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Plant Related Inventions

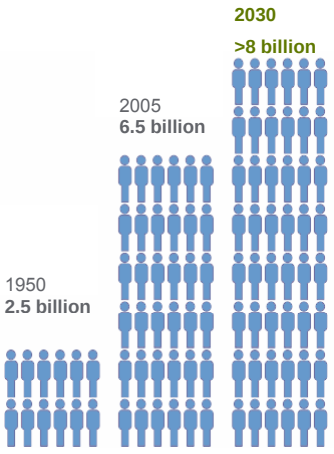
Experiences from a seed industry perspective

Dr. Michael A. Kock

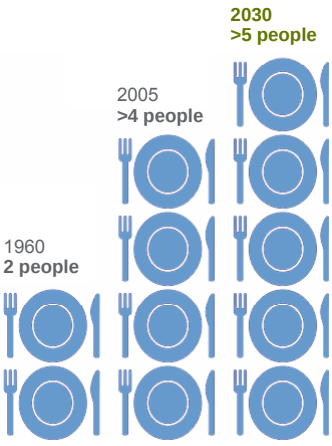
Geneva, July 14, 2009

Demand is driven by population growth and land scarcity

World population



People fed per hectare



Source: FAO, World Bank statistics, Syngenta

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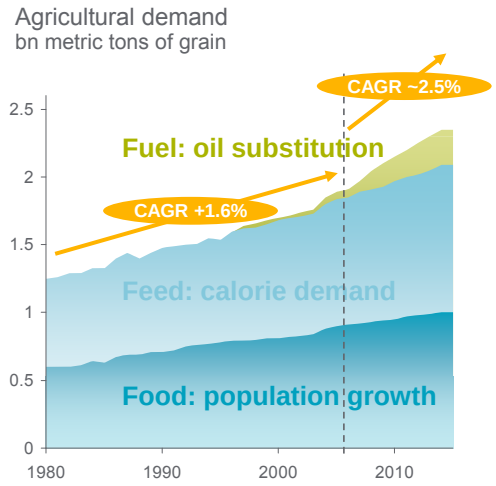
Increasing Demand – Increased Need for Innovation



- Food, feed & fuel
- Emerging markets GDP growth drives agricultural demand
- Agriculture: intensify, modernize
- Land, climate, infrastructure

Not yet factored in: Climate Change

Source: USDA, Goldman Sachs Commodities Research

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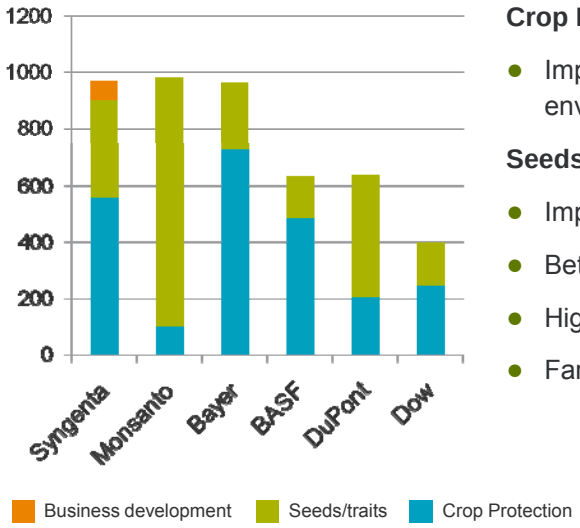
Seed Industry: High investments in research and development



Crop Protection

- Improved performance, better environmental friendliness

Seeds

- Improved yield
- Better disease management
- Higher nutritional value
- Farmer and consumer benefits

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Success Factor: Intellectual Property Environment
Dependency of the Seed Industry on IP

What does seed and entertainment industry have in common ?

Seed is a high-tech product in an easy to copy form

- **Like** entertainment industry: Copying by “counterfeiters” and customers
- **Like** entertainment industry: Strong „shareware“ movement (“free copies”)
- **Like** entertainment industry: Highly dependent on efficient IP systems

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Current Challenges & Suggest Improvements

- **Patents and PVP**
  An issue of „double-protection“ ?
- **Patents and restriction of germplasm**
  Need for a breeders‘ exemptions in patents ?
- **Patents and „source / origin of biomaterial**
  New requirements of patentability
- **Patents, „Open Innovation“, „Open Source“, …**
  New models to encourage innovation

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Protection of Plant Varieties
TRIPs / WTO Requirement

Article 27 (3) TRIPs

Members may also exclude from patentability:

(b) plants and animals (…). However, Members shall provide for the protection of plant varieties either by patents or by an effective *sui generis* system or by any combination thereof.

Sui generis system = Plant variety protection (PVP)
Union for the Protection of New Varieties of Plants (UPOV)

Patentability of Plants - Lack of Harmonization

- **No limitation:** All claims on plants permissible (AU, JP, US)
- **Narrow exception:** No claims on plant varieties, but generic claims on plants (EP)
- **Broad exception:** No claims on any kind of plant or seed
- **Protection gap:** No claims on plants; limited species for PVP (AR, BR, CA, CN…)

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25 Years Patents on Plants
Far away from global harmonization

		AR	AU	BR	CA	CL	CN	EC	US
1	Are plants protectable ?	NO	YES	NO	NO	NO	NO	YES	YES
2	If YES: Are there restrictions ?	-	Inventive step	-	-	-	-	Inventive step; no varieties	Non-obvious-ness
3	Are plant cells or parts patentable ?	NO	YES	NO	YES	NO	YES	YES	YES
4	Are plant seeds protectable ?	NO	NO	NO	NO	NO	NO	YES	YES
5	Are DNA sequences patentable ?	YES	YES	YES	YES	YES	YES	YES	YES
6	If YES: Are there restrictions ?	Only non-natural sequences	NO	Only non-natural sequences	NO	Only non-natural sequences	NO	NO	NO

Need for Harmonization

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Protection Tools for Plant Related Inventions

Patents & PVP – An Issue of Double Protection ?

