

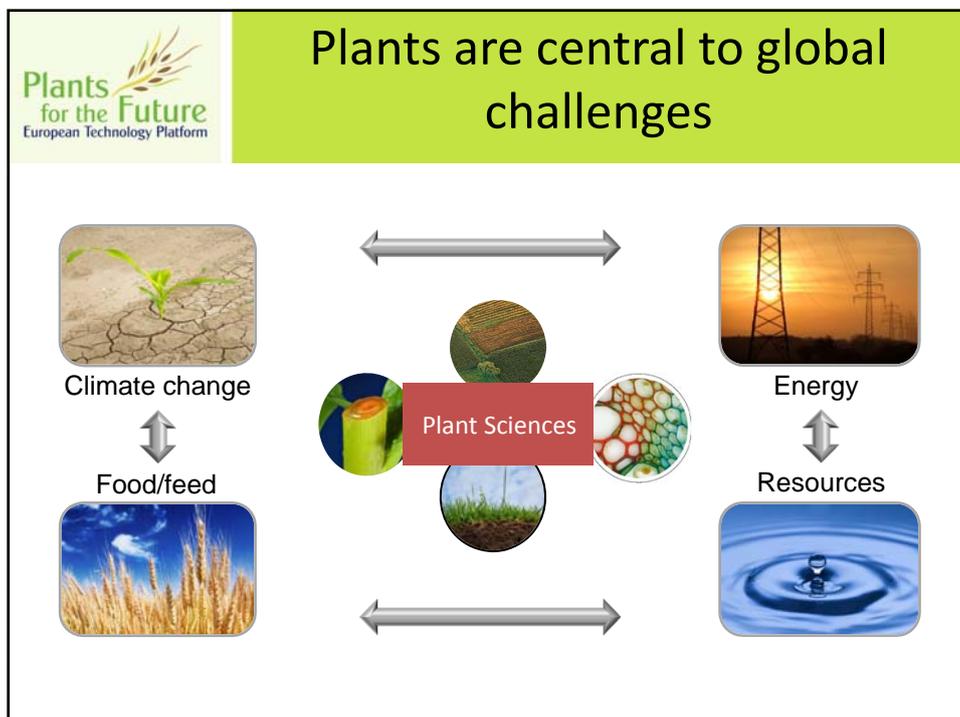
**Plants for the Future**  
European Technology Platform

*Plant Biology Europe 2016  
Prague*



**The European Plant Sector –  
Importance and  
Targets in Research, Innovation  
and Education**

Prof. Uli Schurr  
Chairman of ETP 'Plants for the Future'



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## Plants are in the center of our daily life and welfare

**Food & Feed**



**Clothes & Textiles**



**Heating & Biofuels**



**Ecosystem services, Pleasure & Recreation**



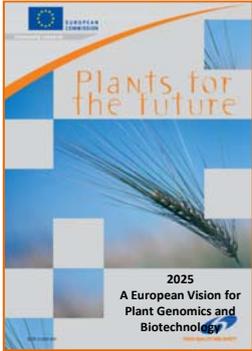
 Research gains relevance, when integrated into products, services and regulation

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## Plant sector is a cornerstone of the European economy

**Plant sector: combined agricultural & food sectors, plant science**

- 30 million jobs (13,4% total employment)
- 3,5% total Gross Value Added in EU-28
- 40 % of EU lands are farmed
- 10-20 % of annual turnover in R&D
- 50,000 scientists in public sector
- 13,000 R&D employees in private sector



*"The future competitiveness of Europe's agricultural and Agro processing industries will depend on plant genomics, biotechnology and their smart application"* (Plant ETP Vision, June 2004)



## European Technology Platform Plants for the Future

Breeder - Industry – Academia – Farmers



>7000 Companies (90% SMEs)





European Plant Science  
Organisation  
>220 Research Institutes & Uni  
> 22.000 researchers










76 Farmers' Organizations & 40.000 Coop







## The economic, social and environmental value of plant breeding in Europe

HFFA Research GmbH

The economic, social and environmental value of plant breeding in the European Union

An ex post evaluation and ex ante assessment

Corresponding author: Steffen Noltepp



HFFA Research Paper 03/2016

- Ex-post study on the economic value of plant breeding
- Initiated by Plant ETP
- undertaken by an independent researcher

