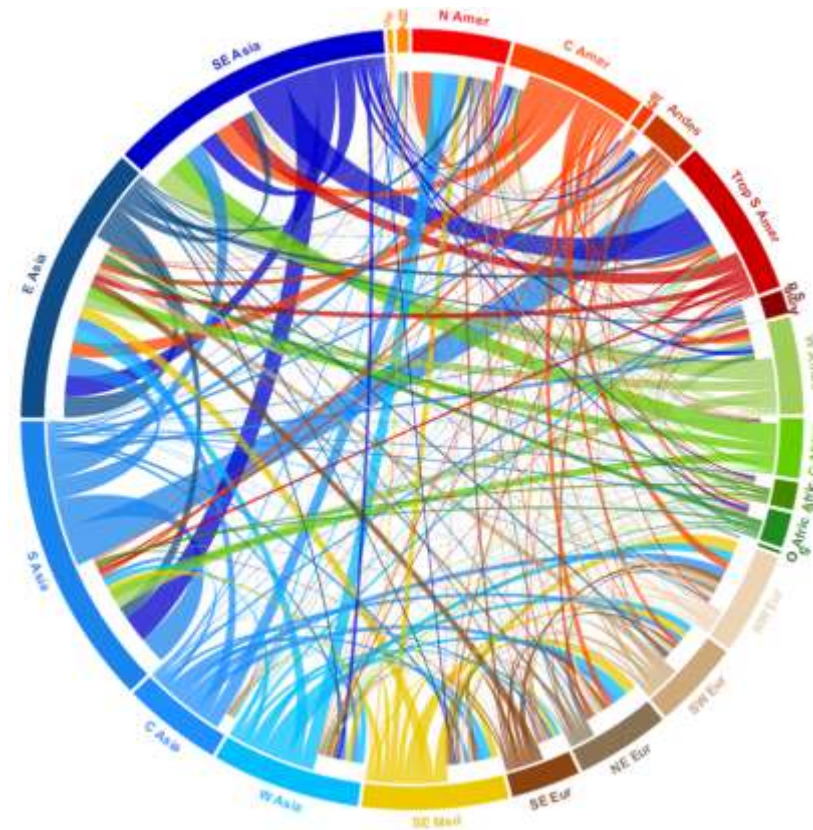
(Modelled by Pardy et al. 2015)



