Intellectual Property and Technology Transfer

New Approaches

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Technologies in Plant Breeding

Conventional Breeding
- Crossing & phenotype selection
- Yield focused improvements

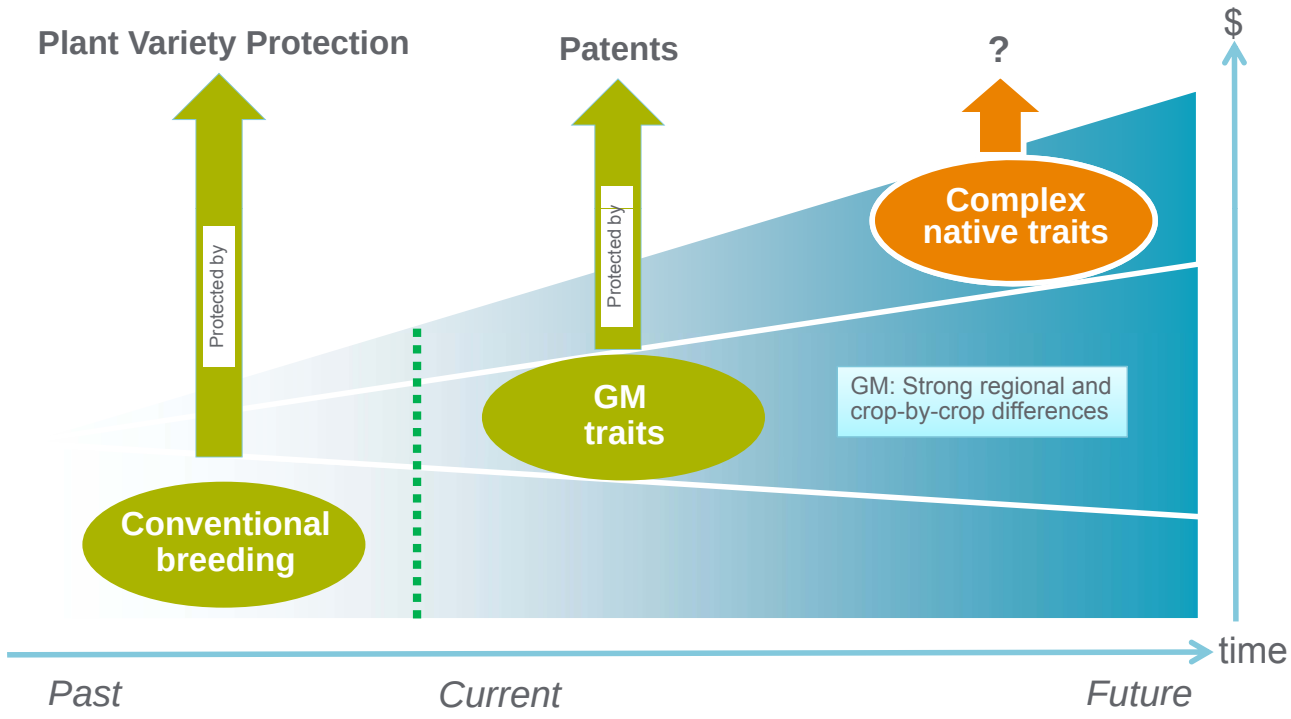
Hybrid Technology
- Increase yield and performance
  (Maise, rape seed, barley, rice)

„Smart Breeding“ (Marker)
- Shortened breeding cycles
- Trait focused breeding
  (disease & stress resistance, nutritional value)

Green Biotechnology
(~2010: 148 Mio ha globally)
- Broader use of genetic diversity
  (no specie barrier)
- Trait focused breeding
  (disease & stress resistance, nutritional value)

The IP tool kit: patentability of agro-innovations

Large heterogeneity: Uncertainty for new areas



Success Factor: Intellectual Property Environment

Dependency of the Seed Industry on IP

What does seed and software industry have in common ?

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

IP is necessary to prevent “unfair” copying

IP regimes:

- Plant variety protection
- Patents

Criticism on IP ...
IP stands in the way of innovation

"There are limits that we should not cross. Farmers and breeders should not be handcuffed by biological patents"

Germany's Minister of Food, Agriculture and Consumer Protection Ilse Aigner

Patent blockings and the anti-commons problem are notable in hindering access to breeding material and the use in breeding of established knowledge.

Advisory Board on Biodiversity and Genetic Resources at the Federal Ministry of Food, Agriculture and Consumer Protection

States have to *"[e]nsure that protection of patent-holders or plant breeders' rights does not discourage innovation. In particular, States should not allow patents on plants.*

UN Special Raporteur on the Rigth to Food, Olivier de Schutter

Praise on IP ...
IP fosters innovation

To foster competitiveness and innovation in this field, the Commission calls for better co-ordinated […] effective intellectual property rights regime in Europe.

