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The UPOV Convention, Farmers' Rights and Human Rights

An integrated assessment of potentially conflicting legal frameworks

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Abbreviations used in the text

ABS	Access and Benefit Sharing
ACB	African Centre for Biosafety
ARIPO	African Regional Intellectual Property Organization
BDP	Bundesverband Deutscher Pflanzenzüchter
CBD	Convention on Biological Diversity
CEDAW	United Nations Convention on the Elimination of all Forms of Discrimination Against Women
CGIAR	Consultative Group on International Agricultural Research
DUS	Distinctness, Uniformity and Stability
ECOWAS	Economic Community of West African States
FAO	Food and Agriculture Organization of the United Nations
FIAN	Food First Information and Action Network
FPIC	Free Prior and Informed Consent
HRIA	Human Rights Impact Assessment
HRPs	Human Rights Principles
ICESCR	International Covenant on Economic, Social and Cultural Rights
ICJ	International Court of Justice
ILO	International Labour Organization
IPR	Intellectual Property Rights
ISSD	Integrated Seed Sector Development
ITPGRFA	International Treaty on Plant Genetic Resources for Food and Agriculture
LDC	Least Developed Country
MAT	Mutually Agreed Terms
MLS	Multilateral System
MTA	Material Transfer Agreement
NDUS	Novelty, Distinctness, Uniformity and Stability
PGR	Plant Genetic Resources
PGRFA	Plant Genetic Resources for Food and Agriculture
PIC	Prior Informed Consent
PPP	Public-Private Partnership
PVP	Plant Variety Protection
SMTA	Standard Material Transfer Agreement
SSSA	Seed System Security Assessment
TRIPS	Trade-Related Aspects of Intellectual Property Rights
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
UNDRIP	United Nations Declaration on the Rights of Indigenous People
UNEP	United Nations Environmental Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UPOV	International Union for the Protection of New Varieties of Plants
VCU	Value for Cultivation and Use
WIPO	World Intellectual Property Organization
WTO	World Trade Organization

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Title photo: A Malawian woman husks corn in her village on the outskirts of Lilongwe, Malawi. *© Stephen Morrison/Africa Practice.*
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Executive summary

This study explores the relations between the International Convention for the Protection of New Varieties of Plants (UPOV Convention), Farmers' Rights as enshrined in the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA), and human rights, particularly the right to adequate food. These three legal frameworks, though apparently referring to different fields of law, have in common that they are all related to the issue of seed and to rules that concern access to seed. The interrelations among these legal frameworks, including areas of overlap and of potential conflict, are an important topic in current political processes and debates.

The study focuses on the questions of whether the regulations of the 1991 Act of the UPOV Convention (1) support or oppose the right to food and other human rights; (2) advance or hinder the implementation of Farmers' Rights as required by the ITPGRFA; and (3) whether they are suitable for the agricultural conditions in developing countries. The study does not provide any judgments on other issues, e.g. advantages or disadvantages of plant variety protection (PVP) laws established based on the UPOV Convention compared with patent laws, or potential benefits for national economies or private investors that may arise from membership in UPOV.

The study relied on a desk review of written documents, including academic and non-academic contributions. In order to clarify the relation between the rules of the UPOV Convention and Farmers' Rights, emphasis was put on assessing the legal content of these rights. Furthermore, stakeholders from governmental and non-governmental organisations as well as the private sector were invited to contribute via expert interviews, written comments or participation in a discussion event.

The starting point for the assessment is a review of four topics identified as relevant for the issues addressed: (1) the history of intellectual property rights and PVP; (2) different approaches to plant breeding that exist in developing countries; (3) the importance of formal versus farmer-managed seed systems; and (4) agricultural conditions that prevail in developing countries. The concept of 'intellectual property' emerged historically from the European context, along with simultaneous developments in the United States of America. Its application to plant varieties is a new area of law for many developing countries. It has gained impetus since the Trade-Related Aspects of Intellectual Property Rights (TRIPS) agreement requires World Trade Organization (WTO) members to protect new plant varieties by using patent rights, an effective *sui generis* system, or a combination thereof. The UPOV system is thus one of several options available to developing countries to comply with this intellectual property protection requirement.

In many developing countries, a farmer-managed breeding system continues to exist that relies on traditional knowledge and the farmers' practices of freely saving, using and exchanging seed. This system has some points of contact with the scientific breeding system if protected varieties get introduced into the farmer-managed system, and vice versa. Each of these breeding systems can deliver different products and impacts, and they often focus on different crops and conditions.

Farmer-managed seed systems are the most important source of seed used by farmers in developing countries. The seed price is usually much lower than certified seed from the formal sector. The higher price of certified seed is mainly due to the higher production and distribution cost, with breeders' licences for protected varieties accounting for 5 to 10 per cent of the final seed price. However, PVP laws can interfere with these farmer-managed seed systems in various ways, and affect different groups of people differently, e.g. with regard to their possibilities for access to seed of protected varieties.

