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The relationship between intellectual property rights and small-scale farmer innovation

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A note about Food and Sustainability at QUNO

The Food & Sustainability programme of the Quaker United Nations Office addresses the complex and intertwined issues of trade and innovation policy and how they relate to poverty, hunger and food insecurity. We look at these issues with a particular focus on small-scale farmers, including fisherfolk, forest dwellers and pastoralists, a critical yet largely unheard voice in trade and innovation policy-making. Our work is collaborative, providing the space where it is safe to think, share and explore creative alternatives to a food system that does not work for the majority of the world's population.

Half the world's food today is produced by 1.5 billion small-scale farmers. The figure is higher for food produced in the non-industrialized world -- up to 80%. Small-scale farmers are stewards of biodiversity; they maintain, adapt, improve and distribute plant varieties. The agricultural biological diversity they enhance and develop provides a major contribution to health and nutrition. They find ways to deal with new pests and disease. They are also active players in critical ecosystem processes, developing and adapting ideas for nutrient cycling, effective water use and the maintenance of soil fertility, both traditional and from elsewhere. Who could be better placed to help the world cope with global environmental change and feed the world than over a billion small-scale farmers living, working and experimenting on the front lines of change? Our work aims to ensure that trade and innovation policy are supportive of, and do not undermine, the critical role of small-scale farmers in providing local and global food security and the resilience we will need to facing ever-increasing environmental change.

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I. Introduction

This paper explores the relationship between intellectual property rights (IPRs) and small-scale farmer[1] innovation. It focuses on the type of on-farm innovation that relates to the use, conservation and further enhancement of plant genetic resources for food and agriculture (PGRFA) and associated knowledge. A range of IPR tools – patents, trade secrets, plant variety protection (PVP), variety registries, trademarks and geographical indications – are assessed in sequence in terms of how each may support and/or impede innovation in this area.

All member states of the World Trade Organization (WTO) are obliged to provide plant breeders' rights in the form of patents, an effective *sui generis* system[2] or any combination thereof, subject to Article 27.3(b) of the Trade-Related Aspects of Intellectual Property Rights (TRIPS) Agreement. Such rights allow breeders to exclude others from commercializing protected varieties and thus capture the economic benefit from their investment. The intention of this provision is to promote innovation in agriculture, premised on the idea that plant breeders are driven by economic gain. The extent to which IPRs encourage agricultural innovation however, even in developed countries, is a source of great contention.[3]

The relationship between IPRs and small-scale farmer innovation is even less straightforward. Innovation on-farm – which is where the majority of innovation has taken place since the beginning of agriculture[4] – has always and continues to happen in

1 'Small-scale farmers' is inclusive of fisher folk, forest dwellers and pastoralists, including producers who do not have legal rights to land. Small-scale farming systems are characterized by their relative size, reliance on family labour, low use of external inputs, and the sheer diversity of farm management practices and livelihood strategies employed to suit local environmental and socioeconomic conditions.

2 A sui generis system is a unique and standalone system designed to address the needs and concerns of a particular issue. In intellectual property law it describes a regime designed to protect rights that fall outside the traditional patent, trademark, copyright, and trade-secret doctrines. See http://www.wipo.int/tk/en/resources/glossary.html#46

3 See Correa, C. (2013). Innovation and Technology Transfer of Environmentally Sound Technologies: The Need to Engage in a Substantive Debate, Review of European, Comparative and International Environmental Law (RECIEL), 22(1), 54-61.

4 Sanginga, P.C. (ed.) (2009). Innovation Africa: enriching farmers' livelihoods. Earthscan.

the absence of IPRs.[5] Small-scale farmers themselves by and large do not use IP tools, which for the most part accommodate the interests of well-resourced actors rather than the collective interests of rural communities.[6] Even alternative IP tools such as collective trademarks and geographical indications can demand financial and organizational capacities beyond those of rural communities.[7]

Moreover, the granting of exclusionary rights is not always a natural fit with farmers' innovation systems. Small-scale farmers are driven to innovate by more than commercial opportunities, and on-farm innovation goes beyond the development of new tools or technologies of commercial value that may be captured through exclusionary rights. The innovation process itself with respect to PGRFA depends upon the free exchange of material, knowledge and ideas through informal networks based on trust and reciprocity. This process tends to be collaborative and cumulative, the outputs of which cannot be attributed to individual rights holders.

However, some IP tools – when carefully selected and adapted to suit domestic circumstances – may have the potential to either directly incentivize small-scale farmer innovation or, at minimum, allow the space for it to occur unimpeded.[8]

This paper explores how alternative or *sui generis* PVP systems, collective and certification trademarks, and geographical indications have the *potential* to:

- Increase farmers' incomes and support rural entrepreneurship;
- Provide incentives for the conservation, use and further enhancement of agrobiodiversity

5 Louwaars, N.P. et al (2005). Impacts of Strengthened Intellectual Property Rights Regimes on the Plant Breeding Industry in Developing Countries. A Synthesis of Five Case Studies. Wageningen UR, available at http://www.iprsonline.org/resources/docs/LouwaarsCGN_Plants_05.pdf.

6 Dutfield, G. (2011) Intellectual property tools for products based on biocultural heritage. A legal review of geographical indications, trademarks and protection from unfair competition. International Institute for Environment and Development. London.

7 Argumedo, A. (2013). Collective trademarks and biocultural heritage: Towards new indications of distinction for indigenous peoples in the Potato Park, Peru. International Institute for Environment and Development, London.

8 See QUNO (2015). "Small-scale farmer innovation systems: A review of the literature." Available at: http://www.quno.org/resource/2015/11/small-scale-farmer-innovation- systems-review-literature

White pea bean in Ethiopia, Georgina Smith (CIAT).

and associated knowledge; Facilitate the exchange of seeds through informal seed networks; and

- Recognise and reward farmers' innovation.

By contrast, this paper also explores how patents, trade secrets and UPOV-style PVP systems have the *potential* to:

- Restrict farmers from selling seed and increase costs of seed;
- Contribute to the erosion of plant genetic diversity and associated knowledge;
- Impede the exchange of seed through informal seed systems; and
- Insufficiently recognise farmers' innovation with regards to PGRFA.

These conclusions need be held lightly. Further study is required to explore these relationships in greater depth, particularly in light of other factors affecting our global food system. It is also important to note that while a well-crafted IPR regime may support small-scale farmer innovation, it is by itself insufficient for doing so. Other components of an enabling environment for small-scale farmer innovation may include, among other things, access to land and water, access to affordable credit and insurance systems, and investment in programs

supporting farmer-led research.[9] Section II introduces key concepts that provide the foundations for discussion throughout the remainder of the paper. Section III then discusses the relationship between each type of IPR tool and small-scale farmer innovation systems. Brief concluding remarks are made in Section IV.

II. Key Concepts

a) Small-scale farmer innovation systems

Small-scale farmer innovation systems are informal networks of social and economic actors where individuals and communities share and adapt local knowledge and material, selectively integrate 'scientific' knowledge and 'modern' tools and technologies with that which exists, and develop new and better ways of managing resources and overcoming local challenges.[10] In short, they are networks of farmers and rural communities developing new and better ways of doing things. Farmers have intimate knowledge of their natural landscapes and continually conduct experiments and observe subtle changes over time. They adapt their management practices to suit changing conditions and to reflect local needs and preferences. So while small-scale farmers are often portrayed as a socio-economically vulnerable group, their capacity to innovate and adapt also makes them highly resilient.

