

World Café on the Impact of PVP

Why is plant breeding important?

Office of the Union - UPOV

*Train-the-Trainer Course on Plant Variety Protection under the UPOV Convention
UPOV Headquarters, Geneva - May 13, 2016*

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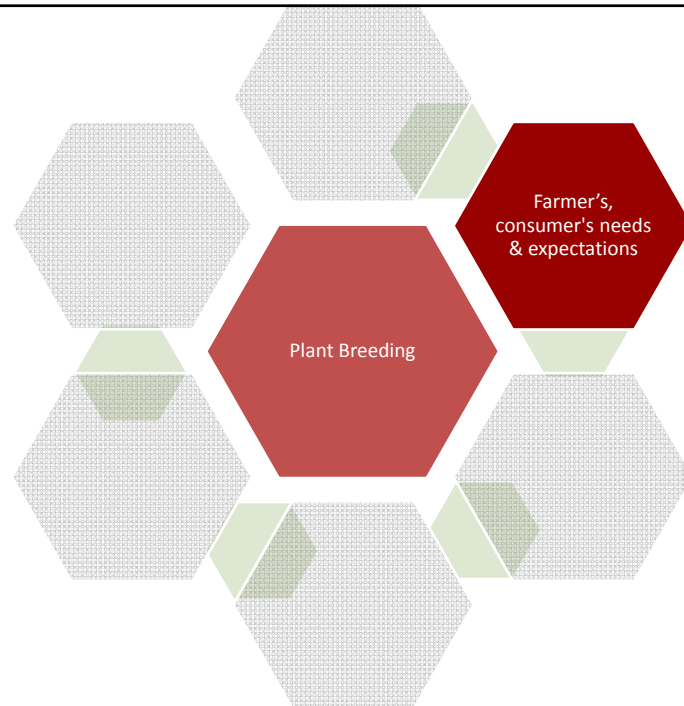
**WHY IS PLANT
BREEDING
IMPORTANT ?**

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PLANT BREEDING IS
IMPORTANT FOR :

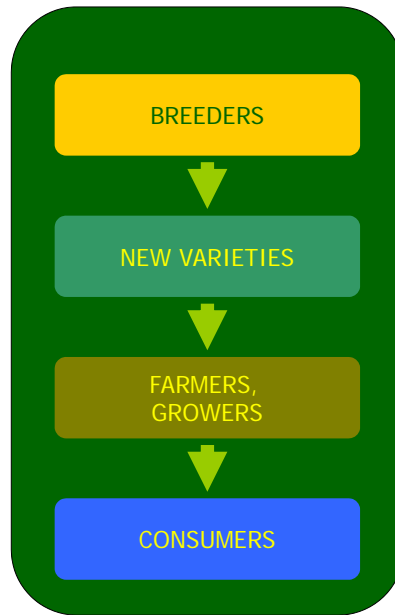


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Importance of Plant Variety Protection



Plant breeding targets



Farmer	Logistics	Distributor	Consumer
Agronomic characteristics: Yield Pest & disease resistance Abiotic stress resistance Earliness Harvestability Market value	Harvestability Transportability	Earliness Storability Appearance Price	Organoleptic (taste, sight, smell, touch) Convenience Nutritional value Price



Improved Varieties

Hot pepper

Development of disease resistant variety

🟡 Dok-Ya-Cheong-Cheong
Resistant to phytophthora blight/virus

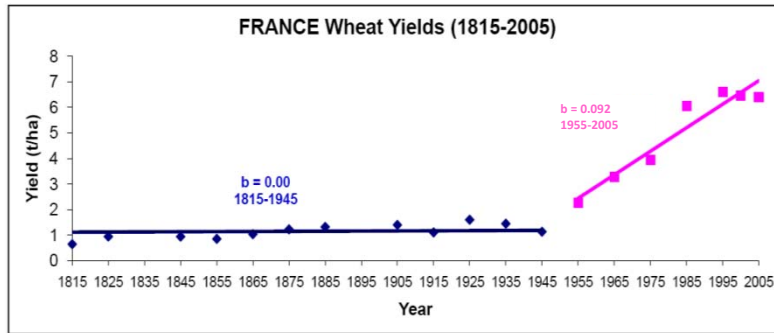
Phytophthora blight (Fungal disease):
- above : **Resistant variety**
- below: **Susceptible variety**