Typically, input-intensive agricultural production systems are found in developing countries alongside low-input systems, where biotic and abiotic constraints render standard approaches to agricultural intensification uneconomic. 'Improved' varieties from the formal breeding sector do not generally perform better than local varieties under such conditions. The associated costs, benefits and risks can differ for various sets of conditions and groups of farmers. Depending on the situation of each country, the distribution of high- and low-input conditions for farming can vary widely; however, it is estimated that at least 40 to 50 per cent of all agricultural lands in developing countries qualify as 'marginal' with regard to the production conditions faced by the farmers.

The assessment of how UPOV-based PVP laws support or oppose human rights focuses on (1) the human right to adequate food; (2) the human right to enjoy the benefits of scientific progress and its applications; (3) the rights of indigenous peoples with regard to genetic resources; and (4) the human rights principles.

The first two rights are both enshrined in the International Covenant on Economic, Social and Cultural Rights (ICESCR) and are legally binding rights for the 164 state parties to this treaty. States are the primary duty bearers and have obligations not only towards their own citizens, but also towards citizens of other countries, e.g. as members of international organisations, or in their role as donors. If competencies are transferred, e.g. to inter-governmental organisations, they remain responsible for their human rights obligations being fulfilled. They have to ensure constant efforts towards the realisation of human rights under ICESCR, to regularly report on the progress made, and to avoid any retrogressive measures.

The right to adequate food implies a comprehensive notion of food and nutrition security that goes beyond being free from hunger. It implies that people need to have access either to productive resources to produce their own food, or to sufficient

income that enables them to access food. The right to food does not prescribe any particular agricultural policies; however, in signatory states to the ICESCR, any policies affecting food and nutrition security should be assessed for their human rights impacts, and implemented based on human rights standards and principles. UPOV-based PVP laws involve risks for the realisation of the right to food, which can be more or less pronounced depending on the situation in each country. Such risks need to be assessed prior to implementation; if risks are identified, states have to take appropriate measures to ensure that human rights are not violated. Whether or not UPOV-based PVP laws are in harmony with the right to food depends on their implementation into national law, along with other measures taken by a state, e.g. to ensure that vulnerable groups have access to productive resources (e.g. seed) and income.

Moreover, states have to ensure that everyone can have access to scientific progress and its applications, e.g. new varieties of plants. When implementing PVP laws that potentially restrict farmers' access to seed of protected varieties, they have a responsibility to enable them to access seed of plant varieties that are bred based on scientific knowledge and related applications. State parties to ICESCR have to ensure that scientific breeding progress is directed towards resource-poor farmers and vulnerable groups that may be insufficiently addressed by existing breeding initiatives.

The rights of indigenous peoples have been declared under the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), which is however not a legally binding instrument under international law. It represents a development of legal norms and reflects the commitment of all UN member states to move in this direction. UNDRIP explicitly mentions the rights that indigenous peoples have with regard to the genetic resources they use, as well as to maintaining customary practices and institutions. Before adopting or changing policies that could potentially affect the rights of indigenous peoples, it has to be clarified whether such peoples are present in a state's territories. UNDRIP calls for Free Prior and Informed Consent (FPIC) as a standard procedure that should be followed. Additionally, for the signatory states to International Labour Organization (ILO) Convention No. 169, there is a legally binding obligation to establish dialogue and appropriate processes of consultation with indigenous and tribal peoples through their representative institutions for all matters that concern them directly.

The human rights principles should be followed in all processes that relate to human rights. They entail the principles of equality and non-discrimination, participation and inclusion, as well as accountability and rule of law. They are legally enforceable in many cases, depending on the legal situation in each country and the issue in question. In general, human rights rely on appropriate legal frameworks, processes and institutions for their realisation; the human rights principles are closely related to key attributes of 'good governance'.

Regarding the relation between the UPOV Convention and the Farmers' Rights enshrined in ITPGRFA, it is important to differentiate between different levels of law. Whereas the UPOV Convention and ITPGRFA are both treaties in international law, the practical realisation of the rights of plant breeders and Farmers' Rights happens within the national jurisdiction of each country. ITPGRFA leaves it largely to the discretion of states how Farmers' Rights are implemented in their national law. This differs from the UPOV system, where the national PVP law of a country is reviewed and approved prior to granting membership; the UPOV system thus narrows the possibilities of states to adapt PVP laws to individual countries' needs. Moreover, the Explanatory Notes provided by UPOV further limit flexibility in implementing national PVP laws, as they put forward a particular interpretation of issues that may be important in practice.

Farmers' Rights as established in Article 9 of ITPGRFA include the following elements: the right to protection of relevant traditional knowledge; the right to participate in sharing benefits from the use of plant genetic resources; the right to partici-

pate in decision-making; and the right to save, use, exchange and sell farm-saved seeds or other propagating materials. However, the wording used in the text of ITPGRFA leaves flexibility for states as to how to implement Farmers' Rights in their national legislation in a way that is found appropriate. At the same time it includes a clear obligation to take steps for protecting and promoting Farmers' Rights.

In spite of the recognition of farmers' contributions to the past, present and future development of plant genetic resources in the preamble and the reference made to Farmers' Rights in Article 9 of ITPGRFA, this does not provide a firm legal basis sufficient to classify Farmers' Rights as international customary law. However, if customary law is found to exist in a country with regard to farmers' seed-related practices, its relation to other rights needs to be clarified based on the national legal system of that country.