Summarized, small-scale farmer innovation systems are different from 'formal' innovation systems – comprised of public, private and philanthropic entities working to improve agriculture through the advancement of science and technology – in three key ways:

- The scope of what is considered innovation is much broader;
- The process is informal and fundamentally a collective, social phenomenon; and
- Farmers' incentives to innovate include but transcend opportunities to improve their competitive advantage and participate in commercial markets.

There is less a strict dichotomy than a continuum between 'formal' and small-scale farmer innovation

9 See Susan H. Bragdon and Chelsea Smith (2015), Small-scale farmer innovation, (Quaker United Nations Office, Geneva) Available at http://quno.org/resource/2015/12/small-scale-farmer-innovation in Chinese, English, French and Chinese

10 QUNO (2015) supra note 8.

"While small-scale farmers are often portrayed as a socio-economically vulnerable group, their capacity to innovate and adapt also makes them highly resilient."

systems. There is, however, value in drawing attention to alternative conceptions of innovation that are not represented in global policy discussions relating to intellectual property, trade and PGRFA.

b) Informal seed systems

The majority of agrobiodiversity[11] is actively maintained, used and enhanced by small-scale farmers. This is both 'innovation' in and of itself as well as the foundation for all future innovation in crop breeding.[12] Women in particular are widely recognized as knowledge holders and play important roles in variety use and development.[13] Informal seed systems are a cornerstone of farmers' innovation systems. Farmers develop new varieties adapted to local conditions and distribute them through informal social and economic networks (i.e. fairs, local markets, exchanges with neighbouring farmers and community seed banks).[14] Informal seed systems:

- Provide farmers with sufficient access to locally adapted and affordable seed in a timely manner;[15]
- Provide farmers with an important source of income;
- Encourage the use of landraces and underutilized species and contribute to genetic and species diversity conservation;
- Minimize risks associated with reliance on commercial seed

11 Agrobiodiversity encompasses plant and livestock diversity (both wild and domesticated) at the genetic, species and ecosystem levels, as well as its human component, cultural diversity.

12 See Smith, C., Elliott, D. and Bragdon, S.H. (2015). Realizing the right to food in an era of climate change: The importance of small-scale farmers. Geneva: Quaker United Nations Office.

13 Howard, P. et al (2008). A Scientific Conceptual Framework and Strategic Principles for the Globally Important Agricultural Heritage Systems Programme from a Social-ecological Systems Perspective. Rome: Food and Agriculture Organization of the United Nations.

14 Vernooy, R. and Ruiz, M (eds.) (2012).The Custodians of Biodiversity: Sharing Access to and Benefits of Genetic Resources. Earthscan. USA and Canada.

15 Louwaars, N.P., de Boef, W.S. and Edeme, J. (2013). Integrated Seed Sector Development in Africa: A Basis for Seed Policy and Law. Journal of Crop Improvement, 27: 186–214.

Quinoa in Colombia's Purace Municipality, Cauca Department, Neil Palmer (CIAT).

providers;[16] and

- Contribute to improved nutrition and the maintenance of local food cultures.[17]

Informal seed systems are often the only source of affordable and reliable seed for small-scale farmers, particularly where there is insufficient public and private sector investment in minor crops or staple crops adapted to suit marginal growing conditions.[18] It is therefore critically important that national seed policies and IPR regimes reflect the realities of domestic seed

16 Lapeña I. (2012). La Propiedad Intelectual sobre Semillas y sus Implicancias para la Agricultura Familiar en el Perú. Serie de Política y Derecho Ambiental. No. 25, Lima, Perú.

17 De Schutter, O. (2009) "Seed policies and the right to food: enhancing agrobiodiversity and encouraging innovation." Report presented to the UN General Assembly (64th session) (UN doc. A/64/170).

18 Louwaars, N.P. and de Boef, W.S. (2012). Integrated Seed Sector Development in Africa: A Conceptual Framework for Creating Coherence Between Practices, Programs, and Policies. Journal of Crop Improvement, 26: 39–59. Eighty percent of all seed in Africa is produced by farmers and distributed within informal systems, and this is likely to remain the case for the foreseeable future. See Byerlee, D. et al (2007). World development report, 2008: Agriculture for development. Washington, DC: World Bank; FAO (2014). The State of Food and Agriculture. Innovation in Family Farming. Food Agriculture Organization of the United Nations, Rome.

sectors and do not work to undermine the functioning of informal seed systems.

As is the case with 'formal' and 'small-scale farmer' innovation systems, there exists no strict dichotomy between 'formal' and 'informal' seed systems in practice. Farmers commonly integrate 'modern' varieties into their mixtures, selecting those that suit their needs and preferences and adapting them to suit local growing conditions.[19] Synergy between innovation systems and the flow of material and knowledge between seed systems is invaluable.

c) Supporting and incentivizing on-farm innovation with IPR tools

Farmers are driven to innovate for a variety of reasons:[20]

- **Mitigating risks** (e.g. environmental unpredictability, intensifying environmental pressures such as drought and soil nutrient depletion, market volatility, food insecurity and food safety concerns).
- **New opportunities** (e.g. new markets for high value products, opportunities to participate at points further along in agri-food value chains through processing and marketing, availability of resources to experiment, access to affordable credit).
- **Socio-cultural factors** (e.g. the desire for social recognition and status within communities; the desire to keep local food cultures and culinary traditions alive; curiosity and propensity to experiment).

"Informal seed systems are a cornerstone of farmers' innovation systems."

Supporting on-farm innovation requires ensuring that farmers have the tools they need to mitigate risks and take advantage of new opportunities. IPR tools that facilitate access to and the exchange of seeds and other propagating material (including 'modern' varieties) help mitigate risk and deliver

19 Sanginga (2009) supra note 4.

20 QUNO (2015), Small-scale Farmer Innovation Systems: Report on the First Expert Consultation 26-27 May 2015 Chateau de Bossey, Switzerland (Quaker United Nations Office, Geneva) Available at http://www.quno.org/resource/2015/10/small-scale- farmer-innovation-systems-report- first-expert- consultation-26- 27-may

"Supporting on-farm innovation requires ensuring that farmers have the tools they need to mitigate risks and take advantage of new opportunities."

socio-cultural benefits, thereby driving innovation.

Not all small-scale farmers are in a position to take advantage of new opportunities. Subsistence farmers innovate predominantly in response to risk, while only those with accumulated assets, expanded production or off-farm employment are able to 'step out' into commercial markets.[21] IPR tools that help secure sources of income to farmers and contribute to their livelihoods put them in a better position to take advantage of new opportunities, which drives more farmers to innovate.

The outcomes of farmers' innovation may yield public benefit (i.e. when they contribute towards the production of public goods in addition to the private gain they award farmers). In such cases, providing farmers with additional incentives to innovate is in the public interest, and IPR may provide one means of doing so.

IPR may incentivize on-farm innovation if structured in such a way that:

- Farmers are rewarded for using a breadth of varieties rather than individual varieties;[22]
- Informal seed systems are not impeded; and
- Sufficient disclosure requirements are enforced (discussed below).

By extension, well-structured IPR tools may then drive innovation by:

- Helping to ensure the future availability of diversity, thereby mitigating risk;
- Contributing to farmers' incomes,

21 Tittonell, P. (2014). Livelihood strategies, resilience and transformability in African agro-ecosystems. Agricultural Systems, 126: 3–14.