Chang Hyun Kim, Second World Seed Conference

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Importance of Plant Breeding

Evolution of Wheat yield in France



Bernard Le Buanec,
Second World Seed Conference (Rome, September 2009)

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Impact on Agricultural Industry

- Increases in yields = better varieties

- Wheat 21%
- Canola 24%
- Peas 32%

- Increases in area under cultivation

- Canola 72%
- Soybeans 94%
- Peas 578%

- Increases in Investment

- Canola 216%
- Corn 107%
- Soybeans 162%
- Pulse crops 130%



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

– Results achieved so far* –

Steffen Noleppa
HFFA Research GmbH



** This research has been initiated and financially supported by ETP. The results of the study are the sole responsibility of the author and have never been influenced by the initiator and supporter of the study.*

October 13th, 2015, Vienna

EU: 2000-2013

Additional agricultural GDP amounts to EUR 8.5 billion:

- Wheat: EUR 3.1 billion
- Corn (Maize) EUR 0.9 billion
- Pulses EUR 0.2 billion

Without plant breeding:

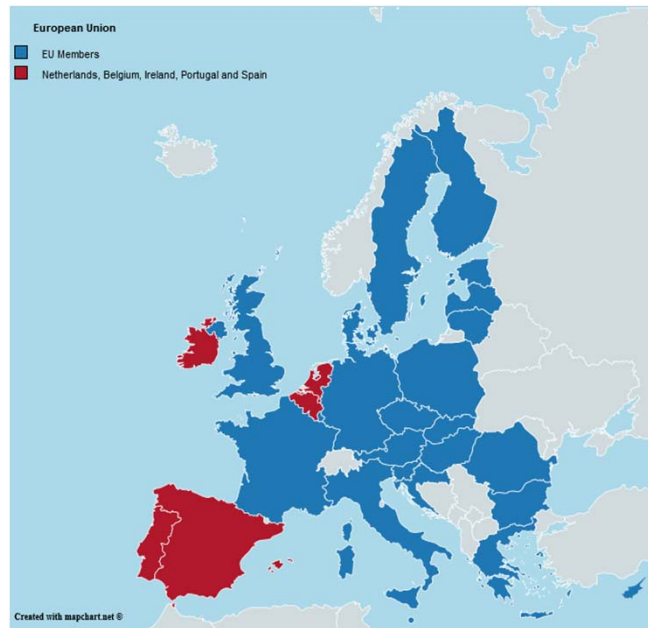
EU would have moved from being net **EXPORTER** to net **IMPORTER** in all major agricultural crops (including wheat and barley)

EU: 2000-2013

Without plant breeding:

An additional 18 million ha of arable land outside the EU would be needed: equivalent to the arable land of...

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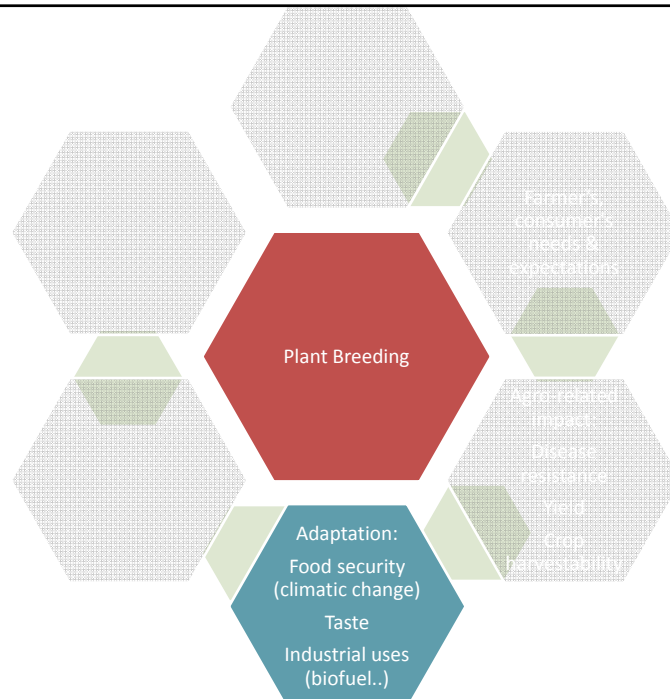


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New Examples- World café outcome

- From Malaysia
 - Rice:
 - adaptation to humid conditions
 - Higher yield (from 3t to 10 tons/ha-Mu ?)