EU Commission, Lisbon Startegy on Biotechnology

Intellectual property (IP) protection is therefore afforded to plant breeders as an incentive for the development of new varieties to contribute to sustainable progress in agriculture, horticulture and forestry.

UPOV, Aug. 2006 Biotechnology

The only way that we know to create the incentives, to have people take money and labor […] and put it into a risky development is to provide the intellectual property protection.

Rob Shapiro, Chair of EcoIDEA; Earth day 2009

A unbridgeable contradiction ?

A changing IP environment: Outlook 2025

2007 Study of the European Patent Office
Patent system 2025 - most likely scenario

- Open source: Society is against IP as perceived threat to human needs (health, knowledge, food, and entertainment)
- Lack of societal trust and growing criticism of the IP system result in its erosion

In a world developing in a knowledge-based society ...

- „Open source" is positively perceived
- Cooperation drives faster solutions
- Networks determine success
- Know-how exchange is facilitated & enforced
- Integrated offers succeed

- IP is perceived roadblock for innovation
- Exclusive rights are negatively perceived
- Trade secrets become difficult to keep
- Traditional IP strategies start to fail
- Anti-trust scrutiny increases

IP as a tool

IP is a tool.

A tool is as such neither good nor bad,

A tool can be used in a beneficial or problematic way.

Beneficial use

- Licensing, technology dissemination, benefit sharing
- Enables “open innovation”

Beneficial effects

- Encourages innovation & R&D investment
- Encourages knowledge sharing

Problematic use

- Monopolistic / anticompetitive use (“trolls”)

Problematic effects

- Can block innovation (if without research exemption)
- Can increase transactional & legal costs

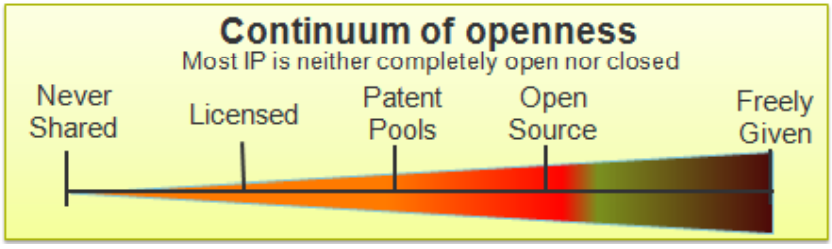
Can we minimize the problematic effects without losing the benefits ?

Optimizing IP use

Optimizing the tool

- **What is the “right” balance between protection and access?**

- **What is the “best” use of IP: Exclusivity vs. dissemination?**



Optimizing its use

destructive

constructive

Benefits of robust patent system

- **Innovation Culture:** Patents foster innovation in all technology fields
  - Breeding inventions are technical and worth of incentives as other technology
  - Plants developed with modern („smart“) breeding are valuable alternatives to green biotechnology. Their agronomic value is not lower.
- **Knowledge Society:** Patents require and foster disclosure and knowledge sharing
  - Denial of patents „forces“ breeders to use trade secrets as last resort to protect their innovations. Will this slow innovation cycles ?
  - Is an industry based on secrets (i.e., without patents) more competitive ? (see software industry)
  - How can SME and academics leverage their innovation without patents ? (Impact on licensing models)
- **Investment Culture:** Availability of patents influence R&D investment
  - Reduced investment in research and preservation of genetic diversity
  - Preferential investment into patentable technology (chemistry, GM)

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

- **Some innovations are not best utilized by exclusivity**
  Germplasm collections, enabling technologies …
- **Open source can speed up innovation cycles**
- **Effective “open source” requires solid IP regimes**
  - “Open sources” in software is enabled by copyright (established with the creation; no need for registration)
  - “Open sources” for plant related innovations requires patents (established by registration)

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 IP rights – **No**

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 needs in a “Patent World”

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

Optimizing IP use
Common objectives

„No IP“ can be problematic:

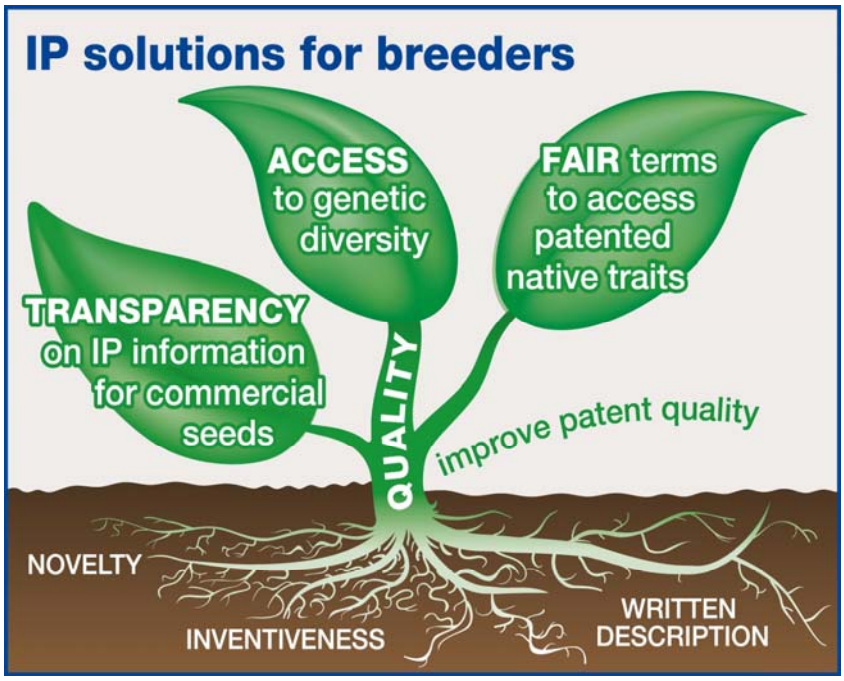
- Encourages secrets (everlasting)
- Facilitates copying and free-riding (for self-disclosing innovations)
- Takes away a mechanism to prevent misappropriation
- Makes enforcement of stewardship requirements complicated

How do we use IP as a tool to

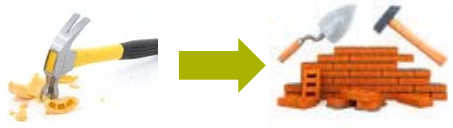
- disseminate knowledge & innovation to speed-up innovation cycles ?
- encourage collaboration and open innovation?
- build a sustainably growing knowledge and innovation pool?
- enable fair access and benefit sharing and prevent unfair „free riding“ ?
- prevent IP misappropriation and FTO constrains ?

Optimizing IP use

Elements of a Solution



Optimizing the tool's use



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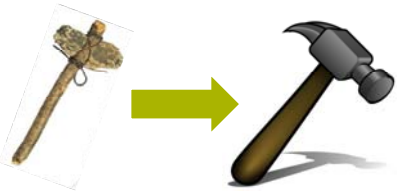
Optimizing the tool



Elements of a Solution

Designing an industry licensing platform

A system based on

incentives („carrots“) and obligations („sticks”)

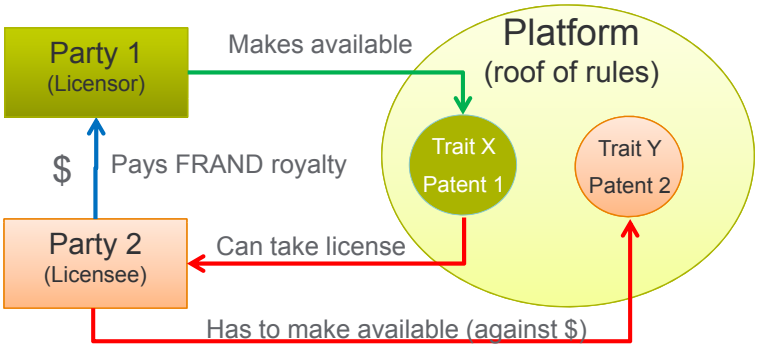
Free access ≠ access without rules

Free access ≠ access for free

- Free use for R&D and breeding; free use of genetic background
- Fair remuneration for commercialization (FRAND)
- Low transactional costs
- Pull-in mechanism for licensee's related IP to grow the pool

Elements of a Solution
Designing an industry licensing platform

- Platform for facilitated FRAND access to non-regulated traits
  (bi-lateral licenses remain available at any time)
- FRAND-based royalty upon commercialization; free use for R&D
  (dispute mediation / arbitration offered by the Platform)
- Pull-in mechanism: Parties who access technology have to make own technologies accessible incl. improvements