22 To reward the use of individual varieties runs counter to goal of conserving diversity, which evolves and changes over time. See Leskien Dan and Flitner Micheal (1997). Intellectual Property Rights and Plant genetic resources: Options for a sui generis system. In IPGRI no.6, available at https://www.bioversityinternational.org/fileadmin/_migrated/uploads/tx_news/Intellectual_property_rights_and_plant_genetic_resources_497.pdf

thereby allowing them to take advantage of new opportunities; and

- Maintaining the vitality of local food cultures and culinary traditions.

The impact of IPR tools on agrobiodiversity is ambiguous, particularly in light of other factors at play such as increasingly globalized food chains and the homogenization of global food supply and demand.[23] Focusing on informal seed systems helps us elucidate this complex relationship: IPR systems that encourage the use of individual varieties (i.e. promote monocultures) and impede informal seed systems run counter to the goal of promoting diversity, which evolves and changes over time. IPR systems that encourage the use and exchange of a diversity of varieties through informal seed systems encourage on-farm innovation with PGRFA. In effect, well-designed IPR systems reflect the public good value of agrobiodiversity.

d) Disclosure

Disclosure has become an important and controversial part of conversations on the use of IPR in the context of PGRFA. Disclosure in this context most often refers to obligations on behalf of users of genetic material (e.g. breeders, biotechnologists) to acknowledge any prior use of, or knowledge about, the material when seeking intellectual property protection in the form of patents.

"IPR systems that encourage the use and exchange of a diversity of varieties through informal seed systems encourage on-farm innovation with PGRFA."

Under different IPR regimes, requirements for what exactly needs to be disclosed vary. Around fifty countries include some form of biodiversity-related disclosure requirements (BRDRs) in their national legislation (biodiversity laws, patents and PVP, etc.),[24] which require disclosure of the geographical origin of genetic re-

23 See Khoury, C.K. et al (2014). Increasing homogeneity in global food supplies and the implications for food security. Proceedings of the National Academy of Sciences, 111(11): 4001-4006.

24 BRDRs are usually applied to patents and to a lesser extent to PVP. See Vivas-Eugui, D. and Anamika, I.P.A. (2012). Bridging the gap on intellectual property and genetic resources in WIPO's Intergovernmental Committee (IGC). ICTSD's Programme on Innovation, Technology and Intellectual Property (34). Geneva, Switzerland: International Centre for Trade and Sustainable Development.

sources used in research (in particular the development of new varieties) in addition to evidence of prior informed consent (PIC), mutually agreed terms (MAT) and other access and benefit-sharing (ABS) provisions.[25] Many feel this is a prerequisite for the functioning of any ABS system, where the benefits from the commercialization of new varieties are to be shared with those who actively conserve the majority of world's PGRFA: small-scale farmers.[26]

Current discussions within the Intergovernmental Committee on Intellectual Property, and Genetic Resources, Traditional Knowledge and Folklore (IGC), a subsidiary body of the World Intellectual Property Organization, are struggling to reach agreement on whether BRDR should be made mandatory within an international IP legal instrument negotiated by WIPO in order to support ABS. 27 How this issue moves forward may have an impact on how small-scale farmers are formally recognized and rewarded for their innovation with respect to PGRFA.

25 ibid. The relationship between the UPOV framework for PVP and BRDR is discussed in Section III/A/ii.
26 ibid.

III. IPRs and their relationship with small-scale farmer innovation

a) Patents

i) Overview of patents

Patents grant exclusive rights to holders to exclude others from using, replicating or commercializing their invention for a given period of time. Requirements for patentability and what is considered patentable subject matter varies by country, but minimum standards are laid out in Article[27] of the TRIPS Agreement. Generally, patentable subject matter must be novel, non-obvious (requiring an 'inventive step'), and useful.

At the crux of the debate on patents and plant varieties is whether novel biological material is an invention or a discovery from pre-existing nature. In most countries, plant varieties are not patentable. However in some jurisdictions, most notably in the US, gene sequences, tools and breeding methods,

27 Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional Knowledge and Folklore, Twenty-Ninth Session, February 15-19, Geneva, WIPO/GRTKF/IC/29

among other things used to develop varieties, are patentable.[28] Varieties developed using protected products and processes are in effect subject to the same protection. Complexity arises when multiple patented products and processes are used to breed a single variety. The resulting web of overlapping claims is referred to as a 'patent thicket,' requiring patent holders to enter into cross-licensing agreements, create patent pools with shared access to proprietary claims, engage in partnerships, or merge with or acquire other companies in order to have the 'freedom to operate.'[29]

In order to achieve balance between exclusive rights and the public interest, patent owners are required to fully disclose their inventions to the public in a sufficiently clear and complete way so that it may be replicated by a person skilled in the art once the patent has expired (TRIPS Agreement, Article 29.1). Once expired, inventions become part of the public domain. Competition laws may also be used to limit mergers and acquisitions among private companies amassing patents in order to limit the concentration of market power among a few actors.[30] Standards for patentability need be sufficiently high so that non-practicing entities, or 'patent trolls,'[31] are discouraged from

28 Generally, in the US, Japan and the EU, natural biological substances can be patented if they are sufficiently altered, isolated or purified from their naturally occurring state. See Gold, R. et al (2008). Toward a new era of intellectual property: from confrontation to negotiation A Report from the International Expert Group on Biotechnology, Innovation and Intellectual Property (pp. 1–44). However, what is considered patentable subject matter is a moving target. In the US, recent court decisions have clarified that isolated DNA are not patentable as nucleotide sequences if what is claimed does not differ from the order of bases that occurs naturally. Likewise, synthetic DNA is only patentable if the order of the bases varies from its natural counterpart, and cloned animals need be 'markedly different' from the donor animals. In the EU, isolated DNA and cloned animals are all patentable if technical means are employed to produce them and a plausible industrial application is disclosed. New plant varieties are reserved for the UPOV system of PVP, except when they incorporate foreign gene engineered into them that has been separately patented.

29 'Freedom to operate' refers to the ability to use a patented product or process in research and development without infringing upon the IPRs of others.

30 Given the consolidation in the seed and chemical inputs agribusiness arena, it does not seem a lot of use is being made of these laws. See ETC Group (2013), Putting the Cartel before the Horse...and Farm, Seeds, Soil and Peasants etc: Who Will Control the Agricultural Inputs? The State of Corporate Concentration. Available at http://www.etcgroup.org/putting_the_cartel_before_the_horse_2013

31 Rüther, F. (2012). Patent Aggregating Companies: Their strategies, activities and options for producing companies. Springer Science & Business Media.

obtaining patents for commercial gain rather than for further innovation.

ii) Patents and small-scale innovation

Small-scale farmers and small rural enterprises are generally less inclined to pursue and use patents for their business objectives. Large companies are instead better positioned to exploit the patent system and undertake the costs associated with acquiring, monitoring and defending their rights, so benefit more from it.[32] In the US, the estimated costs associated with filing, issue, examination and maintenance of patents, along with a host of miscellaneous fees, is upwards of US$10,000.[33] Patent litigation is a far more expensive process[34] that can take several years, and patent infringement cases relating to agricultural biotechnology are on the rise in the US.[35]

"IPR systems that encourage the use and exchange of a diversity of varieties through informal seed systems encourage on-farm innovation with PGRFA."

Proponents argue that patents help stimulate investment in the development of new varieties that both benefit farmers and introduce new genetic diversity into crop gene pools. Advances in biotechnology allow breeders to select and transfer traits of interest with increasing precision. Beneficial traits may include improved resistances to biotic and abiotic stresses and specific quality characteristics, which may help farmers in their efforts to adapt to climate change and changing market conditions.