Aims

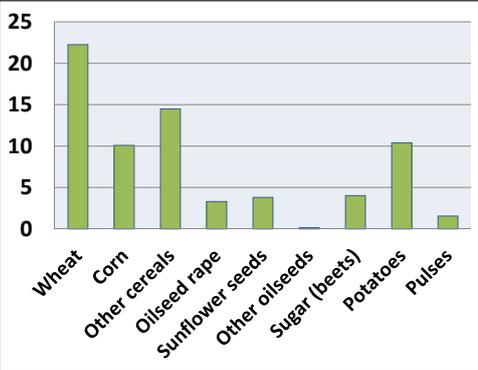
- Science-based and methodological sound data on plant breeding benefits
- importance of plant breeding for productivity growth in EU agriculture
- Specific benefits plant breeding has offered since the turn of the millennium

<http://www.plantetp.org>



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## The economic, social and environmental value of plant breeding in Europe



Crop	Additional supply (in 10 <sup>6</sup> tons)
Wheat	22
Corn	10
Other cereals	14
Oilseed rape	3.3
Sunflower seeds	4
Other oilseeds	0.5
Sugar (beets)	4
Potatoes	10
Pulses	1

Source: HFFA Research GmbH (2016).

Additional annual crop supply of plant breeding in EU since 2000 (in 10<sup>6</sup> tons)

### Yield and Productivity

**Thanks to plant breeding, every year farmers in EU grow additional:**

- ✓ 22 million tons of wheat;
- ✓ 10 million tons of corn and potato;
- ✓ 3.3 million tons of oilseed rape.



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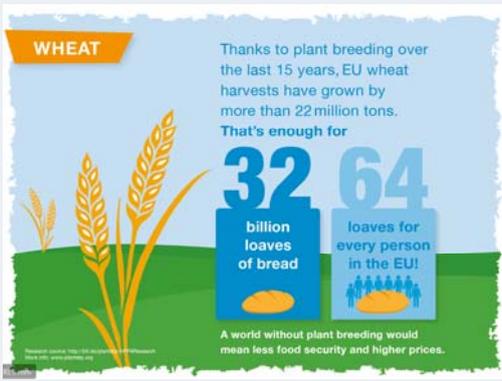
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HFFA Research Paper 03/2016





WHEAT

Thanks to plant breeding over the last 15 years, EU wheat harvests have grown by more than 22 million tons. That's enough for

32

billion loaves of bread

64

loaves for every person in the EU!

A world without plant breeding would mean less food security and higher prices.

<http://www.plantetp.org>

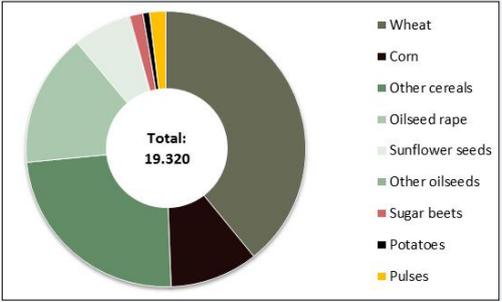
EU plant breeding has largely **improved global food supply** - enough to additionally **feed 160 million** people with kcal.



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## The economic, social and environmental value of plant breeding in Europe

### Land and resource use



Total: 19.320

Source: HFFA Research GmbH (2016).

✓ Without plant breeding Europe would need an extra 19 million hectares of farm land to produce the same amount of food.

Avoided net virtual land trade with plant breeding for major arable crops in EU since 2000 (in million ha)



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## The economic, social and environmental value of plant breeding in Europe

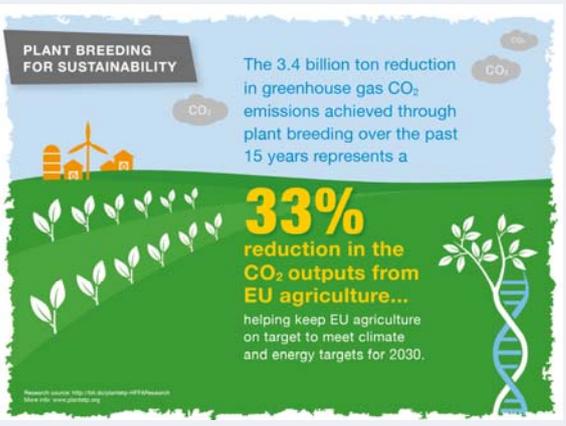
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hffa  
RESEARCH