Generally, farmers can be said to have an implicit right concerning their genetic resources, including seed and planting material, unless it is challenged by other law, e.g. PVP law. UPOV-based PVP laws set four criteria as necessary requirements for a variety to qualify for protection: (1) novelty; (2) distinctness; (3) uniformity; and (4) stability. A variety can be protected under UPOV-based PVP law as a 'novel' variety if it has not been sold or marketed as such with its defining characteristic; this means that well-known and used farmers' varieties could be developed into protected varieties if some breeding activity has been involved. This exposes the farmers to limitations regarding their previous rights, such as to freely save, use, exchange and sell seed of this variety. In cases where there is no system that allows for registration of existing farmer varieties, the assessment of 'distinctness' cannot be done in a reasonable manner, as the diversity of characteristics of farmer varieties in use will be largely unknown. Moreover, a strictly applied 'uniformity' criterion could become a challenge for protecting varieties targeting stress-prone environments and low-input farming systems, thus hindering rather than promoting breeding progress for these conditions. It could also prevent farmers from protecting local varieties that are less uniform. The 'stability' criterion is less problematic with regard to Farmers' Rights. However, since the UPOV system does not foresee that any other criteria are required for granting a plant breeders' right, this system cannot be used to effectively control whether plant genetic material was legally obtained by a breeder. Hence, UPOV-based PVP law does not provide for legal certainty in this regard.

The scope of plant breeder's rights in UPOV-based PVP law is broadly defined and covers harvested seed, e.g. in farmers' fields and on farm. This scope of protection is a challenge to those elements of Farmers' Rights that relate to farmers' practices for use of farm-saved seeds or propagating materials in cases where protected varieties are concerned. This broad main rule for protection provides for a strong legal situation for the owner of a PVP right, in spite of possible exceptions. Possible exceptions concern acts done 'privately and for non-commercial purposes' (compulsory); and within limits and subject to safeguarding the legitimate interest of breeders concerning the farmers' use of seed harvested from their own landholdings for re-sowing on these same holdings (optional). These exceptions are narrowly defined, as they prohibit the farmers' customary practices of exchanging and selling seed from their own harvest, which are important elements of farmer-managed breeding and seed systems. Moreover, the use of protected varieties by farmers for their own breeding activities can be subject to legal uncertainty, as breeding and seed production cannot be clearly separated. It may not be easy in all cases to clarify if a variety bred by a farmer is considered to be sufficiently distinct, or if it is 'essentially derived' from a protected variety.

Other challenges to Farmers' Rights derive from supra-national implementation of UPOV-based PVP laws that impede effective participation of farmers and other stakeholders. Moreover, if plant genetic resources are collected from farmers' fields and made available under the multilateral system (MLS), there may be challenges regarding Farmers' Rights to participate in decision-making as well as benefit-sharing. Lastly, restrictive seed legislation can render

illegal the farmers' customary practices of exchanging and selling uncertified farm-saved seed.

Alternative approaches to developing TRIPS-compliant *sui generis* PVP laws exist already in practice. Additionally, 'model laws' or elements of these have been suggested by academics and civil society organizations. Depending on the conditions in the breeding and seed sector of each country, these alternatives can facilitate pluralistic approaches to developing breeding and seed systems in developing countries, and provide differentiated options to implement national PVP laws in harmony with other treaty obligations and policy goals.

The study results in 20 recommendations that address (1) the possibilities to harmonise the goals and obligations of different treaties within national PVP laws; (2) the progressive realisation of human rights; (3) the realisation of Farmers' Rights; and (4) the agricultural conditions in developing countries.

Main recommendations are:

- Developing countries, prior to establishing national PVP laws, should clarify the legal requirements for a process involving rights holders in their country, e.g. farmers and indigenous peoples.
- The German government as a state party to the ICESCR and member of the UN could provide assistance to developing countries in designing human-rights based processes for establishing PVP laws.
- Governments of developing countries should clarify the objectives of their national PVP law and carefully consider how different PVP laws could help address these objectives. This includes ensuring how all farmers can access seed of protected varieties in practice, and how scientific breeding progress can be directed towards the needs of vulnerable groups.
- Prior to adopting national PVP laws, governments of developing countries should assess whether indigenous peoples live in their territories, and seek their consent through appropriate consultation processes.
- Developing countries that have not yet joined UPOV should consider opting for alternative *sui generis* systems of PVP that allow for more flexibility in meeting the obligations of different treaties, for balancing the interests of diverse actors, and for protecting and promoting Farmers' Rights, compared with the UPOV system.
- Common standards for regional harmonization of PVP laws can also be agreed upon based on a *sui generis* approach, should this be found to be of shared interest.
- UPOV members may consider the diversity of their present and potential new members' agricultural conditions in the further development of rules and their interpretation, and consider allowing for more flexibility in designing national PVP laws, e.g. with regard to exceptions for small-scale farmers and indigenous peoples. They may also consider changes in the process of granting membership, so that it is easier for new members to comply with the requirements of different treaties.
- Research needs were identified with regard to empirical studies on breeding and seed systems in developing countries; to human rights impact assessments; as well as to legal aspects of alternative *sui generis* PVP laws.
- In those developing countries that have implemented UPOV 91 in their national legislation, research is needed to better understand the effects of PVP laws on human rights, Farmers' Rights and agricultural biodiversity.
- The German government could consider funding such research, through its own initiatives or as a member of European and international programmes.