If robust disclosure requirements are enforced, patent claims may facilitate access to information on new tools and techniques useful to other breeders. This may enhance competition

32 Correa, C. (2014). "Tackling the proliferation of patents: How to avoid undue limitations to competition and the public domain. South Centre Research paper 52. Available at: http://www.southcentre.int/wp-content/uploads/2014/09/RP52_Tackling- the-Proliferation- of-Patents-rev_EN.pdf

33 USPTO fee schedule available at: http://www.uspto.gov/learning-and- resources/fees-and-payment/uspto-fee- schedule

34 Estimates of cost of litigation include CAD$2 million per side in Canada at http://www.valgen.ca/wp-content/uploads/Gold-Richard-version- 2-E- 2011-01- 27.pdf and GB£500,000 to GB£2 million per side in the UK at http://ca.practicallaw.com/3-623-0277#a465286

35 See https://www.uschamberfoundation.org/patents-and- biotechnology

The so-called "Enola" yellow bean variety that has been at the centre of a decade-long biopiracy case, Neil Palmer (CIAT).

within the private sector and support public sector research targeting the needs of poor farmers who lack the ability to pay for commercial varieties. The accessibility of this information, however, is the subject of much debate.[36]

Critics argue that the type of innovation that is incentivized by patents does not benefit the majority of small-scale farmers. IPRs in general incentivize investment in crop improvement where there is a promised return on investment, i.e. in the development of high-yielding varieties of staple crops for which there is a large commercial market. Investment in minor crops important to small-scale farmers' food security or in the development of varieties adapted to suit marginal environments (without necessitating the use of additional

"Critics argue that the type of innovation that is incentivized by patents does not benefit the majority of small-scale farmers… and that patents have led to a contraction in the genetic diversity available to farmers."

36 See https://www.lens.org/lens/; Correa (2014) supra note 32.

inputs) is not profitable. The costs associated with obtaining a patent in particular means than investment is funnelled into developing varieties of substantial commercial value.

Critics also argue that patents have led to a contraction in the genetic diversity available to farmers. Varieties that are developed on-farm using patented varieties as parents cannot be freely exchanged through farmers' informal networks of seed exchange without the permission of patent holders and, commonly, paying royalties.[37] Farmers' varieties and modern varieties can be combined to produce those that perform better under local conditions and reflect farmers' selection preferences. This is a foregone opportunity if farmers are unable to freely exchange patented seed.

There is also debate over how much 'patent thickets' slow innovation on the part of the public sector, small enterprises and entrepreneurs that benefits small-scale farmers. 'Patent thickets' may create a barrier to entry for small enterprises and entrepreneurs because of the difficulty in anticipating when they may be infringing upon others' patent claims, and the transaction costs associated with obtaining multiple licenses.[38] Investment that targets the needs of small-scale farmers can have a positive impact on small-scale farmer innovation; another forgone opportunity if research is constrained by patents.

b) Trade Secrets / Hybridization

i) Overview of trade secrets

Under the TRIPS Agreement, trade secrets are information about the development of a product that is not accessible to the public or generally known among people in related circles, is of commercial value, and is kept confidential by the rights holder (Article 39). Unlike patents, no registration is required and the information can be protected for an unlimited period of time.[39] Trade secret and patent protection can be used together to create very strong exclusivity rights for individual rights holders.[40]

37 IPR regimes are national systems, and patents must be granted in the country they are being used in for it to be 'illegal' to use patent protected varieties.

38 See https://eml.berkeley.edu/~bhhall/papers/HHvGR_Patent_Thickets_FIN_29Oct12.pdf

39 See http://www.wipo.int/sme/en/ip_business/trade_secrets/protection.html

40 Jorda, K.F. et al (2007). Trade secrets and trade-secret licensing. Intellectual property management in health and agricultural innova-

Trade secrets have been used for decades in the US to protect information about the parental lines of hybrid maize. Hybridization refers to the cross-pollination of two genetically unique parents of the same species to produce a variety (F1) with improved performance, or 'hybrid vigour.' Subsequent cross-pollination among hybrids (F2) yields offspring with inferior performance, necessitating the purchase of new, F1 seeds every season. Keeping the parental lines a secret ensures the rights holder a steady customer base.[41]

ii) Trade secrets and small-scale farmer innovation

Small-scale farmers do not use trade secrets, thus trade secrets do not directly drive on-farm innovation.

Hybrid maize, together with the use of synthetic fertilizers and farm machinery, has allowed dramatic increases in yield.[42] However, varieties protected by trade secrets are costly and require purchase every season – impossible for many small-scale farmers worldwide. Synthetic fertilizers are likewise cost-prohibitive.[43]

Saving and re-sowing seed that comes from hybrid varieties is ineffective. Hybridization therefore does not contribute to the exchange of plant genetic material and associated knowledge, and the conservation of agrobiodiversity.

As there are no disclosure requirements of rights holders, trade secrets do not recognize or reward the contributions of small-scale farmers.

c) Plant Variety Protection

i) Overview of PVP

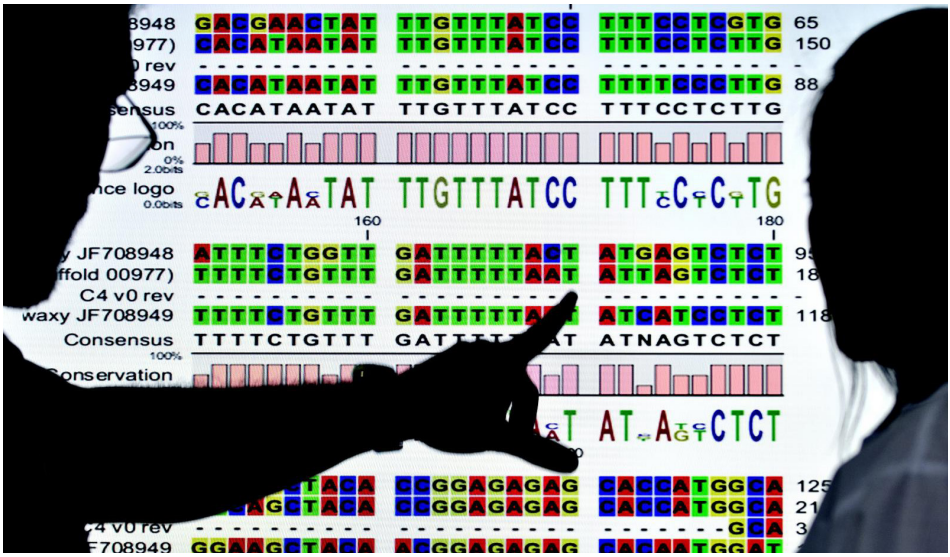
Plant variety protection (PVP) is an exclusive set of rights over propagating material (including seed, cuttings, divisions, tissue culture) and harvested material (cut flowers, fruit, foliage) for a number of years.

tion: a handbook of best practices, Volumes 1 and 2: 1043-1057.

41 For a history of the use of trade secrets in the US see Blair, D. L. (1999). Intellectual Property Protection and Its Impact on the US Seed Industry. Drake J. Agric. L., 4, 297.

42 Edgerton, M.D. (2009). Increasing crop productivity to meet global needs for feed, food, and fuel. Plant physiology, 149(1), 7-13.

43 FAO (2014) "Appropriate Seed Varieties for Small-scale Farmers: Key Practices for DRR Implementers," available at http://www.fao.org/3/a-i3768e.pdf



Decoding the cassava genome, Neil Palmer (CIAT).