Red: Persistent occurrences
Green: Occasional occurrences



Genetic resources: global interdependency

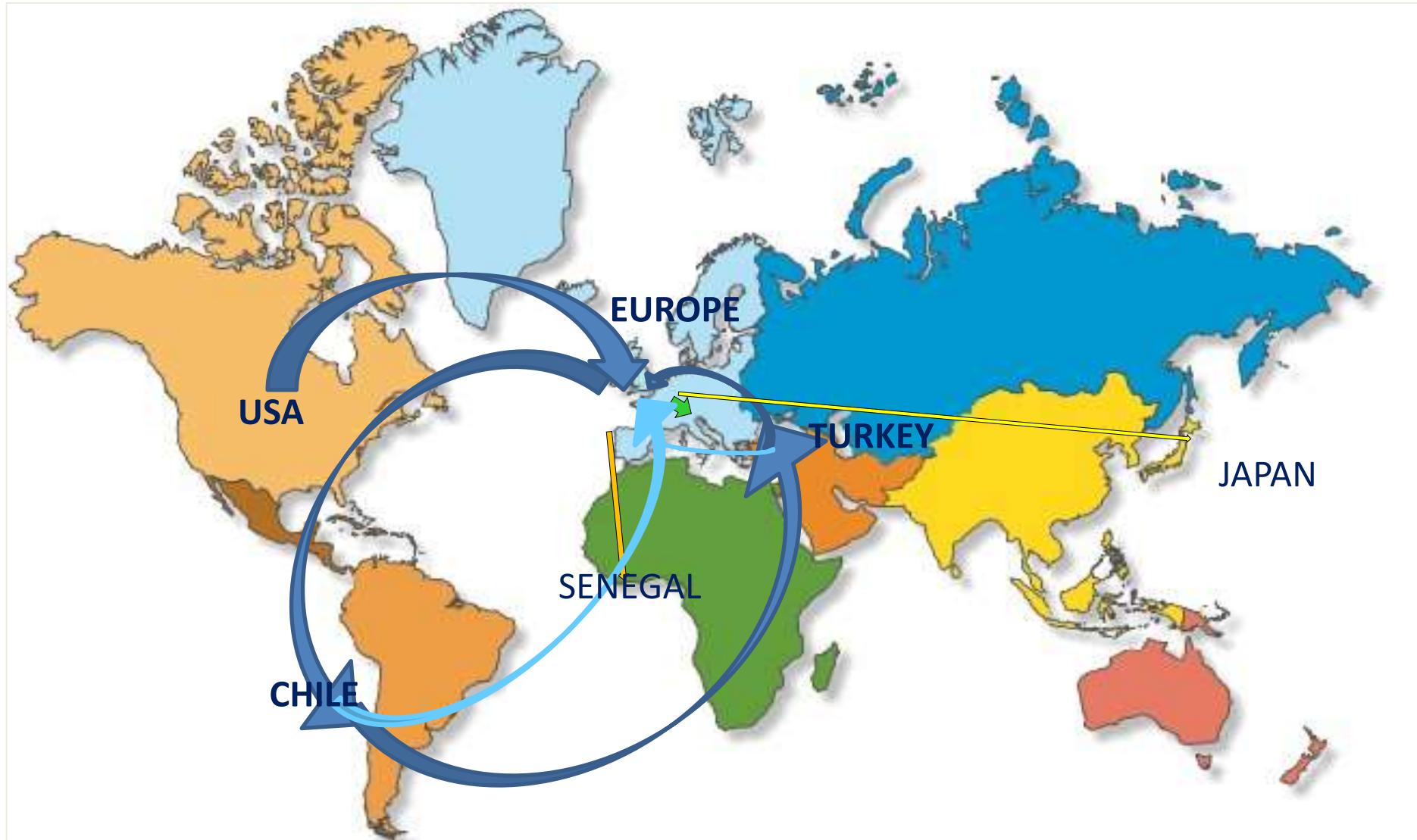


“Origins of food crops connect countries worldwide”

International Center
for Tropical Agriculture (CIAT)



Potential pathway of a corn variety



Plant breeding innovation

Plant breeding innovation can contribute to overcoming global challenges:

- Changing climate
- Limited resources (i.e. land, water, energy)
- Crop pests and diseases

Plant breeding innovation defined

Plant breeding innovation:

- describes the constantly evolving ideas and practices which enhance the field of plant breeding
- is the way to adapt crops to the local needs
- reflects the continuum of innovation in plant breeding.
- it does not focus on any particular group of techniques, nor is it defined by them.