Exclusivity is not Exclusivity

Patents and PVP: Two different, supplementary (but not alternative) tools

Plant Variety Protection:

- **Protects:** New variety described by **all** its phenotypical characteristics. Only plants with **all** characteristics are protected.
- **Suitable for:** Traditional, experienced-based breeding.
- **Not suitable for:** Protection of new genes, traits, breeding processes.

Patent:

- **Protects:** Invention (new gene, breeding process). Plants with the inventive feature are protected.
- **Suitable for:** Biotechnology, complex traits, new breeding processes.

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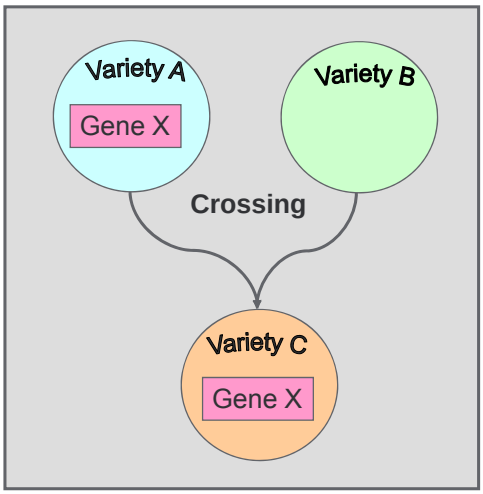
Patent & PVP

Scope of Protection



PVP
Variety C is outside the scope of a PVP right for variety A.

Patent
Variety C is within the scope of a patent for Gene X.

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Patents and restriction of germplasm

Need for a breeders‘ exemptions in patents ?

Concern:

- One patented gene in a plant limits the use of the entire plant
- Accessibility of germplasm is important for further breeding
- Breeding is not covered under a patent “research exemption”

Current Solutions:

- **DE, FR, CH:** Free use of a plant with a patented element for breeding and developing (but not commercializing) a new plant variety
- **Problem:** Allows use of genetic background **and** patented element → Erosion of protection (commercial development during patent term)

Suggestion:

- Free use to breed, develop, and commercialize plants **NOT** comprising the patented element (access only to genetic background)

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Patents and „source / origin” of biomaterial
New requirements for Patentability ?

Country	Declaration of Source / Origin		ABS[1]	Requisite for grant	Link to validity	Sanctions & Fines
BR	If BR	If BR	X	X	?	-
CH	X	-	-	?	-	<100k CHF
CN	X	X	-	X	X	-
DE	X	-	-	?	-	-
DK	-	X			-	-
IN	-	X			X	-
IT	X	?	-	X	X	-
NO	X	X	-	-	-	fines <2 a prison
Andean	X	?	X	X	X	

Need for Harmonization

1 Access and benefit sharing provisons

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Patents and „source / origin" of biomaterial
Challenges for the Applicant

Uncertainties:
- **"Source" vs "Origin":** Can we define the origin of genetic material ?
- **Scope:** More than what is claimed ?
- **Impact:** New prerequisite of patentability beyond Art. 27, 29 TRIPS ?

Consequences:
- High burden for applicant to achieve full compliance
- Threat to patent validity; discourage to utilize genetic diversity

Room for Improvement:
- Global harmonization (Budapest Treaty as a model ?)
- No link to patent validity (enforcement via the civil legal system)

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Patents, „Open Innovation“, „Open Source“, …
New models to encourage innovation

- **Complex challenges require “innovations networks”**
  - Limited in-house resources
  - Multi-disciplinary, “out-of the box” input
  - Integration of innovation

- **Open innovation networks:**
  - Externally posted “Challenge”
  - Open participation
  - Best solution is selected & rewarded
  - Experience: 11 challenges, >3000 solvers (40 countries), 3 rewards

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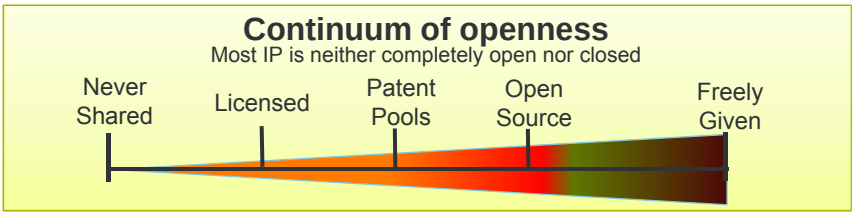
Patents, „Open Innovation“, „Open Source“, …
New models to encourage innovation

- **Certain IP assets are not best utilized by exclusivity**
  Germplasm collections, enabling technologies …
- **Open source can increase responsiveness and IP utilization**



What Open Source is NOT

- Free Lunch - **No**
- Free to Do what I want - **No**
- Just a way to publish – **No**
- Public Domain – **No**
- Viral – **Not Necessarily**
- Immune from Patent Rights – **No**

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Patents, „Open Innovation“, „Open Source“, …
New models to encourage innovation

Syngenta donates maize genetic stocks for public research

February 29

Syngenta is donating approximately 7500 maize genetic stocks to the Maize Functional Diversity Group. The stocks contain segments of ancestral DNA and the marker data associated with the lines. This donation will help the Group and other researchers advance our knowledge of maize diversity.

What Open Source requires in the “Patent World”

- Access & Control
- Incentives to innovate (give’n take)
- Benefit capture, value sharing
- Consent not to “block” further innovation

➢ **Effective IP system:** Ensure incentives for initial innovator

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Thank you very much !

Bringing plant potential to life

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