The Union for the Protection of New Varieties of Plants (UPOV)[44] is the only international agreement that lays out a framework for PVP. This framework is the most widely implemented PVP system among contracting parties of the TRIPS Agreement. Under UPOV, breeders have exclusive rights to commercialize and distribute protected varieties. Farmers and other breeders are able to use protected varieties as a source of breeding material, subject to national legislation with respect to farmers and breeders' exemptions. Varieties eligible for protection must meet requirements for novelty, distinctiveness, uniformity and stability (NDUS).[45] Under UPOV 1991, governments are obliged to grant protection to all genera and species (Article 3(1)(ii) and 3(2)(ii)) for a minimum of 20 years (Article 19).

ii) UPOV framework for PVP and small-scale farmer innovation

The UPOV Convention was originally designed to suit the needs of commercial breeders in Europe and has since spread throughout the world. Its adoption has been included as a re-

44 See http://www.upov.int/portal/index.html.en

45 See http://www.upov.int/about/en/upov_system.html

quirement within many bilateral and plurilateral trade agreements in the interest of harmonizing IPR frameworks internationally. In addition, grants are sometimes made subject to required changes to national law. For example, to receive money from the New Alliance for Food Security and Nutrition, countries are required to enact UPOV 1991 compliant PVP legislation.[46]

Critics argue that the UPOV Convention, and particularly UPOV 1991,[47] does not reflect the realities of developing countries' seed sectors, characterized by informal seed exchange and heavy reliance on farmer saved seed. The definition of a breeder (Article 1) precludes the protection of varieties developed in collective, informal breeding systems where no 'legal person' is the owner.[48] Furthermore, requirements for uniformity and stability exclude farmers' varieties – which are heterogeneous and variable – from protection.[49]

Under UPOV 1991, saving, re-using and exchanging seeds among farmers for non-commercial use is subject to national implementation of the farmers' exemption clause (Article 15). Although no countries have yet enforced restrictions on these activities, it is noteworthy that what was once outside the scope of the Convention has been brought in to safeguard the interests of the breeder. The potential exists for farmers' seed exchange to be impeded, limiting farmers' access to farm saved seed.[50] This exchange is integral to the concept of Farmers' Rights enshrined in Article 9 of International Treaty on Plant Genetic Resources for Food and Agriculture.

The provision on essentially derived varieties (EDVs) is new to the 1991 Convention

(Article 14). It holds that a variety closely related to (or essentially

46 For example see G8 (2012). Cooperation Framework to Support the "New Alliance for Food Security and Nutrition" in Tanzania. Available at https://www.usaid.gov/sites/default/files/documents/1868/TanzaniaCooperationFramework.pdf

47 It should be noted that UPOV 1991 is the only version of the agreement open for signing, i.e. countries not yet party to the Convention may not sign the less restrictive 1978 version.

48 GIZ (2015). "The UPOV Convention, Farmers' Rights and Human Rights: An integrated assessment of potentially conflicting legal frameworks," available at: https://www.giz.de/fachexpertise/downloads/giz2015-en-upov-convention.pdf

49 Correa, C. (2015). Plant variety protection in developing countries: A tool for designing a sui generis plant variety protection system: An alternative to UPOV 1991. APBREBES.

50 Louwaars et al (2005) supra note 5.

"Critics argue that the UPOV Convention, and particularly UPOV 1991, does not reflect the realities of developing countries' seed sectors, characterized by informal seed exchange and heavy reliance on farmer saved seed."

derived from) a protected variety may not be commercialized without authorization of the rights holder. This means that improvements made upon protected varieties that are determined to be EDVs fall under the exclusive rights granted to the original breeder. Critics of the EDV provision posit that it may encourage market concentration rather than agricultural innovation at any scale.[51]

While the provision on EDVs has yet to have any measured impact on informal seed systems, there remains the potential for farmers' to be restricted from selling locally-adapted varieties that have been bred using protected varieties in the future. Selling seeds is an important source of income for many farmers.[52] This may be an impediment to the maintenance and/or development of a robust local seed sector and have a negative impact on both farmers' incomes and farmers' access to sources of farm-saved seed.

Where there is no system in place for registering farmers' existing varieties (or establishing prior art), two distinct yet related problems may arise. First, there is no working mechanism for farmers to be recognized for their contributions to the maintenance of PGRFA. In this case they will likely not share in the benefits arising from the commercialization of 'modern' varieties.[53] Secondly, commercial breeders may obtain PVP for varieties that are very similar to those in farmers' fields, without significant alteration. Farmers may be subsequently restricted from entering into the commercial seed sector with their varieties.[54] This runs counter to the goal of supporting rural entrepreneurship.

Critics also argue that UPOV 1991 favours genetic uniformity in crop varieties and creates incentives for the

51 Correa (2015) supra note 48.
52 Berne Declaration (2014). "Owning Seeds, Accessing Food: A Human Rights Impact Assessment of UPOV 1991. Based on Case Studies in Kenya, Peru and the Philippines," available at http://www.bernedeclaration.ch/fileadmin/files/documents/Saatgut/2014_07_10_Owning_Seed_-_Accessing_Food_report_def.pdf.
53 ibid.
54 GIZ (2015) supra note 47.

Maize, Neil Palmer (CIAT).

narrowing of crop gene pools.[55] PVP is granted for genetically uniform, stable varieties: homogenous varieties with characteristics that remain unchanged after repeated propagation (Article 8, 9). This encourages breeders to eliminate genetic variation within crop varieties to suit market demands. This runs contrary to agronomic needs. Genetic diversity is essential to the sustainability and resilience of agricultural systems, particularly in the context of climate change.[56] Small-scale farmers sourcing seed from the commercial seed sector will face narrowed selection.

"Critics also argue that UPOV 1991 favours genetic uniformity in crop varieties and creates incentives for the narrowing of crop gene pools."

Importantly, the present form of UPOV does not promote the use of locally adapted crops and underutilized species, nor the development of varieties adapted to unique social, economic and ecological conditions.[57]

55 De Schutter (2009) supra note 17.
56 Correa (2015) supra note 48.
57 GIZ (2015) supra note 47.

Varieties with intra-specific variation are beneficial to farmers trying to overcome biotic and abiotic stresses using ecological principles. These forms of innovation are not encouraged under a PVP system.

In terms of recognizing and rewarding farmers' contributions to PGRFA through disclosure (i.e. biodiversity related disclosure requirements (BRDR)), UPOV is "not opposed to the disclosure, per se, of countries of origin or geographical origin of genetic resources…but could not accept this as an additional condition of protection." Thus, if a country decides to introduce a mechanism for BRDR, it could not be included as a condition for plant variety protection.[58] Separate legislation from PVP legislation is then required to establish disclosure requirements within countries party to the UPOV Convention, such as that used for phytosanitary requirements or seed quality regulations. However, there remains a lack of evidence-based research on national governments' practical experiences with implementing BRDR legislation in conjunction-with UPOV.[59] What is clear is that the UPOV framework for PVP does not actively encourage recognition and reward of farmers' innovation.

"The UPOV framework for PVP does not actively encourage recognition and reward of farmers' innovation."