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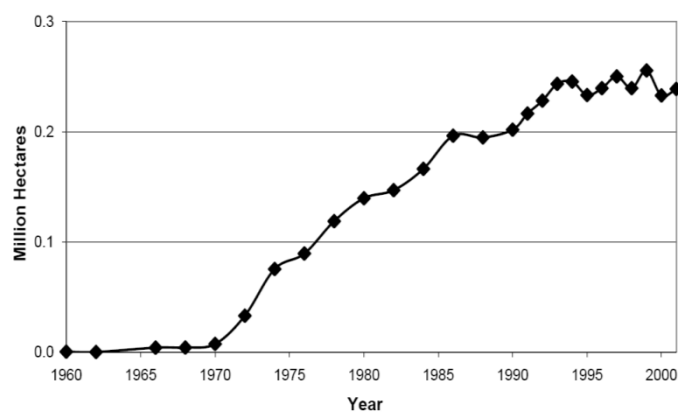
PLANT BREEDING IS IMPORTANT :

- To feed the people and the planet
- To adapt plant varieties to :
 - New needs:
 - Consumer's taste (bitter, seedless...)
 - Food diversity
 - New consumption habits
 - Growing area (rural vs. urban)
 - Mechanization...
 - New uses:
 - Energy (Biofuel...)
 - Industry (e.g. sugar, oilseed rape...)
 - Environment (e.g. water efficiency, phytoremediation...)

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Importance of Plant Breeding

Adaptation of Maize to Temperate Climate: the case of the Netherlands



Second World Seed Conference. Source: Dutch Recommended List 2002)

Bernard Le Buanec, Second World Seed Conference (Rome, September 2009)

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Glucosinolate content

from 100 μ moles ('Jetneuf') to 12 μ moles ('Samouraï')