PLANT BREEDING FOR SUSTAINABILITY

The 3.4 billion ton reduction in greenhouse gas CO<sub>2</sub> emissions achieved through plant breeding over the past 15 years represents a

**33%** reduction in the CO<sub>2</sub> outputs from EU agriculture...

helping keep EU agriculture on target to meet climate and energy targets for 2030.

Research source: HFFA 15th Anniversary HFFA Research Report 2016 (www.hffa.org)

<http://www.plantetp.org>



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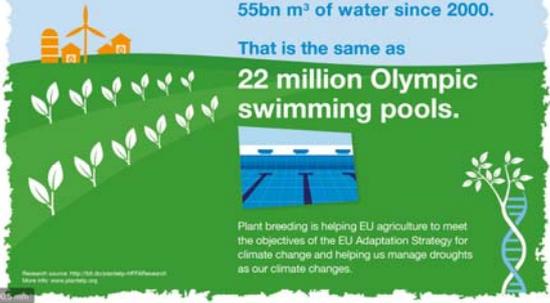


PLANT BREEDING FOR SUSTAINABILITY

Plant breeding has enabled EU farmers to save nearly 55bn m<sup>3</sup> of water since 2000.

That is the same as

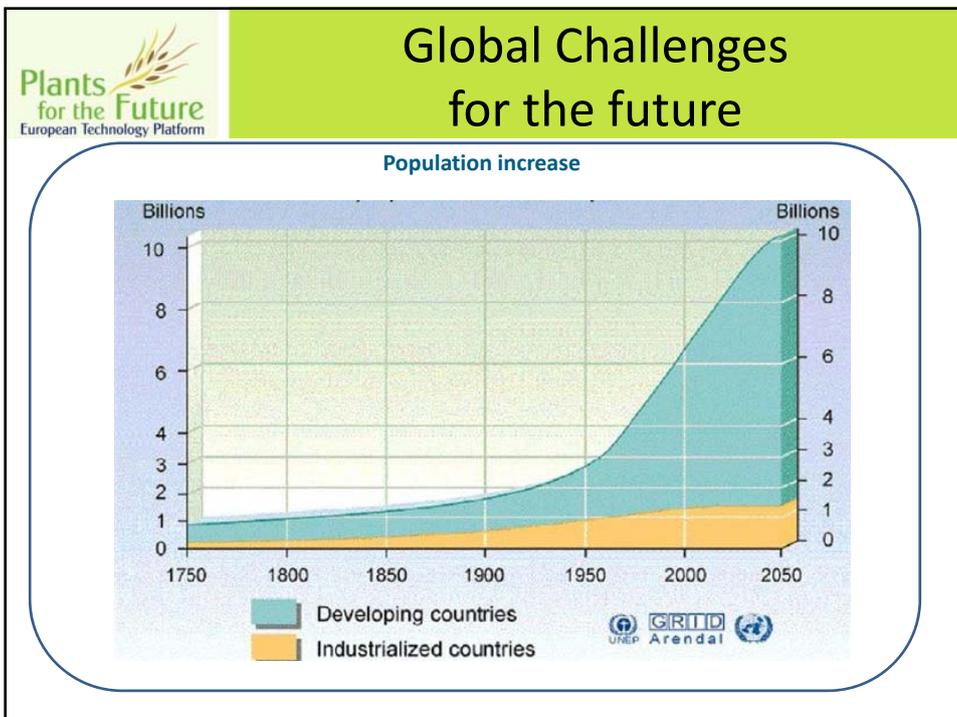
22 million Olympic swimming pools.



Plant breeding is helping EU agriculture to meet the objectives of the EU Adaptation Strategy for climate change and helping us manage droughts as our climate changes.