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1 Introduction and objectives of the study

1.1 Introduction

Intellectual property rights (IPR) for plant varieties are a highly topical and strongly debated issue, particularly with regard to the situation in developing countries, where agriculture continues to be an important source of livelihood for many people, and where food insecurity prevails. On the one hand, granting IPR to plant breeders aims at stimulating private investment, thus improving farmers' possibilities to use new plant varieties that are developed based on scientific breeding methods; on the other hand, there are concerns with regard to the sustainable use of agricultural biodiversity, the rights of farmers, and also to food and nutrition security and human rights. Private investment tends to be focused on a few crops of major economic importance, and on breeding strategies that do not particularly address the needs of small-scale farmers in developing countries. Furthermore, it is inherent in the concept of IPR that the exclusive right to use is allocated to the rights holder. In the case of plant variety protection (PVP), the one identified as the 'breeder' has the right to control the use of the plant variety. This concerns the rights of farmers to save, use, exchange and sell seed obtained from their own harvest, as far as protected varieties are concerned.

The International Union for the Protection of New Varieties of Plants (UPOV) is an international organisation, based in Geneva, Switzerland, that aims to provide and promote an effective system of PVP,

thereby encouraging the development of new varieties. It was founded in 1961 by the International Convention for the Protection of New Varieties of Plants, which had been put forward by several European countries and their breeding industries. The UPOV Convention protects the IPR of plant breeders, but at the same time permits other breeders to use protected material without authorisation, for their own breeding work, a concession known as the 'breeding exemption'. This is an important difference from patent laws in general, even though some national patent laws include similar provisions. The UPOV Convention has been revised several times, with the 1991 Act of the Convention being the only one open for signing at present. It continues to be an important vehicle to promote commercial interests in plant breeding. UPOV has currently 72 members (as of June 2014); among the countries that joined UPOV in the last decade are several East European and Asian countries, e.g. countries that formerly belonged to the Union of Soviet Socialist Republics (USSR), but also developing countries, e.g. Peru, Viet Nam and Morocco. A number of African countries are in the process of joining UPOV, an issue that attracts attention to the question how and to what extent the UPOV Convention is in line with the interest of developing countries, and particularly their farming sector.

Farmers' Rights as a political concept dates back to the early 1980s (Andersen, 2005: 2). It was addressed for the first time in an FAO forum in 1986 (Andersen, 2005: 4–5; 2013: 5–6). The purpose was to draw attention to the mostly unremunerated contributions of farmers to the development of the global pool of crop genetic diversity, which forms the basis for modern plant breeding. Before plant breeding emerged as science and profession, all plant breeding was done by farmers as an integral part of their agricultural practices. The concept of Farmers' Rights aims to better balance the rights of farmers with the rights claimed by plant breeders.

The issue of Farmers' Rights was put forward in the discussions leading to the Convention on Biological Diversity (CBD), the first legally binding international treaty to address the conservation, sustainable use and equitable sharing of benefits derived from the utilization of biological diversity. The Parties to the CBD have committed themselves to respect, preserve and maintain traditional knowledge, innovation and practices (Article 8j), and to promote their wider use. In the Nairobi Conference for establishing the final text of the CBD, the topic of Farmers' Rights was, however, postponed, to be addressed in future negotiations (UNEP, 1992).

Subsequently, Farmers' Rights became enshrined in the International Treaty on Plants and Genetic Resources for Food and Agriculture (ITPGRFA, 2001), which entered into force in 2004 and has at present 133 member parties. Farmers' Rights and certain elements of them are mentioned and recognised in the Preamble and in Article 9 of the treaty. However, the responsibility for their realisation rests with national governments, as stated in Article 9.2: 'In accordance with their needs and priorities, each Contracting Party should, as appropriate, and subject to its national legislation, take measures to protect and promote Farmers' Rights.' Moreover, the treaty obliges the Contracting Parties to 'develop and maintain appropriate policy and legal measures that promote the sustainable use of plant genetic resources for food and agriculture' (Article 6.1), and suggests a variety of measures, including 'reviewing, and, as appropriate, adjusting breeding strategies and regulations concerning variety release and seed distribution' (Article 6.2(g)). However, signatory states tend to make only slow progress in implementing the treaty's obligations in this regard. Several resolutions adopted at the 5th session of the Governing Body of ITPGRFA, held in Muscat, Oman, in 2013, address this issue directly or indirectly (Resolutions 7–9)[1]. *Inter alia*, the Secretariat is to develop options for national implementation of Article 9 on Farmers' Rights and to present these to the Governing Body at its next session, which should take place in October 2015; the contracting parties are called upon to

[1] For further information, visit http://planttreaty.org/content/fifth_gb_resolutions.

develop national action plans for the implementation of Farmers' Rights.

