Intellectual Property Landscape for Agricultural Innovation

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AGRIFOOD BUSINESS
WORKSHOP ON IPRS FOR INNOVATION IN INDUSTRIAL & AGRICULTURAL SECTORS IN SUPPORT OF ECONOMIC DEVELOPMENT
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Session Outline

- Introduction

- IPRs & innovation

  - International legislation for IPRs in agricultural innovation
    - International Union for the Protection of New Varieties of Plants (UPOV)
    - Trade Related Aspects of IPRs (TRIPS) Agreement

- Regulatory contexts for IP in agricultural innovation

- Technology transfer & public-private partnerships (PPPs) in biotechnology
In order to stimulate agrifood innovation & technology transfer, many developing nations have made efforts to strengthen their IP management.

It has been the case that modifying genetic life forms through biotechnology has been a driving force for changes in IP management in developed countries.

In particular, the gradual growth of IPRs in biological innovations began in the 1980s, first in patenting microorganisms and later, incorporating plants & animals.
R&D in biotechnology & genetics are essential for meeting the agricultural demands of a growing world population, especially in the areas of climate change, social unrest & revolution.

This would help us in both public & private research institutions better understand the current situation of IPRs & how IP can be leveraged to support agricultural innovation & dissemination.
By definition, IPRs are legal protection and rights over new & useful products that originate as a result of efforts & ingenuity of human intellect.

Granted by governmental authorities & protected under a mix of both national & international legislation.

Time-limited exclusive rights.

Long-term protection of an invention, restrictions for the use of the invention based on mandatory licensing.

IPRs for existing, new & improved plant varieties provide breeders with compensation for risks & costs incurred when they make a value-added innovation to a fundamental biological resource.

IPRs are not the rights to make, use, offer for sale, sell or import; rather, they are defensive activities to exclude others from making, using, offering for sale, selling or importing the invention.
Intellectual Property Rights & Innovation

Why does IP matter? Whether IPRs enhance innovation and provide incentives for innovation & technological diffusion. IPRs as a stimulator for innovation (biotechnology sector) (Castle 2009)

Innovation = invention + commercialization

Innovation: knowledge-rich economic & social phenomena… (Rogers, 1962, 2003)
Joseph Schumpeter (1934):

“innovation… the carrying out of new combinations… is the key to entrepreneurial profits… [innovation] is the only way to create new economic value over the long term”

J.A.Schumpeter, “The Theory of Economic Development”, 1934

- Patents play an important role in spurring innovation and investment in innovation. They contribute to the dissemination of information throughout an economy (Granstrand 2005)

- Innovation and commercialization are causal relationship and can be fostered or stymied by strong IPRs
Policy Context & International Legislation for IPRs (UPOV & TRIPS)

Key International IP Treaties & Conventions

WTO
- TRIPS (1995)

United Nations
- WIPO
  - CBD (1993)
  - UPOV (1968)
  - PCT (1970)
  - ITPGRFA (2004)

FAO
- Cartagena (2003)
- 1978 UPOV
- 1991 UPOV

(UPOV 2012 & WTO 2013)
UPOV
Requires each member to grant and protect breeders’ rights in accordance with national legislation

TRIPS Agreement of WTO
Requires all WTO member states to set out the minimum standards of protection of subject matter, grant a right & exception to this right, & the minimum duration of protection.
International Union for the Protection of New Varieties of Plants (UPOV)

The requirements

The plant variety must be a new, distinct, uniform, & stable (DUS) & the variety must be designated with a suitable denomination

Why UPOV is fundamental to IP management in agricultural R&D?

1) To satisfy the *sui generis* protection required by the WTO-TRIPS in order to include protection for new plant varieties as a part of their IP laws

2) Strong interests in providing incentives to protect plant breeders & the researcher exemption
Eligible for Protection

- Conventional varieties (traditional breeding)
- Hybrid varieties
- A variety which is the parent of hybrid variety
- Genetically modified varieties (genetic modification)

Possibly

- Landraces (if they fulfill the definition of variety & the criteria of protection)

Not Eligible

- Wild populations
- Genes
- Tissue culture
- Resistance to a plant disease
## Filling Applications

<table>
<thead>
<tr>
<th>First application</th>
<th>The breeder can choose any UPOV member</th>
</tr>
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<tbody>
<tr>
<td>Subsequent applications for the same variety</td>
<td>Can be filed without the need to wait for the granting of the breeder’s right based on the 1st application</td>
</tr>
<tr>
<td>Independence of protection</td>
<td>The PBR can not be granted or rejected by a UPOV member on the basis of the granting, rejection, or expiration of BR in another UPOV member</td>
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The nature of the “DUS” test