*d) Variety Registration / **Sui Generis** PVP Systems*

i) Overview of *sui generis* PVP systems

Variety registration systems, or sui generis PVP systems that differ from the UPOV framework, are registration systems for varieties developed through 'formal' breeding programs as well as those improved upon and used by farmers that typically do not meet NDUS requirements. They are distinct from seed registration and certification laws that require farmers to purchase certified and thus quality assured seed, under which farmers' heterogenous varieties may not meet

58 Review of the Provisions of Article 27.3(b), Relationship between the TRIPS Agreement and the Convention on Biological Diversity and Protection of Traditional Knowledge and Folklore, IP/C/W/347/Add.2. No longer available online. Cited in Nuno Pires de Carvalho (2010), The TRIPS regime of patent rights. Kluwer Law International at 369.

59 Vivas-Eugui and Anamika (2012) supra note 24.

registration requirements and be prohibited from commercial sale. Instead they provide a means of establishing prior art and taking a complete stock of the genetic and species diversity that exist, and the characteristics of propagating material in supply.

Alternative PVP systems are unique to each country in terms of eligible subject matter, requirements for protection and what rights are conferred.[60] For example, India's Protection of Plant Varieties and Farmers' Rights Act generally requires varieties to meet NDUS standards, but allows for the registration of EDVs and exempts farmers' and extant varieties[61] from the novelty criterion (Article 2). The Thai PVP Act requires that registered varieties have a distinct feature related to cultivation, consumption, pharmacy, production or transformation (Article 2), as opposed to the distinctiveness criterion in UPOV 1991 that requires varieties to be 'clearly distinguishable from any other variety' (Article 7). Under the Malaysian Protection of New Plant Varieties Act, uniformity and stability are not required to obtain protection;

"Alternative PVP systems are unique to each country in terms of eligible subject matter, requirements for protection and what rights are conferred."

varieties need only be identifiable and not yet have been commercialized (Section 14(2)).

Several countries are in the process of designing sui generis regimes designed to suit the domestic seed sector. Zimbabwe, Ethiopia and Zambia generally follow the UPOV model but with some exceptions relating to disclosure requirements, the scope and limitations of breeders rights and recognition of Farmers' Rights. India, Thailand and Malaysia provide three working examples of standalone, sui generis PVP systems.[62]

ii) *Sui generis* PVP systems and small-scale farmer innovation

Sui generis PVP systems ideally invite farmers' participation. In India, farmers are exempt from some of the formalities in the application process such as providing complete passport data of parental lines (Section 18),

60 Correa (2015) supra note 48.

61 Extant varieties are farmers' varieties or any other variety in the public domain or about which there is common knowledge. Article 2(j) of the PPVFR Act.

62 Correa (2015) supra note 48.

and registration fees vary according to whether varieties are registered for individual, educational or commercial use.[63] However, technical requirements and registration fees may still represent barriers to participation for small-scale farmers. Kochhar (2012) presents evidence that farmers in India have little interest in registering varieties, evidenced by the low number of farmers' varieties registered. At the same time, extant varieties make up approximately 85 percent of all those registered with the PVPFR Authority,[64] indicating significant interest on behalf of commercial breeders and public research institutions in documenting *prior art*.

Similarly, in Thailand, no farmers or local communities have registered local domestic plant varieties despite the statutory framework in place for doing so.[65] In this case the deterrent may be requirements for varieties to meet uniformity and stability requirements. [66]

"Technical requirements and registration fees may still represent barriers to participation for small-scale farmers."

Relaxed eligibility requirements with regards to uniformity and stability (e.g. in India and Malaysia) allow for intra-specifically diverse, or heterogeneous varieties to be registered. This means that farmers' varieties may be protected and commercialized through formal avenues as well as exchanged within informal networks. This encourages a wider diffusion of varieties bred by farmers and helps ensure the availability and accessibility of non-genetically uniform varieties to farmers in marginal areas where diversity is an asset.[67] The wider dissemination and further enhancement of farmers' varieties contribute to the objective of agrobiodiversity conservation.

Relaxed eligibility requirements with

63 Sujith Koonan (2014). "India's sui generis system of plant variety protection," QUNO, available at http://www.quno.org/resource/2014/1/developing-country- sui-generis- options-plant-variety- protection

64 ibid.

65 Lertdhamtewe, P. (2014). Protection of Plant Varieties in Thailand. The Journal of World Intellectual Property, 17(5–6): 142–159.

66 Lertdhamtewe, P. (2012). Thailand's Plant Protection Regime: A Case Study in Implementing TRIPS. Journal of Intellectual Property Law and Practice, 7(3): 186–93; Chiarolla, C. (2006). Commodifying Agricultural Biodiversity and Development-Related Issues. Journal of World Intellectual Property, 9(1): 25.

67 Correa (2015) supra note 48.

"Such provisions support the informal seed sector, protect farmers' access to seed, encourage rural and community-based entrepreneurship, and help maintain an important source of income for farmers."

regards to novelty and distinctiveness means that EDVs can be registered. This encourages a wider disclosure of the characteristics of seeds and propagating materials in supply, and thus supports public sector innovation as well as on the farm.

Sui generis PVP systems safeguard farmers' rights to save, exchange and even sell seed and propagating material derived from protected varieties. The Malaysian national PVP legislation explicitly allows for "any exchange of reasonable amounts of propagating materials among small farmers" (Section 31(1)(e)). PVP legislation in the Philippines protects the exchange and sale of seeds among small farmers (Section 43(d)).[68] Such provisions support the informal seed sector, protect farmers' access to seed, encourage rural and community-based entrepreneurship, and help maintain an important source of income for farmers.

It is arguable that the rights conferred by *sui generis* PVP systems strike a better balance between private rights and the public benefit than patents or UPOV-style PVP systems. Looking again at the case of India, exclusive rights to produce, sell, distribute, import and export crop varieties are valid for six years (renewable for up to 15), as opposed to 20 years under UPOV 1991. Rights holders have a duty to make seeds or propagating materials available to farmers 'in a timely manner' at a 'reasonable market price.'[69] If protected varieties do not perform as per disclosure, farmers have the right to claim compensation.

Benefit sharing provisions found in PVP laws of India, Malaysia, Costa Rica and Thailand attempt to recognize and reward farmers for their contributions to the conservation of PGRFA. Generally, breeders are

68 The UPOV Secretariat found both these provisions inconsistent with exemptions in UPOV 1991 (Article 15) and recommend that they be redrafted. See UPOV reports on legislation in Malaysia http://www.upov.int/edocs/mdocs/upov/en/c_extr/22/c_extr_22_2.pdf and the Philippines http://www.upov.int/edocs/mdocs/upov/en/c_extr/24/c_extr_24_02.pdf

69 Correa (2015) supra note 48.

Philippine VP Jejomar Binay visit to IRRI, 2015, International Rice Research Institute (IRRI).

required to disclose the parental lines used and the geographical location where they originate, including any knowledge of prior art. When individual farmers or communities register varieties they become eligible to share in the revenue collected from the sale and registration of these varieties.[70]

Benefit sharing, however, has not taken place in practice to the extent that proponents have envisioned. In India, the National Gene Fund, established with the intent of operationalizing the right to recognition and reward and the right to benefit sharing (Article 26, 45), has accrued little revenue.[71] Since 2007, the PVPFR

"Benefit sharing provisions found in PVP laws of India, Malaysia, Costa Rica and Thailand attempt to recognize and reward farmers for their contributions to the conservation of PGRFA."

70 De Jonge, B. (2014). Plant Variety Protection in Sub-Saharan Africa: Balancing Commercial and Smallholder Farmers' Interests. Journal of Politics and Law, 7(3): 100-111.

71 Andersen, R. and Winge, T. (2013). *Realising Farmers'; Rights to Crop Genetic Resources: Success Stories and Best Practices.* Routledge.