One criticism relating to PVP is based on human rights considerations, particularly the right to adequate food, which is enshrined in the International Covenant on Economic, Social and Cultural Rights (ICESCR). Seed is the basis of almost all food production worldwide; the relation between accessing seed and obtaining food is obvious and direct for small-scale farmers in developing countries. However, the control over seed as an agricultural input and genetic resources for future breeding activities also shapes farming and food systems worldwide, and thus concerns food and nutrition security for all people. A report by the former Special Rapporteur on the Right to Food, Olivier de Schutter, delivered to the United Nations General Assembly on 23 July 2009, clearly confirms a relationship between state obligations regarding the right to food, and regulations concerning seed commercialisation and PVP (United Nations, 2009a). Other human rights may also be touched, as will be further outlined in Chapter 4 of this study.

It is thus obvious that the UPOV Convention, ITPGRFA and the right to food, though aiming at the regulation of different issues at first sight, have some degree of overlap, in that they are all related to seed and the rules that concern property rights and access to seed. However, this overlap occurs partly through intermediate or indirect effects, which makes them difficult to address if each legal framework is looked at in isolation (Haugen, 2014a).

Given the ongoing controversies, the ITPGRFA Governing Body invited contracting parties and stakeholders to report on possible interrelations between Article 9 of ITPGRFA on Farmers' Rights and relevant international instruments for the protection of IPR, such as the UPOV Convention and national patent laws. Furthermore, in the case of human rights, states have not only obligations with regard to their own national policies, but also regarding international cooperation, and effects of their policies on rights holders in other countries. This is why the discussion on interrelations between Farmers' Rights, human rights and IPR is also relevant for considering the future engagement of the German government in various other processes and initiatives. Moreover, a study related to human rights impacts of the 1991 Act of the UPOV Convention has recently been published, supported by a number of non-governmental organisations (The Berne Declaration, 2014). Discussions arising in the course of reception lead to an awareness of the need to take a closer look into some of the issues raised.

Key points

- The UPOV Convention, ITPGRFA and the human right to food have in common that they are all related to seed and the rules that concern property rights and access to seeds.
- The relations among these different legal frameworks are an important topic in current political processes and discussions.

1.2 Objectives

The overall aim of this study is to assess how the UPOV Convention, the right to food and Farmers' Rights are interrelated. Based on this aim and the aforementioned considerations, the study addresses the following specific objectives:

1. Evaluate, whether the regulations under the 1991 Act of the UPOV Convention support or conflict with the right to food and other relevant human rights. A key question to be addressed in this context is the possible impact of UPOV's requirements (especially of Articles 5–9, 14 and 15 of the 1991 Act of the UPOV Convention) on Farmers' Rights to save, use, exchange and sell farm-saved seed and other propagating material, and how this relates to the right to food, as well as expected advantages for small-scale farmers in developing countries that might arise.
2. Investigate where ITPGRFA and the UPOV Convention overlap and to what extent the 1991 Act of the UPOV Convention advances or contradicts

the implementation of the Farmers' Rights and other provisions as defined by ITPGRFA and CBD. Should the 1991 Act of the UPOV Convention contradict or be inconsistent with human rights, ITPGRFA or the CBD, specific recommendations should be developed on how to address these discrepancies. Additionally, those paragraphs opposing human rights and hindering the implementation of Farmers' Rights are to be identified and revisions for better integrating these issues are to be suggested.

3. Investigate the extent to which the 1991 Act of the UPOV Convention is suitable for the agricultural conditions prevailing in developing countries. If the suitability cannot be confirmed, elements of alternative *sui generis* legal frameworks for PVP should be proposed. Furthermore, existing proposals for Integrated Seed Sector Development (ISSD) should be taken into account; the ISSD approach aims to match the needs and interests of a range of seed entrepreneurs who address different crops, varieties and markets, as well as the legal, financial and institutional environments in which they operate [2].

It was not within the scope of the study to assess the advantages or disadvantages of PVP laws under the UPOV Convention in comparison with other legal frameworks, e.g. patent laws. General economic benefits expected from joining UPOV, e.g. for private investors, for the agricultural sector or national economies in general, were also not addressed. State obligations regarding human rights and ITPGRFA do not depend on such considerations, even if they may be otherwise important, and cannot be balanced against them. Rather, the human rights that are found relevant for the topic of the study require a particular focus on vulnerable and marginalised population groups. This is why we emphasize the potential effects for these groups of changes in agricultural policies. However, this does not mean that states should not consider any other benefits in designing their policies, as long as they take care that human rights obligations and other treaty obligations are fulfilled. This is why the study focuses on identifying options available for states to take policy measures for PVP while respecting their obligations towards human rights and ITPGRFA. As such, this study also aims at providing input to policy development on seed and PVP for the German Federal Ministry for Economic Cooperation and Development (BMZ), and to developing shared positions between the BMZ and the German Federal Ministry of Food and Agriculture (BMEL).

Key points

- The study focuses on the question of whether the regulations of the 1991 Act of the UPOV Convention support or oppose the right to food and other human rights, and advance or hinder the implementation of Farmers' Rights as required by ITPGRFA.
- A focus on disadvantaged and marginalised groups is required for assessing the relation among the UPOV Convention and the right to food and other human rights.
- The study does not provide any judgement on other issues, such as potential economic benefits for national economies, the agricultural sector or private investors, arising from membership of UPOV; it also does not assess potential advantages or disadvantages of PVP laws established under the UPOV Convention, compared with patent laws.