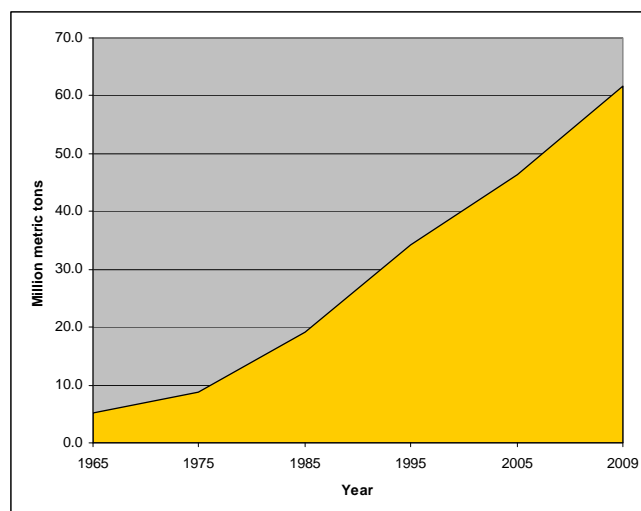
LEAR: Low Erucic Acid



HOLLI: High Oleic and Low Linolenic



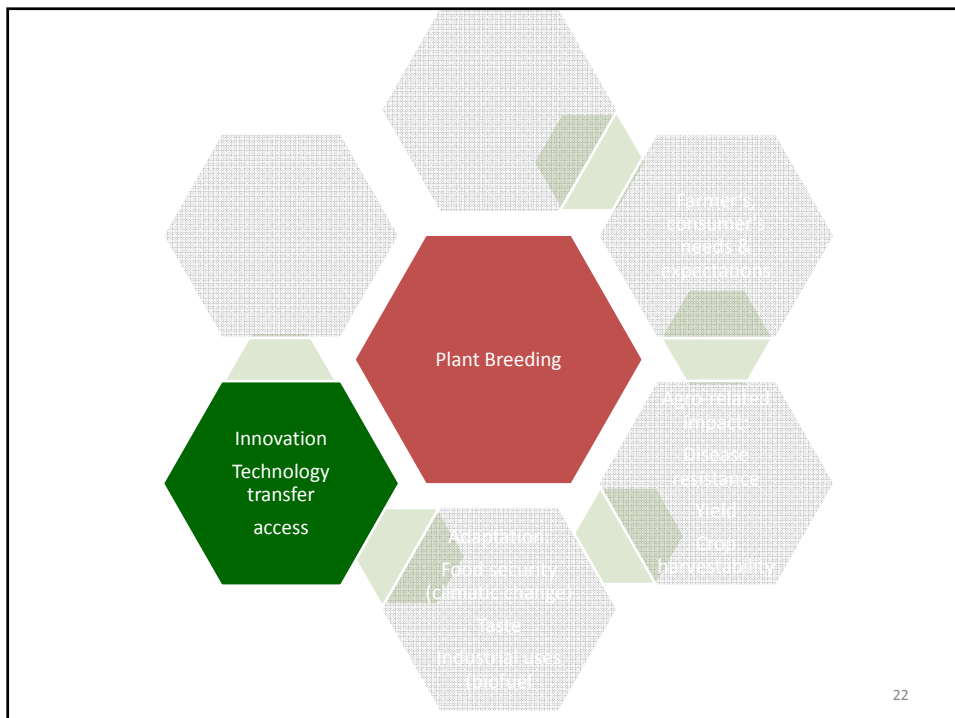
World Total Rapeseed Production



New Examples- World café outcome

- From Barbados:
 - Sugarcane:
 - Reduce fiber content
- From Kenya & Ghana:
 - Sorghum
 - Beer production
- From United Republic of Tanzania:
 - Cassava
 - Bitterfree
- Seedless fruits and vegetables:
 - Grapes, pepper, cucumber...

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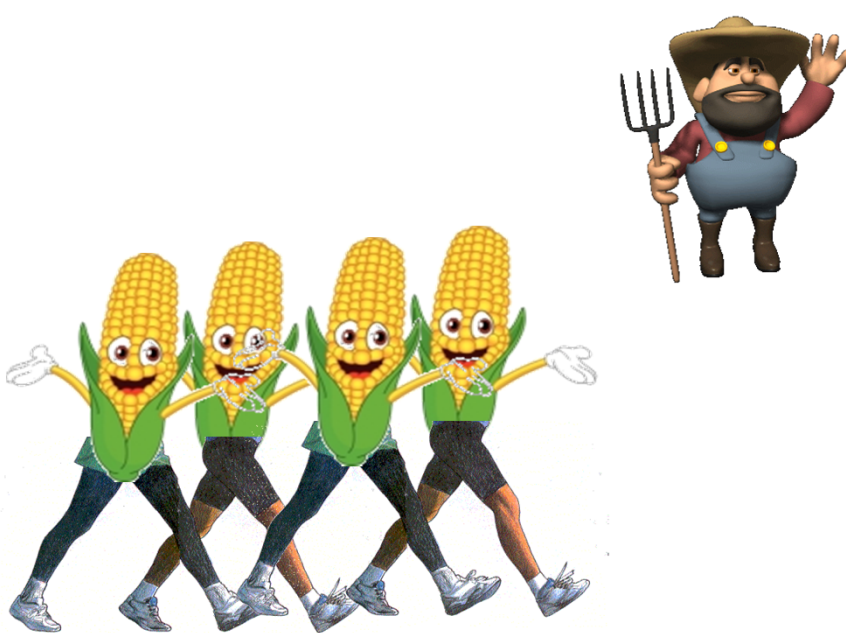


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PLANT BREEDING IS IMPORTANT :

- To promote, encourage and protect innovation
 - Impact on breeder's community (number – resident/non-resident, diversity, investment in R&D)
- Transfer technology and innovation to all (**for the benefit of society**)
 - Farmers (ensuring quality of the product)
 - Consumers (e.g. flower industry)