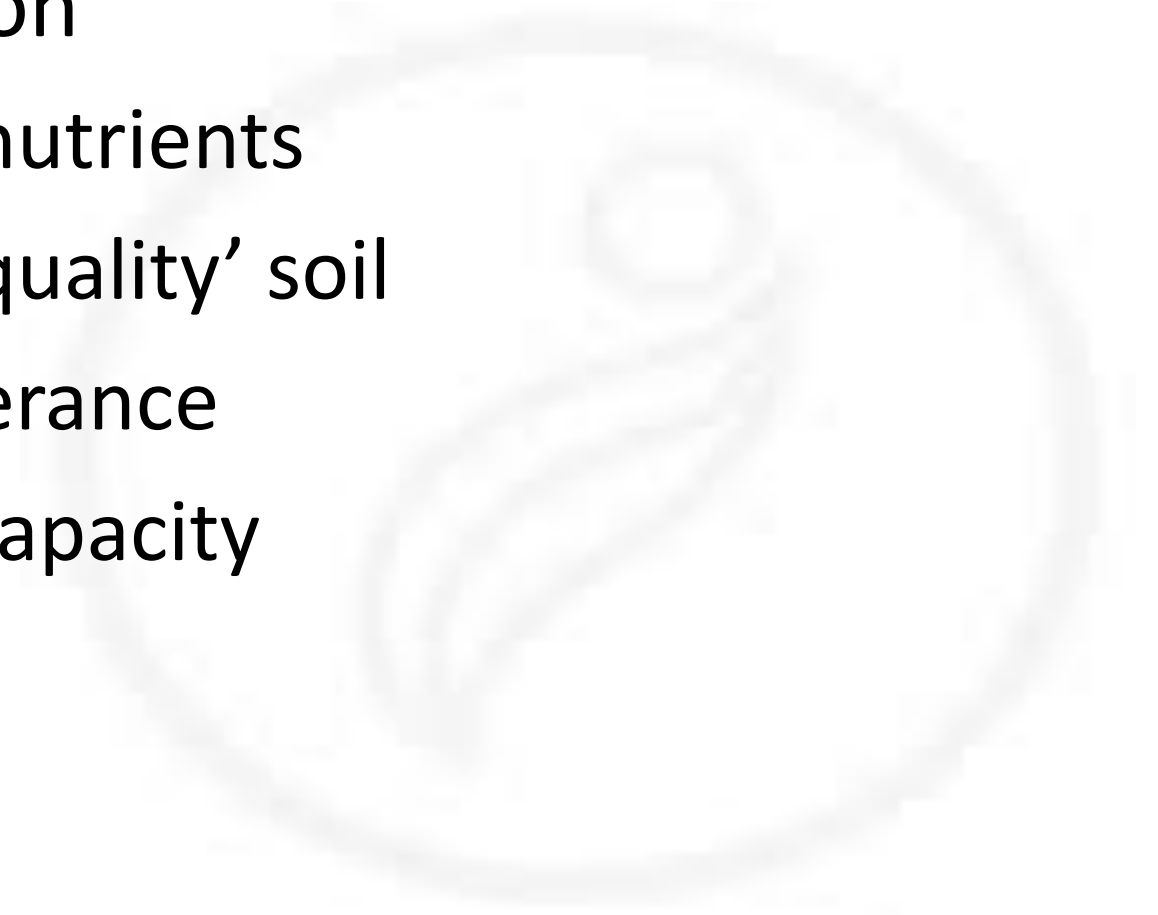
Goals of Plant Breeders

Plant breeders have always strived to:

- create new variations of plant characteristics
- provide solutions for disease and pest resistance
- increase tolerance to environmental stress
- achieve higher yields
- meet consumer expectations.

Ahead of us we could have a more sustainable production

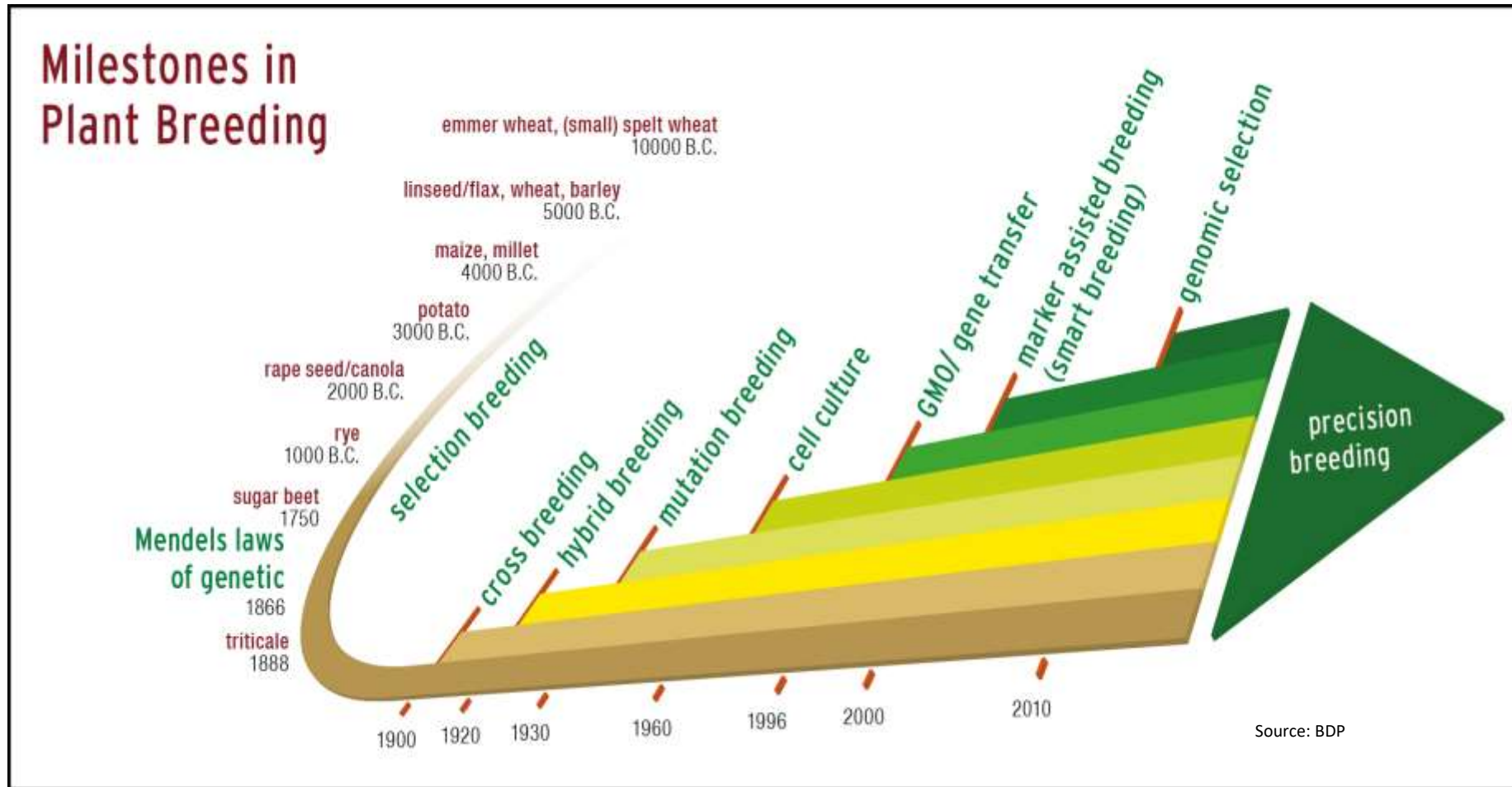
- More Sustainable Production
 - efficient use of water and nutrients
 - ability to grow on 'poorer quality' soil
 - increased temperature tolerance
 - improved photosynthetic capacity
 - reduced use of inputs