Research source: <http://100.technology.hfffa.eu>  
Date 06/2016 www.plantetp.org

<http://www.plantetp.org>

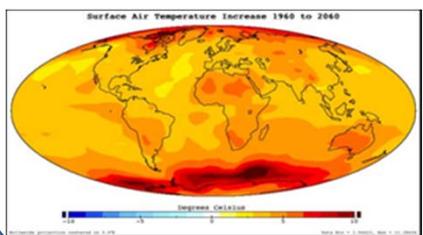




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## Global Challenges for the future

**Climate change**



**Agro-Biodiversity at risk**

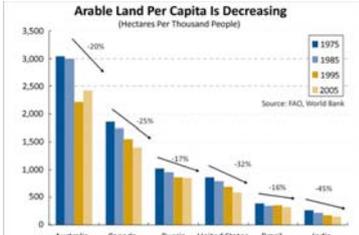


**Feeding the future**

We must mine the biodiversity in seed banks to help to overcome food shortages, urge Susan McCouch and colleagues.

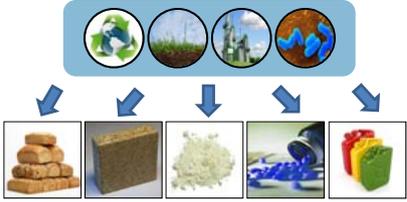
**Limits of yield and land**

**Arable Land Per Capita Is Decreasing**  
(Hectares Per Thousand People)



Source: FAO, World Bank

**Novel demands in quality and scale**





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## Urgent need for strategic action - Integrated strategy

- **Mapping**  
needs & bottlenecks
- **Identification**  
key actions & solutions
- **Implementation**
  - National, multinational
  - EU (e.g. H2020)
  - Global level (e.g. FAO)
- **Launch in January 2015**



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## Innovation Action Plan to 2020

**Innovation Action Plan:**

- Link of market needs and idea generation
- Ease flow from idea to marketable product
- Develop innovation culture in Europe




How can innovation be boosted and research-to-market be shortened?

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## Key Actions to build sustainable innovation leadership in European agriculture

**Ensure innovation success**

- Promote **critical scale in basic and applied research**
- Reduce risk of engaging in applied research
- **Enable use of all processes and technologies considered safe**
- Reduce cost and time-to-market

**Increase innovation predictability**

- Develop a transparent approach to IP management and access to plant genetic resources
- Develop public-private interfaces for enterprises



**Improve innovation coordination**

- Improve sustainability and global leadership through regulation, standards and procurement
- **Integrate costumers and farmers in innovation process**
- Communicate skill needs in entire sector
- Integrate and make data & knowledge accessible across value chain

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## Research Action Plan to 2020

**Research Action Plan:**

- Improve competitiveness and critical scale of European plant research
- Balance knowledge- and application-driven plant research
- Work on priority research areas



How can future research contribute to innovative solutions for societal and market challenges ?



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## Key actions to boost research for a sustainable bioeconomy

**Sustainable plant production and yield**

- Improve resource use efficiency and resource stewardship
- Enhance yield and yield stability for increase resilience in dynamic environments
- Improve plant health for resilient production

**Quality of food, feed and non-food products**

- Develop plants with improved composition for human and animal nutrition and health
- Improve composition and performance of plants for non-food products

**Vibrant research environment**

- Develop and implement horizontal actions
- Strengthen basic and applied research and research infrastructure to secure innovation



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## Education Action Plan to 2020

**Education Action Plan:**

Provide short-, mid- and long-term

- Skill needs in plant R&D
- Career opportunities in plant sector




- How to secure people and workforce for the plant sector and bioeconomy?
- How to embed plant and agricultural sector in society?

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## Key actions to educate and train the next generation

**Three key actions to help ensuring an appropriately qualified and skilled future workforce:**

**Build a sustainable workforce for the plant sector**

Clustering of plant sciences & agricultural disciplines and integrating with other disciplines to ensure the mobilisation of all relevant knowledge

**Foster future of the plant sector through research, education and training**

Public funding, public-private cooperation & greater engagement with agricultural production chain

**Increase public appreciation of the plant sector**

Outreach activities are key to raise essential public awareness of importance of plant sector and to increase its appreciation



## From Action Plans to Action



Let's work together !

- Challenges are global & urgent
- Joint effort of all stakeholders needed