[2] A quick introduction to ISSD is available at www.wageningenur.nl/en/show/Integrated-seed-sector-development-in-Africa.htm

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2 Methodological approaches

The study relies mainly on a review and evaluation of written documents, including both scientific and non-academic contributions. Given the tight time frame, it had to partly rely on previous works done by the authors, team colleagues and other researchers, for example with regard to reviewing and identifying relevant literature. An impressive body of knowledge existed already, particularly with regard to relations between the various Acts of the UPOV Convention and Farmers' Rights, and to some extent also the right to food.

In order to go beyond this existing knowledge, a focus was to understand some basic issues and concepts, such as the diversity of agricultural conditions found in developing countries, and how different breeding and seed systems address this diversity. These are based on differing notions of intellectual property and differing funding mechanisms (addressed further in Chapter 3).

For assessing how the regulations under the UPOV Convention relate to human rights, the human rights that were found to be relevant in this regard are identified and their content and implications described, based on legal sources and existing literature (see Chapter 4).

The relation between Farmers' Rights and the plant breeders' rights established in UPOV-based PVP laws was assessed based on understanding the legal sources of the ITPGRFA and the UPOV Convention, and how they interact (see Chapter 5).

Various perspectives and contributions of stakeholders were collected to address them in the study. Eleven expert interviews were conducted in the initial phase; these interviews were conducted as semi-structured interviews and helped us focus the study, but were not considered as scientific 'results', given the small number of interviewees and their various fields of knowledge and expertise. The

results of these interviews are thus not presented in the study as such. Furthermore, representatives of governmental and non-governmental organisations, academia as well as of the private and public breeding sector, were invited to comment on the preliminary versions of the study in written form. A discussion was held at the German Federal Ministry for Economic Cooperation and Development (BMZ) on 6 March 2015. All comments provided in oral or written form were considered and/or addressed while preparing the final version of the study. A list of all experts who contributed either by interviews, by participating in the discussion, or via written comments and contributions, is provided in the acknowledgements (Chapter 8).

Key points

- The study relied on a desk review of written documents, including both academic and non-academic contributions.
- Additionally, stakeholders were invited to contribute via expert interviews, by participating in a discussion or via written comments on the previous versions of the study.

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3 Basic concepts and issues

In this chapter, we will look into four basic issues that are of importance for the topic of the study, namely: the history of IPR and PVP (Section 3.1); different approaches to plant breeding (3.2); the importance of both formal and farmer-managed seed systems (3.3); and agricultural conditions in developing countries (3.4). Each of these issues cannot be explored in depth in this study. We will, therefore, concentrate on those aspects we consider relevant for later arriving at conclusions and recommendations that take these issues into account.

3.1 A historical perspective on 'intellectual property' rights and protection of plant varieties

Different types of creative works are protected by different types of IPR. Knowledge can in general be characterised as a public good, as it is non-rivalry and non-excludable by nature. This means that it can be used by several people simultaneously with-

out losing content or quality, and that it is more or less impossible to exclude people from using it, once available. At the same time, certain areas of knowledge are expensive to develop and cheap to copy; therefore there is a need to establish legal protection for these. This tension between conceiving knowledge and innovation as public goods, while recognising and protecting the rights of authors and inventors, seems to be characteristic for the debate on IPR (Dorn, 2007).

Taking a historical perspective, the concept of 'intellectual property' is relatively new. In European history, a contemporary conception of intellectual property regulation emerged in the late 17th century, and gained importance after the French revolution. In central Europe, this mainly took the form of moral rights, e.g. of authors and artists. A more pragmatic notion of IPR as a practical means to foster technological progress and reward innovation was conceptualised in the late 18th century, mainly starting out in the United States of America (Dorn, 2007).

IPR could, in this phase of history, only be protected under national legislations of countries; the appropriation of foreign intellectual property was, however, not seen as 'piracy', but rather as the rendering of a public service (following Drahos and Braithwaite, 2002: 32, cited in Dorn, 2007). Overall, today's leading economic powers achieved development in part by freely appropriating the 'intellectual property' deriving from inventors from other countries. Examples exist both for technologies as well as genetic resources (see Sell, 2003: 64; Flitner, 1995).

Milestones towards international regulations for IPR were the signing of the Berne Convention for the Protection of Literary and Artistic Works in 1886, and the Paris Convention for the Protection of Industrial Property in 1883. The Paris Convention was originally developed and signed by eight European and three South and Central American states, and is still in force today. While these states established common principles for all parties to observe, they also allowed for variation in issues such as scope and duration of the rights conferred, and matters that could be protected. This permitted national autonomy in adjusting protection levels depending, for example, on the level of economic development, or policy objectives (Sell, 2003: 11–12). Plants and animals were considered 'natural' and not patentable at that time. In the United States of America, a 'Plant Patent Act' was passed in 1930; however, the issue of patenting plant varieties has gained importance for agricultural plants since the 1980s.