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International Research Centers

Chair: David Boreham Conclusions – Session 3

- **PVP provides a mechanism to facilitate dissemination of varieties to farmers:**
open access does not ensure widespread dissemination or use

1. Lloyd Le Page, CGIAR
2. Ruairaidh Sackville Hamilton, IRRI
3. Ian Barker, Syngenta Foundation

Chair: David Boreham

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Plant Variety Protection:
Improving Income for Farmers and Growers

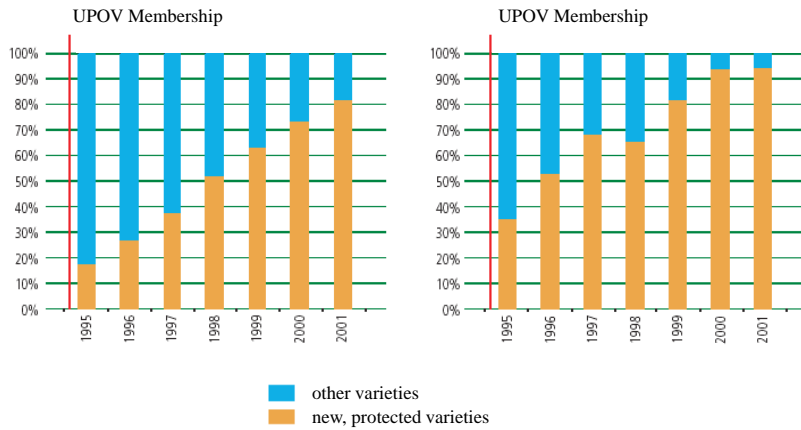
variety **CHOICE**
+ **INFORMATION** on performance
+ **DELIVERY** of good quality planting material
= Opportunities for
ADDED VALUE

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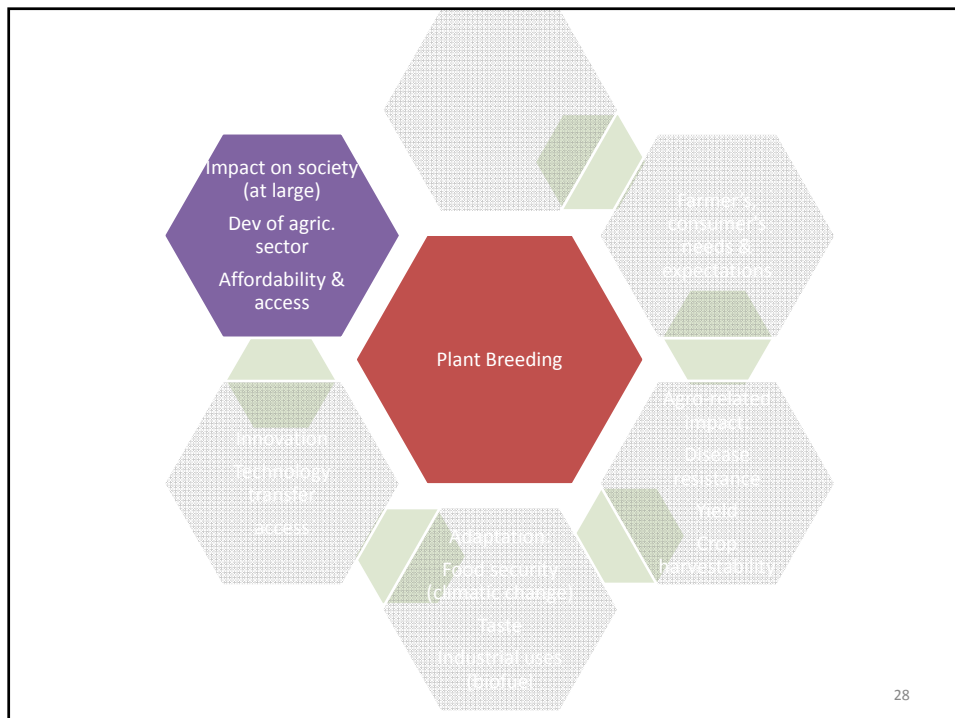
(b) Improved Varieties

