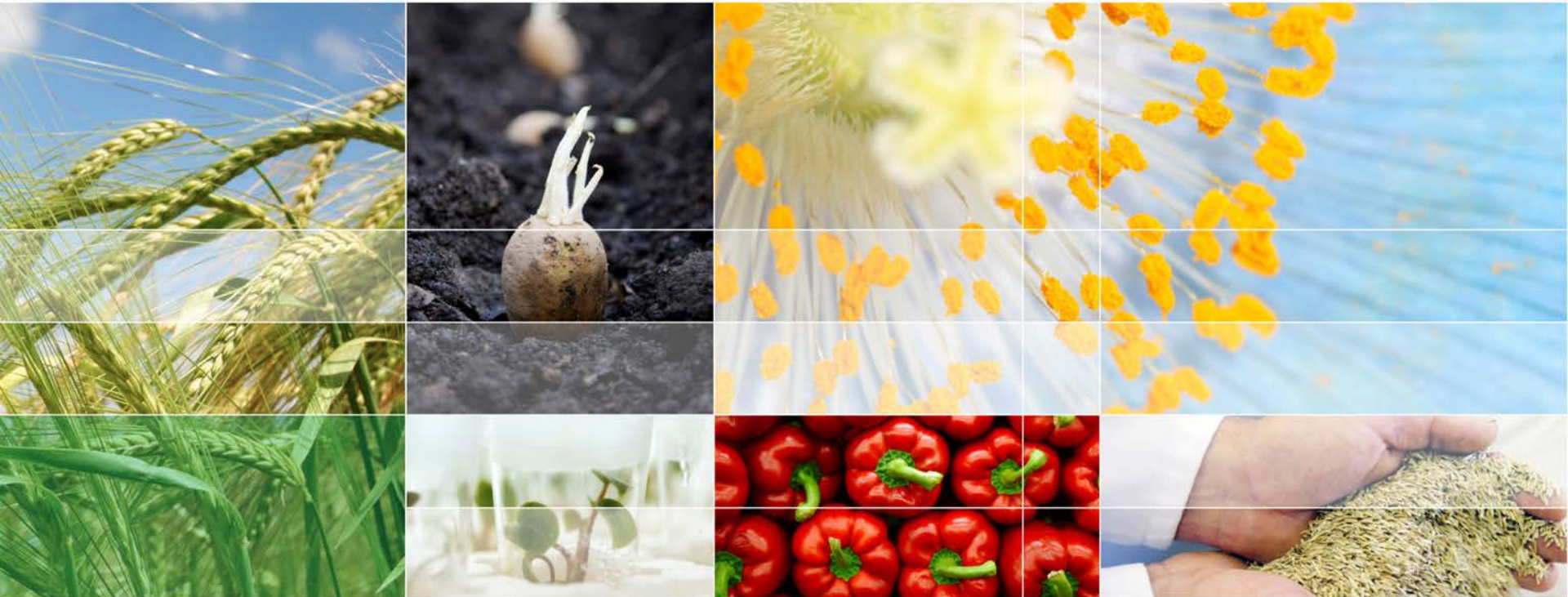


The value of plant breeding

In the past and the future

Niels P. Louwaars, director



Crop production

Crops are the basis of almost all our food (all except fish and hunted/gathered products).

Crops are also essential for wellbeing and health (ornamentals) and a variety of industrial raw materials.

With the depletion of fossil resources, crops are likely to become increasingly important for society

Seeds and other planting materials are the basis of all crop production



Plant breeding - why

Plant breeding is the science, art and business of crop improvement

“Improvement” relates to the value that users attach to the plant, i.e. optimising performance

- In the cropping system e.g. yield, adaptation to mechanisation, yield stability
- To abiotic and biotic stresses
- To the needs of transporters, to processors, retailers
- To consumer preferences



Yield

Cereal yields have steadily increased with 1 or 2 percent per year reaching this year over 10 Ton/ha. NIAB (UK) estimates that 80% of yield increases over the past 25 years are due to breeding

Projected yield loss in the EU since 2000 assuming there would have been no plant breeding:

Wheat, pulses, maize, oilseed rape 15%
Potato, sugar beet 20%
Sunflower 25%

(equal to 45 million Tons of cereals)
(equal to approx 22% less income for farmers)

Stresses

Breeding contributes to sustainability

Non-biotic

- Adapting maize to northern European conditions
- Potato varieties that use 20% less water in Northern Africa

Biotic stresses

- Resistances to ever adapting pests and diseases contribute to sustainability



Value chain qualities- examples



Enhanced brewing quality of barley

Low erucic acid oilseed rape



Improved vase life of carnation

'non-leaking' tomatoes for hamburgers

Lettuce with even-sized leaves for packing industry

.....



Consumption qualities - examples



Lunchbox peppers

Diversity in shapes, colors, taste of tomatoes



High-taste strawberries

Non-allergenic primula

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Value of the breeding sector

Sector plant reproduction materials itself:

In the Netherlands: approx 2.4 billion Euro
75% of this is export value

Value of seed in the value chain – example tomato:

Seed	(20,000)	8,000 E
Farm-gate tomatoes	(800 Ton)	500,000 E
Retail tomatoes	(1.75 E/kg)	1,400,000 E

Value of public investment:

British research: 1 UKP invested in breeding has a return of 40 UKP for society

How do breeders maintain this? Innovation!!

- 18th c.: Biological knowledge cross-breeding
- 1880: Family selection methods
- 1900: Rediscovery of Mendel's laws – genetics
- 1910: Hardy&Weinberg and 1920 Fisher: quantitative genetics
- 1920s: hybridisation
- 1930s: Mutation breeding
- 1950s: Watson&Crick - Molecular biology
- 1970s: Transgenesis – 1970s
- 1980s – present: Other molecular tools

Conclusion

Plant breeding is part of the solution

No sustainable production without breeding

Seed doesn't cost – it pays

Breeding = innovation – breeding needs innovation

**Plant Breeding Matters - - - - not only to breeders and
farmers - - - - but to society**