An important turn towards a global intellectual property policy regime occurred in the last three decades of the 20th century, and led to the signing of the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS). The TRIPS agreement forms part of the founding agreements for the World Trade Organization (WTO), that came into effect in January 1995. It sets down minimum standards for various forms of intellectual property regulation; furthermore, it lays down a set of general principles for enforcement of IPR, and provides for dispute settlement procedures among its members (WTO, 2015). The value of the TRIPS agreement for developing countries—mostly net importers of 'intellectual property'—has often been questioned. It has led to controversy, including in relation to human rights, e.g. where public health issues are concerned and need to be balanced against intellectual property claims for pharmaceuticals.

In some countries, e.g. Tanzania, patent law was first introduced by colonial administrations and remained largely unchanged after independence (Government of Tanzania, 2010). However, a large number of countries had no patent system prior to TRIPS. Thus, they were obliged to introduce the concept of property rights in their national context, even though this was a quite unfamiliar concept of law for many people in these countries. This seems to be even more the case for plants and plant varieties: the idea that someone different from the person or community growing them has the right to prevent one from freely using or sharing the seed challenges long-standing practices of farmers, especially in more traditional cultures and among small-scale farmers of developing countries.

Hence, the contemporary notion of 'intellectual property' has emerged from European and North American contexts, with few other countries being

Table 1. Summary of differences between the 1978 and 1991 Acts of the UPOV Convention

Subject	UPOV 1978 Act	UPOV 1991 Act
Definition of variety	Not provided	A plant grouping within a single botanical taxon of the lowest known rank; recognisable by its characteristics; different from any other variety.
Minimum scope of coverage	Increasing number of genera or species required to be protected: from five at time of accession, to 24 eight years later.	Increasing number of genera or species required to be protected: from 15 at time of accession, to all genera and species 10 years later (5 years for member states of earlier UPOV Act).
Eligibility requirements	Novelty, distinctness, homogeneity and stability.	Novelty, distinctness, uniformity and stability.
Exclusive rights in propagating material	Production for purposes of commercial marketing; offering for sale; marketing; repeated use for the commercial production of another variety.	Production or reproduction; conditioning for the purposes of propagation; offering for sale; selling or other marketing; exporting; importing or stocking for any of these purposes.
Exclusive rights in harvested material	No, except for ornamental plants used for commercial propagating purposes.	If harvested material was obtained through unauthorized use of propagating material and if breeder had no reasonable opportunity to exercise his/her right in relation to the propagating material.
Prohibition on dual protection with patent	Yes, for same botanical genus or species.	No. It is allowed to use patent laws to protect traits, genes, etc., of the same variety.
Breeders' exemption	Mandatory; breeders are free to use a protected variety to develop a new variety.	Permissive, but breeding and exploitation of a new variety that is "essentially derived" from an earlier variety requires right holder's authorization.
Farmers' exemption	Implicitly allowed under the definition of exclusive rights.	Compulsory for acts done privately and for non-commercial purposes, or for experimental purposes; optionally within reasonable limits and while safeguarding the legitimate interests of the breeder for farmers to use farm-saved seed on their own landholding only.
Minimum term of protection	18 years for grapevines and trees; 15 years for all other plants.	25 years for grapevines and trees. 20 years for all other plants.

Source: Adapted from Helfer, 2004; UNDP, 2008; The Berne Declaration, 2014.

involved in shaping the rules on which the concept is based initially. Subsequently, it became applied to other cultural contexts, as a result of economic and policy processes that took place in the international arena. IPR are, for example, usually based on identifying one legal person as the right holder, and do not allow for collective rights.

The TRIPS Agreement requires WTO Member States to protect new plant varieties using patent rights, a sui generis system or a combination thereof. Because TRIPS provides states with this flexibility, national governments face an array of options in choosing the intellectual property regime applicable to plant varieties, as outlined in detail by Helfer (2004). A national PVP law that complies with the UPOV Convention is one of these options, but not the only one available. Some countries, including India, Malaysia and Thailand, have chosen to develop sui generis acts for protection of plant varieties; these countries have emerging industrial sectors in agriculture but still harbour extensive traditional and subsistence systems with high levels of agricultural biodiversity. Least Developed Countries (LDCs) enjoy an exemption until at least 2021 to implement this part of the TRIPS agreement, which could be extended (De Jonge, 2014).

In contrast to patent law, the UPOV approach focuses on varieties [3] of plants and not on traits, genes or specific breeding processes or techniques [4]. In order to qualify for protection under UPOV-based PVP law, a variety has to fulfil four basic criteria: novelty, distinctness, uniformity and stability—the so-called NDUS criteria (see also later, in Chapter 5, Section 5.3). Breeders have exclusive rights to produce or reproduce the protected varieties. Whereas earlier Acts of the UPOV Convention allowed exemptions to this rule to farmers, e.g. with regard to re-sowing and exchanging seed of protected varieties from their own harvest, these have become more restricted in the 1991 Act of the convention, which is now the only one open for signing [5]. Another important difference between the 1978 Act and the 1991 Act of the UPOV Convention is that the PVP law should now apply to plant varieties of all genera and species after a transition period of ten years. Previously, the genera and species could be listed by the respective country with a minimum of 24 to which the PVP law should apply after eight years. An outstanding characteristic of the UPOV system is the 'breeding exemption', which allows other breeders to use a protected variety for further breeding, in most cases without authorisation or compensation. However, the 1991 Act of the UPOV Convention, given the date it was established, does not take some of the newer developments into account, e.g. Farmers' Rights as they are recognised in ITPGRFA, and the Nagoya Protocol set up under CBD (see Chapter 5).