Authority has granted financial rewards to approximately thirty individual recipients, and no awards have been granted since 2012.[72]

In Thailand, the Plant Variety Protection Fund (PVP Fund), established to promote the conservation of wild and domesticated plant varieties, has had even less success in distributing rewards to 'local custodians.' Procedural and technical complications have discouraged farmers from registering as beneficiaries through regional offices, and consequently farmers have been left uncompensated.[73] Farmers remain skeptical of the prospects of benefits accruing through the fund.[74] It has been suggested that allowing NGOs or local government bodies to register on behalf of farming communities may help facilitate benefit sharing, recognizing the social, economic and educational conditions of local farming communities.[75]

72 The PVPFR Authority grants the 'Plant Genome Savior Community Award' and the 'Plant Genome Savior Farmer Reward and Recognition' See: http://plantauthority.gov.in/PGSFR.htm

73 Lertdhamtewe (2014) supra note 64.

74 Robinson, D. (2008). Sui Generis Plant Variety Protection Systems: Liability Rules and Non-UPOV Systems of Protection. Journal of Intellectual Property Law and Practice, 3(10): 659.

75 Lertdhamtewe (2014) supra note 64.

"Farmers remain skeptical of the prospects of benefits accruing through the fund."

e) Trademarks

i) Overview of trademarks

As outlined in the TRIPS Agreement, the owner of a registered trademark has the exclusive right to prevent others from using identical or similar signs, symbols or designations to market their identical of similar products (Article 16.1). There are three main types of trademarks: ordinary, collective and certification.[76] Certification and collective trademarks are not owned or used exclusively by the applicant but by anyone complying with certain specifications. The key difference between the two is that compliance for collective trademarks is enforced internally within associations while independent certifying bodies control compliance for

76 Kireeva, I. and Vergano, P. (2006). Geographical Indications and the Interface between Trade Mark Protection and Sui Generis Protection: The Example of China, Thailand and Vietnam. International Trade Law and Regulation, 12(4): 97–108.

"Collective trademarks may be beyond the legal and financial capacity of small-scale farming communities in developing countries."

certification trademarks.[77] Ordinary trademarks exclude others from producing identical goods without the consent of the trademark owner.[78]

Trademarks are registered and protected in almost every country in the world. Most WTO members do not allow geographical names to be registered as ordinary trademarks because of their wide application and the exclusivity rights it would otherwise grant to individuals.[79] Trademark law commonly requires marks to have a distinctive 'secondary meaning' (beyond a description) so that consumers readily associate the mark with a particular good, as opposed to a generic good (e.g. 'Apple' vs. 'computer').

77 Kireeva, I. and O'Conner, B. (2010) Geographical Indications and the TRIPS Agreement: What Protection is Provided to Geographical Indications in WTO Members? The Journal of World Intellectual Property, 13(2): 275–303.
78 ibid.
79 ibid.

ii) Trademarks and small-scale farmer innovation

There is some evidence that collective trademarks are beyond the legal and financial capacity of small-scale farming communities in developing countries.[80] In Europe, producers with collective trademarks have had to spend considerable amounts of money to enforce their claims and prove that their products are distinctive rather than generic, in absence of *sui generis* GI legislation (discussed in the following section).

On the other hand, there are examples of collective trademarks being used successfully to differentiate high value products internationally and achieve higher returns for domestic small-scale producers. The Ethiopian Fine Coffee Trademarking and Licensing Initiative, financed by the UK's Department of International Development, has drastically improved farmers' incomes and increased the volume of coffee exports. In this case it was decided that trademarks were more appropriate than a GI or certification scheme.[81] Trademarks do not require

80 Argumedo (2013) supra note 7.
81 Trademarks relate to a commercial origin rather than a geographical origin. Maintaining a GI for Sidamo coffee, for example, would require every bag to be produced, processed or

the product to be produced within a certain region of the country or have specific distinctive qualities from that region, and are thus inclusive of all domestic small-scale producers.[82] Having the national government maintain control over trademarks has allowed for centralized distribution, increased production for export and increased benefits to small-scale producers.

Ordinary trademarks can be used and maintained by producer cooperatives. The Pecuaria Development Cooperative Inc. in the Philippines has registered trademarks for a variety of rice and sugar-based products. They have a reputation for their signature varieties of white, red and black rice, and producers participate in the development, packing and marketing of value-added 'healthy' and 'natural' final products for high-end markets. Trademarks have helped to raise the incomes of participating small-scale farmers and have provided farmers with an incentive to innovate in response to changing consumer demands and to use diverse mixtures of varieties best suited to the land and not rely on chemical fertilizers.[83]

In terms of biodiversity conservation, it is important that trademarks do not limit protection to individual varieties to the detriment of a wider range of diversity. The potential to erode diversity by incentivizing the cultivation of one variety is discussed in the context of geographical indications in the following section.

Trademarks do not restrict the exchange of seed or other propagating material, and thus do not impede informal seed systems.

Trademarks allow farmers to develop a reputation, using branding and labelling, and be recognized and rewarded for their innovation.

"Having the national government maintain control over trademarks has allowed for centralized distribution, increased production for export and increased benefits to small-scale producers."

prepared in the Sidamo region and have unique qualities particular to the region. This was deemed impractical and costly. See: http://www.wipo.int/ipadvantage/en/details.jsp?id=2621

82 See http://www.wipo.int/ipadvantage/en/details.jsp?id=2621

83 See http://www.wipo.int/ipadvantage/en/details.jsp?id=3510

Organic rice from Pecuaria are sold on major department stores distributed by Global Organic and Wellness Corp., brandsonamissionph.wordpress.com

f) Geographical indications

i) Overview of geographical indications

Geographical indications (GIs) are signs, icons, symbols, words or phrases used on goods from a particular geographical origin that have unique qualities or a reputation that is attributable to that origin.[84] An 'indirect GI' is a geographical name that is not that of a country, region or specific place but relates to a specific geographical area when used in connection with certain products.[85]

"Trademarks have provided farmers with an incentive to innovate in response to changing consumer demands and to use diverse mixtures of varieties best suited to the land and not rely on chemical fertilizers."

84 O'Connor, B. (2004) The Law of Geographical Indications. Cameron May International Law and Policy. UK.

85 Larson, J. (2007). Relevance of geographical indications and designations of origin for the sustainable use of genetic resources. Global

Traditionally GIs have been used for alcohols and agricultural products, but can also be used for handicrafts and industrial products.

GIs are registered with a domestic authority established under GI legislation. Registration involves a description of the characteristics that make the product distinctive, such as rivers or other physical features, soil characteristics, elevation, human characteristics, method of production, or other historical or traditional factors. Rights are then extended to any producers who fit this description.[86]

In practice, GIs function much the same as collective trademarks: anyone with relevant knowledge and skills producing in a given area qualify for exclusive rights to use the indication. GIs help producers in a given area differentiate[87] their products on the market and protect them against competition from producers in other areas. They effectually provide a

"In practice, GIs function much the same as collective trademarks: anyone with relevant knowledge and skills producing in a given area qualify for exclusive rights to use the indication."

governance structure to maintain control over local resources and traditional knowledge.[88]

Other types of indications offer slight variations on GIs. 'Appellations of origin' (AO) or 'denominations of origin' (DO) are limited to the use of geographical names on products produced in a designated area. 'Traditional specialty guaranteed' (TSG) is used in Europe to denote traditional agricultural and food products with specific characteristics attributable to a human characteristics rather than environmental factors.[89] Collective or certified trademarks linked to a geographical area are analogous to GIs in theory, however are potentially costly to enforce and may be less effective in

Facilitation Unit for Underutilized Species, Rome, Italy.