Argentina: Proportion of certified seed arising from new, protected varieties (**wheat**)

Argentina: Proportion of certified seed arising from new, protected varieties (**soybean**)



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PLANT BREEDING IS IMPORTANT :

- To develop the agricultural and rural sector
 - Public
 - Private
- To release healthy and affordable products to the market

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

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October 13th, 2015, Vienna

The benefits of plant breeding in the EU: results achieved so far



Concluding remarks: Preliminary summary

- Modern plant breeding in the EU (and probably elsewhere) allows:
 - to essentially increase yields and overall agricultural productivity,
 - to enlarge agricultural crop supply.
- Based on this key result, it can also be concluded that plant breeding acts:
 - to increase rural welfare by generating additional income to farmers,
 - to increase social welfare by adding GDP up- / downstream the value chain,
 - to provide a greater quantity of less expensive food and raw material,
 - to enhance world food security,
 - to stabilise agricultural commodity markets.
- Furthermore, genetic crop improvements permit:
 - to preserve valuable natural resources such as land habitats and water,
 - to reduce GHG emissions from an expansion of the global agricultural land,
 - to protect and to enhance biodiversity around the globe.

October 13th, 2015, Vienna

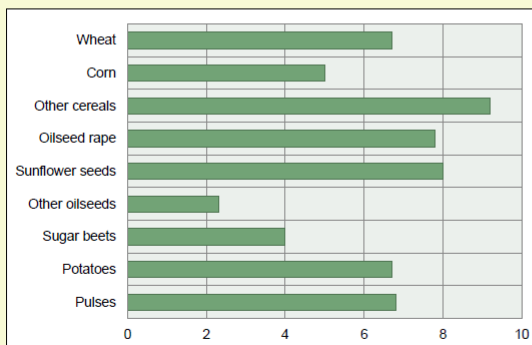
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The benefits of plant breeding in the EU: results achieved so far



The value of plant breeding since the turn of the millennium: Socio-economic effects: Commodity prices

Avoided price increase due to plant breeding in the EU since the year 2000 (in %)



Source: Own calculations and figure.

→ Agricultural market prices would be higher w/o genetic crop improvements.

→ On average, approximately 6 % higher market prices.

→ In addition, a price stabilization effect occurs:
- higher production volumes allow for better stock management in times of ad-hoc market changes.



Task sharing and part of public and private funding of the Swiss wheat breeding program

Public funding (Agroscope)

Variety development



Final Evaluation



Final Evaluation



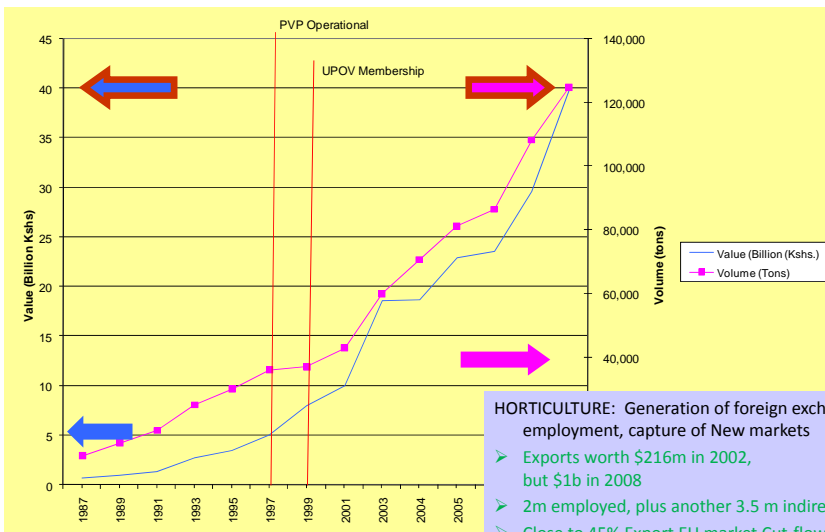
Maintenance breeding,
Basic seed production,
PVR protection,
Variety representation in
Switzerland, in Europe and
worldwide