Public Private Partnerships
Designing a sustainable open source model

A system based on

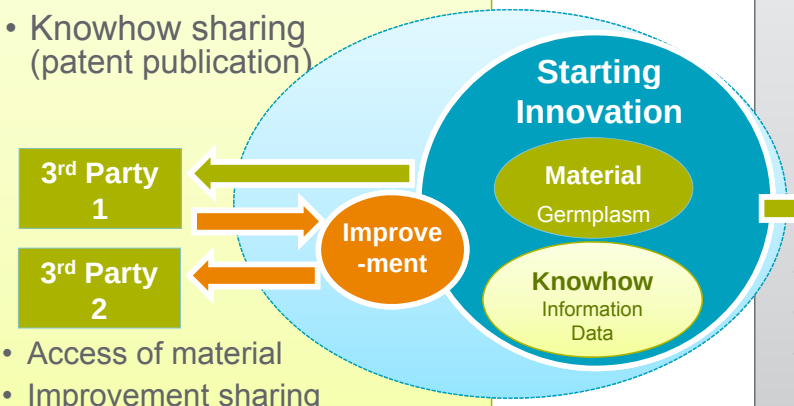
incentives („carrots“) and obligations („sticks”)

- Free (but not unregulated) access of background IP
- Non exclusive grant-back or non-assert under “improvement IP”
- Exclusive ownership for product specific IP (PVP, event patent)
- Free use for R&D; free for public partners and in developing countries
- Remuneration for commercial use in developed markets
- Incentives for contributing innovators (lower payments)

Is a „no patent“ world better ?

The „Patent“ Scenario

- Access of material
- License
- Knowhow sharing (patent publication)



- Access of material
- Improvement sharing
- Benefit sharing

➢ Network creation

➢ Faster innovation cycle

The „No Patent“ Scenario

- Access of material
- No knowhow sharing (trade secrets)

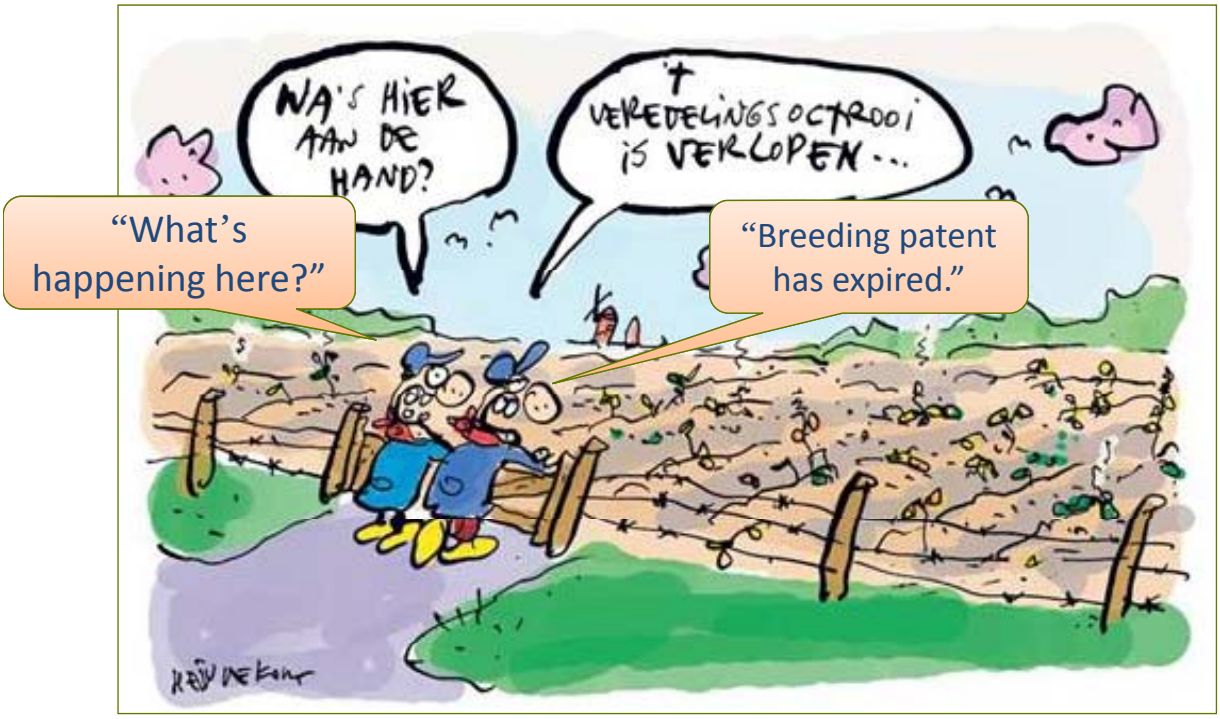
- Access of material
- No improvement sharing
- No financial benefit sharing

➢ No network creation

➢ Slower innovation cycle

➢ Double work

If breeding patents are abandoned …



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