86 Kireeva and O'Conner (2010) supra note 76.

87 Differentiation through labelling makes products that are otherwise equivalent to others on the market but that provide environmental, social and cultural benefits, such as the sustainable use of genetic resources, more valuable.

88 Larson (2007) supra note 84.

89 Regulation 1151/2012 sets out rules on the EU's quality labeling schemes for Protected Designation of Origin" (PDO), Protected Geographic Indication (PGI) and Traditional Specialties Guaranteed (TSG).

supporting small- scale farmers.[90]

ii) Geographical indications and small-scale farmer innovation

GIs have a long history of use in Europe and today about 90 percent of GIs come from OECD countries.[91] Developing countries have benefited from the use of GIs, however some successes pre-date their GI status so it is hard to distinguish their impact.[92] There are many noteworthy examples of GIs in developing and transitioning countries,[93] and interest in implementing GI legislation in others.[94] But the majority of experience comes from countries where boundary-setting, standardization and quality control measures are enforced – the lack of which presents challenges to using GIs in the context of small-scale and widely dispersed producers in developing countries.[95] Such institutional challenges in developing countries may account for the negligible effects, negative trends and contradictory outcomes sometimes reported with the implementation of GIs.[96]

In developed countries, biodiversity conservation is a direct consequence of GI value chain development,[97] while the experience in developing countries has been less straightforward. There have been cases where GIs have been too narrowly defined (i.e. the main distinctive characteristic is a particular variety) and have incentivized uniformity. The GI for tequila in Mexico includes only one variety of agave and as a result, many varieties are no longer being grown.[98] Bolivia's AO for quinoa likewise promotes the production of one variety over

90 GIs are protected as trademarks in the United States, Canada, Australia, Japan and many African and Arab countries. See Kireeva and O'Conner (2010) supra note 76.

91 Dutfield (2011) supra note 6.

92 Well known examples include Darjeeling tea, coffees from Colombia and Guatemala and Tequila.

93 Examples include wines from Brazil, white maize and Pisco from Peru, Mezcal and Tequila from Mexico, Darjeeling tea and Basmati rice from India, fish sauce from Thailand and Rooibus tea from South Africa. India alone, as of November 2015, had registered 237 GIs for agricultural products, foodstuffs, handicrafts and manufactured goods. See http://ipindia.nic.in/girindia/

94 As of 2010, GI legislation had been adopted but not yet entered into force in Bahrain, Guyana, Jamaica, Kuwait and St Vincent and the Grenadines; and was under development in Botswana, Cambodia, Mozambique, Ethiopia, Kenya and Laos. See Kireeva and O'Conner (2010) supra note 76.

95 Dutfield (2011) supra note 6.

96 Larson (2007) supra note 84.

97 ibid. GIs for cheese in France have had an overall positive effect on landscape and genetic resource conservation, valourization of local knowledge, and local and regional economies.

98 Dutfield (2011) supra note 6.

"Such institutional challenges in developing countries may account for the negligible effects, negative trends and contradictory outcomes sometimes reported with the implementation of GIs."

underutilized landraces. Broader descriptions promote the use of landrace varieties and wild species and create positive incentives to conserve genetic resources.[99]

In developed countries GIs have contributed to local economies and improved the livelihoods of small-scale farmers in marginal areas (i.e. mountainous regions, arid climates) where producers have less purchasing power and contribute lower volumes to regional and national markets. Value chains built upon local resources, traditional knowledge and innovative practices have been created. In developing countries, farmers are not typically involved in the production of final products on the market, and power has in some cases been concentrated in the hands of processors and distributors.[100] Farmers' cooperatives and organizations participating in the processing and packaging of final products may help ensure that GIs raise the incomes of small-scale farmers in such cases.

There is some evidence that poorly designed and managed GIs – developed in the interests of a few enterprises – exclude the poorest producers and may contribute to the dissolution of traditional practices.[101] There is also a risk that GIs may raise the price of staple, nutritious and culturally significant foods through the creation of niche markets, thereby limiting access by poor producers and consumers. These negative outcomes are detrimental to small-scale farmer innovation. It is important that governments work with farmers' organizations to develop differentiated policies and regulations for local, regional, national and export markets to avoid these pitfalls.[102] There is a lot of flexibility for WTO members to do so and design a GI system to suit their particular needs, as the definition for GIs in the TRIPS Agreement is vague.

99 Larson (2007) supra note 84.
100 ibid.

101 Giovannucci, D. et al (2009). Guide to geographical indications: Linking products and their origins (summary). Available at SSRN 1736713.
102 Larson (2007) supra note 84.

Production and sale of high-value, gourmet coffee to improve the livelihoods of smallholder coffee farmers in the border area of Colombia and Ecuador, Neil Palmer (CIAT).

GIs do not restrict access to or the exchange of plant genetic resources and traditional knowledge.
GIs have the potential to recognize and reward small-scale farmer innovation. Labeling provides farmers with an opportunity to compete with industrial food chains by differentiating their products. Increasing market demand for 'ethical' and 'natural' products that, for example, support small-scale producer cooperatives, agroecological production methods and agrobiodiversity conservation, provides opportunities for small-scale farmers. Meeting demand requires innovation.[103]

103 ibid. Innovation includes the development of new products, new ways of packaging to increase shelf life and new labeling to suit international consumers.

IV. Conclusion

This paper has discussed how some IP tools – particularly s*ui generis* PVP systems/variety registries, collective trademarks and geographical indications – have the potential to contribute to small-scale farmers' innovation systems by: raising farmers' incomes and improving rural livelihoods; encouraging the conservation, use and enhancement of agrobiodiversity and traditional

knowledge; facilitating the exchange of seeds, other propagating materials and associated knowledge; and recognising and rewarding farmers for their innovation.

It has also been discussed that patents, trade secrets and UPOV-modelled PVP systems may negatively impact small-scale farmers' innovation systems by: restricting farmers from selling, and increasing the costs of, seed and other propagating materials; contributing to the erosion of plant genetic diversity and associated knowledge; impeding the exchange of material and knowledge through informal seed systems; and not sufficiently disclosing, or at worst ignoring completely, the contributions of farmers to the development of new varieties.

Patents and PVP remain the most common IPR tools implemented within countries signed onto the TRIPS Agreement. However, its objective of stimulating investment within the agricultural sector might be best served otherwise. Member states might consider implementing IPR systems and innovation policies that reflect the realities of domestic seed sectors and recognise the contributions of small-scale farmers to agricultural innovation. The flexibilities provided for under the TRIPS Agreement may be applied more widely to support small-scale farmer innovation.

"There is a risk that GIs may raise the price of staple, nutritious and culturally significant foods through the creation of niche markets, thereby limiting access by poor producers and consumers."

The cases referenced throughout this paper are a reminder that while the use of IPR tools such as variety registries and geographical indications may encourage the use and enhancement of farmers' varieties and contribute to farmers' incomes, they do not guarantee these desirable outcomes. Collective governance of resources and value chains are critical.[104] At the same time, the implementation of even well designed IPR systems does not guarantee biodiversity conservation or the distribution of economic benefits to small-scale farmers. Other policies will be required to fulfil these ends. IPR tools may be just one component of an enabling environment for small-scale farmer innovation.

104 ibid.

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