- The DUS test is based mainly on growing tests

- The UPOV test guidelines (each test should include a total of):
  - Apple: 10 trees
  - Strawberry: 20 plants
  - Wheat: 2,000 plants (should be divided between 2 or more replicates)
<table>
<thead>
<tr>
<th>Plant Breeders’ Rights</th>
<th>1991 UPOV Convention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eligibility requirements</td>
<td>Novelty, Distinctness, Uniformity, &amp; Stability.</td>
</tr>
<tr>
<td>Duration of protection</td>
<td>20 years (25 years for grapevines and trees).</td>
</tr>
<tr>
<td>Dual protection with patent</td>
<td>It is allowed to have dual protection.</td>
</tr>
<tr>
<td>Minimum exclusive rights in propagating variety (seed, bulb, tuber, cutting etc.) (require the authorization of the breeder)</td>
<td>Production or reproduction (multiplication); conditioning for the purposes of propagation; offering for sale; selling or other marketing; exporting; importing or stocking for any of these purposes.</td>
</tr>
<tr>
<td>Minimum exclusive rights in harvested material (require the authorization of the breeder)</td>
<td>Harvested material obtained through unauthorized use of propagating material of the protected variety unless the breeder has had reasonable opportunity to exercise the right in relation to the propagating material.</td>
</tr>
<tr>
<td>Breeders’ exemption</td>
<td>Permissive, but breeding and exploitation of a new variety &quot;essentially derived&quot; from earlier variety require right holder’s authorization.</td>
</tr>
<tr>
<td>Farmers’ Privilege (allow farmers to use the harvested variety covered by PBRs for propagation on their own holdings)</td>
<td>It is allowed at the option of the member State (up to national laws) within reasonable limits and subject to safeguarding the legitimate interests of the right holder. (Farm-saved seed)</td>
</tr>
</tbody>
</table>
• Variety X material is obtained in Country A and, without the authorization of the title holder, exported to Country B

• Variety X is propagated in Country B
• Exported to Country A as harvested material (e.g. cut flowers)
• The owner of Variety X can exercise his rights on the imported harvested material
Authorization required to commercialize hybrid variety

<table>
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<tr>
<th>Hybrid variety C</th>
<th>Parent variety A</th>
<th>Parent variety A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protected</td>
<td>Authorization of the breeder A &amp; C</td>
<td>Authorization of the breeder C</td>
</tr>
<tr>
<td>Not protected</td>
<td>Authorization of the breeder A</td>
<td>No authorization required</td>
</tr>
</tbody>
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Trade Related Aspects of IPRs (TRIPS) Agreement

- A second critical trade legislation for agricultural innovation
- Came into force in 1995

- The most important regimes in the international IP laws preceded the TRIPS Agreement:
  - Paris Convention for the Protection of Industrial Property 1883
  - Berne Convention for the protection of Literacy and Artistic Works 1886
- Of interest to crop biotechnology R&D, is the protection of new varieties of plants

- Article 27(1) requires that “patents shall be available & patent rights enjoyable without discrimination as to the place of invention, the field of technology and whether products are imported or locally produced”

- Article 27(3)(b) requires each member state to “provide for the protection of plant varieties either by patents or by an effective sui generis system or by any combination thereof”

- Relatively wealthier nations, such as the United States and Canada, have engaged with the global legislation in quite different ways
### Types of IPRs in agricultural R&D

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<tr>
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<th>U.S.A</th>
<th>Canada</th>
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<tbody>
<tr>
<td>Trademarks</td>
<td>Must be <strong>distinctive</strong> and <strong>should not be deceptive</strong> (USA &amp; Canada have similar requirements for application)</td>
<td></td>
</tr>
<tr>
<td>Trade secrets</td>
<td>Confidential business info, industrial &amp; commercial secrets</td>
<td></td>
</tr>
</tbody>
</table>
| Plant patent         | **Asexually** reproduced plants (except tubers & seeds)  
Up to 17 years       | N/A                              |
| Plant variety protection or PBR | **Sexually** reproduced plants (except fungi, bacteria)  
Tubers & F1 hybrid  
20 years  
1991 UPOV Convention | Asexually & sexually reproduced plants (except algae, bacteria & fungi)  
20 years  
1991 UPOV Convention |
| Utility patent       | **Life forms & organisms (plants) are patentable**  
A new, useful & non-obviousness to the prior art  
20 years  
Diamond v. Chakrabarty 1980 | **High life forms (Plants & seeds) are not patentable**  
A new, useful & non-obviousness to the prior art  
20 years  
Harvard College v. Canada 2002 |
Fostering Agricultural Innovation

- Vigorous competition
- Strong R&D
- Strong education at all levels
- Sound policies promoting science and innovation
- Efficient and transparent regulatory systems
  - IP laws, regulations and guidelines
Technology Commercialization: An Interdisciplinary Field

Scientific Discovery

Intellectual Property or Patents

Commercialization
Technology Transfer & Public-Private Partnerships

The Bayh-Dole Act (USA) 1980: allowed private industry to license & develop products from publicly funded research (Nugent & Keusch, 2007)

The result was the first generation of biotech hubs: the San Francisco Bay area, the greater Boston area, Research Triangle Park in North Carolina, and Oxford and Cambridge in the UK

This model became clear in the 1980s and 1990s, the model spread to Europe and Japan
Technology Transfer Routes

1) Industry-University sponsored research dollar
2) Licensing the technology to the private sector
3) Spin-off company
4) Open innovation (no more doing R&D alone, but partner with other companies)
• Governments need a mechanism to engage academic scientists in policy formulation

• Efforts are required to strengthen capacity development in the area of IP for agricultural innovation

• Universities need to be aware of the importance of a strong and clear IP policy and capacity within their institutions
Thank You!

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