Private funding (DSP Ltd), source: Royalty fees from protected varieties

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International Market Development

Export of Kenyan Cut Flowers



Evans Sikinyi, Second World Seed Conference

- HORTICULTURE:** Generation of foreign exchange, employment, capture of New markets
- Exports worth \$216m in 2002, but \$1b in 2008
 - 2m employed, plus another 3.5 m indirectly
 - Close to 45% Export EU market Cut-flowers
 - Exports 4% of total production

International Market Development

10 Year Report (Canada)

Impact on Horticultural Industry

Floriculture (greenhouses)

- 1991 – 4.5 million sq. metres
 - Net importer of flowers & nursery products
 - \$66 million **imported**
- 2008 – 8.9 million sq. metres
 - Net exporter of flowers & nursery products
 - \$52 million **exported**



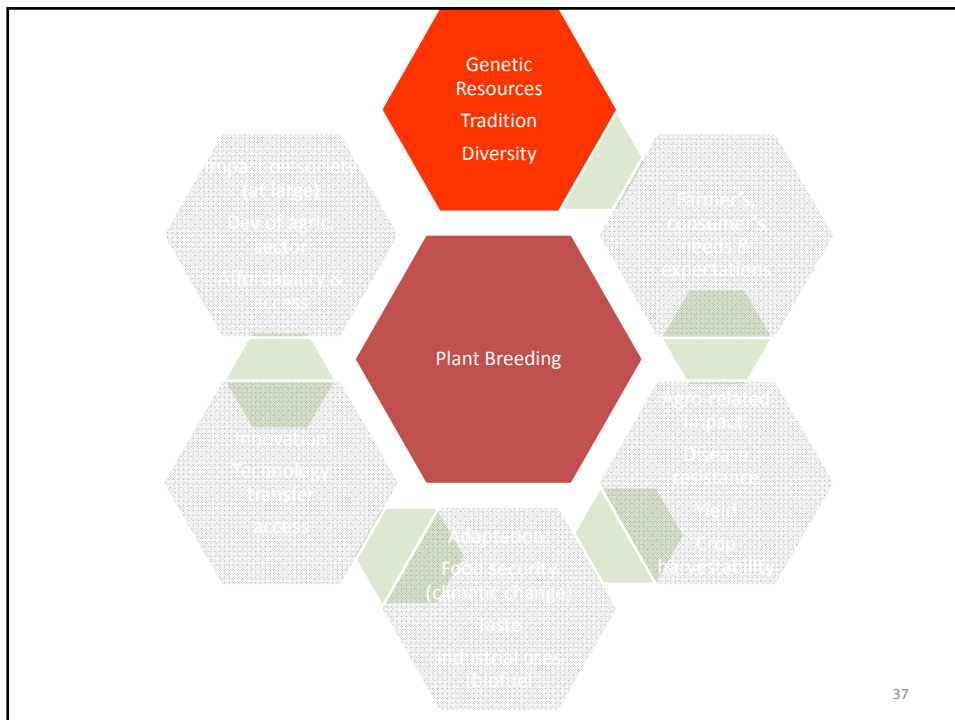
Nurseries and sod farms

- Employment increased by 50% from 1990 to 2000

Only a modest expansion in variety development

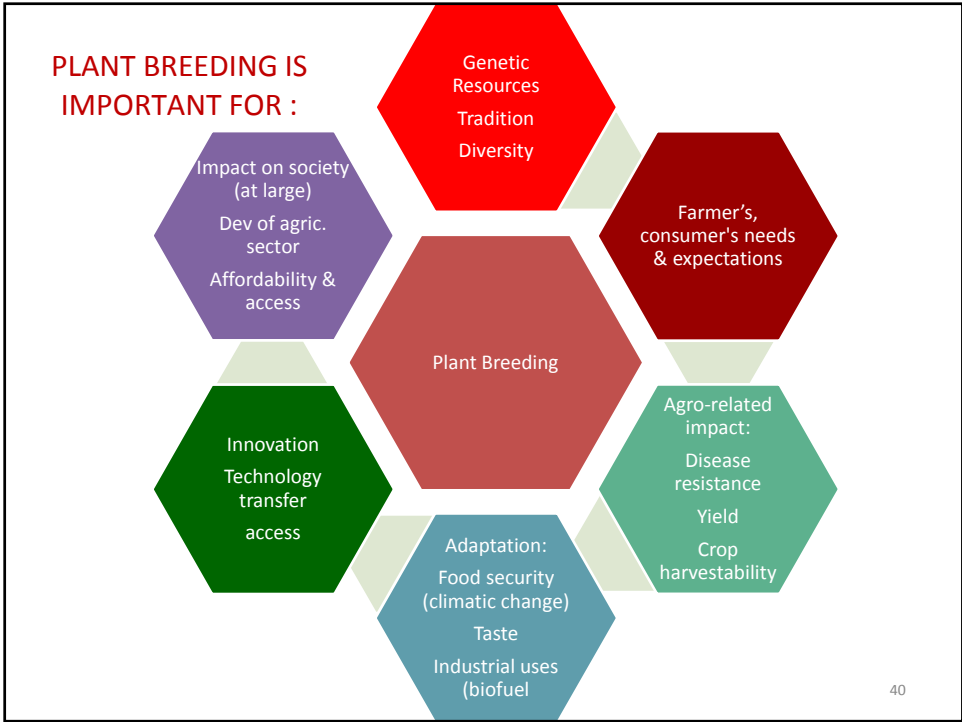
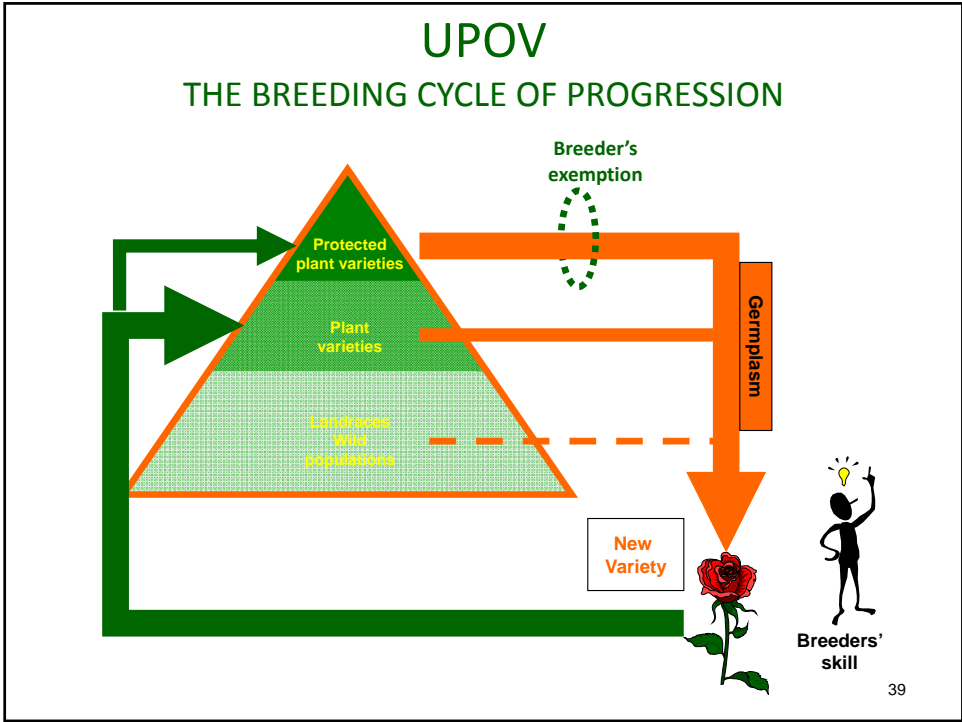
New Examples- World café outcome

- From Jamaica ?
 - Resident/ non Resident applications



PLANT BREEDING IS IMPORTANT :

- To enrich, maintain and diversify Genetic Resources in a sustainable way



PLANT BREEDING

Makes our life

- Easier**
- Cheaper**
- Better**

For everyone

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