Plant breeding innovation: background

- Plant breeders continue to develop methods to safely increase precision and efficiency of breeding.
- Genetic variability: historically the source material for new plant characteristics is:
 - (a) inherent genetic diversity in a plant's gene pool
 - (b) naturally occurring and induced variations of existing genes
- Latest breeding methods, such as genome editing, also use genetic variability as source material.
- **The plant varieties developed using these new tools could, in most cases, be developed through traditional breeding.**

Evolution of plant breeding innovation



Importance of gene editing in plants

- **More targeted plant breeding:** we can improve precision by making specific changes to a plant's DNA using the plant's own internal processes.
 - Activation of a beneficial characteristic (e.g. drought tolerance or increased nutrition)
 - Deactivation of an unfavorable characteristic (e.g. disease sensitivity)
 - Small changes to the DNA that reproduce a characteristic found within the plant's family – like disease resistant characteristic found in a wild relative.
- **More efficient plant breeding:** we can swiftly adapt varieties to meet the challenges of a changing world (e.g. resistance to new plant disease).

Regulation of the products of innovation

Now: Patchwork of regulation

- Process-based/ Product based/ etc...
- Unclear scope of regulation
- Uncertain timelines
- Non-scientific regulation

Future: Consistent criteria

- Common endpoints
- Common scopes of regulatory oversight
- Science - based

Importance of consistent criteria

Regulators:

Meet development goals
Benefit national economy
Prosperity for citizens

Traders:

Create better seed
No new trade barriers

Plant breeders:

Access to latest methods
Legal certainty
Better varieties for farmers & consumers

Academic institutions:

Opportunities for collaboration
Attract investment
Attract public-private partnerships

Farmers:

Access to better seed
Fight plant disease and pests
Smallholder could be met more precisely
Livelihood & prosperity

Consumers:

High quality
Wide variety
Affordable prices

So how are we going to get there?

Our “roadmap” will lead to consistent policies

- ISF Concept Paper: *‘Consistent Criteria for the Scope of Regulatory Oversight’*

Underlying principle for determining the criteria:

“Plant varieties developed through the latest breeding methods should not be differentially regulated if they are similar or indistinguishable from varieties that could have been produced through earlier breeding methods.”

- Consistent Criteria >> What are they?

Consistent criteria

The resulting product would not fall under the current scope of GMO regulation if:

- it does not contain a novel combination of genetic material; or
- the final plant product solely contains the stable insertion of inherited genetic material from sexually compatible plant species; or
- any form of mutagenesis is involved.

Plant breeding Innovation: Global focus

- Clear, science-based, government policy
- Facilitation of innovation and collaboration
- Consistent approach across countries
- ISF international strategy built on: core countries, alliances and communication.

Conclusion

Latest breeding methods provide opportunities to target global challenges as well as local needs and can help us achieve our common vision.

We have to engage together and we need your voice!



Seed is Life

World Seed Partnership (WSP)



- Initiative launched by four international organizations
- To support the development of the seed sector in countries around the world
- To provide guidance on the development of an appropriate and effective seed regulatory framework

➤ [WSP Website : worldseedpartnership.org](http://worldseedpartnership.org)

➤ [WSP Contact: info@worldseedpartnership.org](mailto:info@worldseedpartnership.org)