There are ongoing processes that 'urge' developing countries to implement UPOV 1991-based PVP laws, often along with bilateral trade agreements, in the context of regional harmonisation of trade rules, or development initiatives. Particularly the 'New Alliance for Food Security and Nutrition', a large donor initiative launched in 2012, has drawn criticism. To access cash under the initiative, African governments have to make far-reaching changes to their land, seed and farming policies; this is regarded by opponents as a part of a focused strategy to facilitate access of multinational private investors to African markets and resources, undermining rather than strengthening food and nutrition security (Chandrasekaran and Bassey, 2013; ACB, 2012, 2013; AFSA/GRAIN, 2015). Relatively new is the strong call for the regional Intellectual Property Organisations in Africa to become members of UPOV at the supranational level (see Section 5.5 below). Hence, better understanding the reality and implications of the UPOV regulations for farmers in developing countries could inform decision-making and contribute to designing national PVP laws that take the particular situation of these countries into account.

[3] See Section 5.3.1 below for the definition of 'variety' in the 1991 Act of the UPOV Convention.

[4] This is why patents are of particular importance where such single traits, genes or breeding techniques are to be protected, e.g. in the case of genetically modified plants.

[5] See Table 1 for a summary of differences between the Acts of the UPOV Convention.

Key points

- The concept of 'intellectual property' is historically new and emerged from the European cultural context, along with simultaneous developments in the United States of America.
- The TRIPS agreement requires WTO Member States to protect new plant varieties using patent rights, an effective *sui generis* system, or a combination thereof; each of these options is valid and could comply with TRIPS.
- The UPOV system is one of several options available to states to comply with this requirement, besides patent law and other alternative *sui generis* approaches.
- Better understanding the implications of the UPOV system for farmers in developing countries could contribute to designing national PVP laws that are tailored to the situation of these countries.

3.2 Different approaches to plant breeding

In this section, different approaches to plant breeding will be presented; each approach relies on different concepts, processes and funding mechanisms, and leads to different products and outcomes. Accordingly, there are also different pathways regarding how seed of the varieties dealt with in each system is disseminated.

3.2.1 Traditional plant breeding done by farmers

Since the very beginning of agriculture, people have tried to alter plants and animals in such a way that they are better adapted to their felt needs. Adapting plants and animals to human needs could be described as the most general goal of breeding. Until quite recently in our history, breeding was done only by farmers.

On-farm plant breeding activities of farmers usually form part of their general agricultural practices and include operations such as exchange and procurement, cleaning, mixing, storing and selecting seed (Christinck, 2002). The farmers' seed management thus not only aims at the reproduction of more or less identical seed for the next season, but also includes various steps that may gradually or dramatically alter the genetic composition of the seed. It includes all actions taken by farmers that might influence the genetic composition and viability of the seed: during storage, before sowing, during cultivation and after harvest.

Basic breeding and reproduction of seed by farmers in the traditional breeding and seed system rely on basically the same activities and form part of their normal agricultural practices (see also GIZ, 2014). This applies at least to those crops where the harvested part can be used for subsequent sowing, as is generally the case for cereal and grain crops, as well as potatoes and many other root and tuber crops. In other crop species, particularly some vegetable crops, more specialised activities are required for successful propagation; however, all these procedures were and continue to be applied by many farmers as part of their yearly routine.

Furthermore, farmers do not generally apply the same concept of 'variety' as plant breeders do, or may grow plants pertaining to different 'varieties' together in one field, in separate rows of one field, or adjacent plots. Mixing seed of different sources and thereby creating diverse populations composed of various plant types is not unusual. The practice of mixing not only different crops in one field, but also different varieties of the same species, has been reported from many countries. By doing so, genetic drift can occur to varying degrees, depending on the rate of cross-pollination and flowering dates of the varieties used. Besides mixing different local varieties and seed of various sources, farmers also use 'improved' varieties and hybrids from the formal breeding sector as components of such mixtures. Crossing genetically distant varieties with local germplasm and selecting among the progenies is a practice which is very similar to some practices of 'scientific' plant breeders.

The farmers' selection decisions and decisions on variety use are based on their understanding of

environmental adaptation and human and animal health; it is thus closely related to local or indigenous knowledge, which may in turn be embedded into broader cultural concepts. The knowledge is held collectively, which does however not mean that everybody holds exactly the same knowledge (Werner *et al.*, 2013: 101–105).

In many cultures, women play a prominent role in the preservation and selection of varieties and their seed (Howard, 2003; Oakley and Momsen, 2007; Mata and Quesada-Aguilar, 2010). This role is acknowledged in the preamble to the CBD, and its importance has recently been re-emphasised by Braulio Ferreira de Souzas Dias, the Executive Secretary of the CBD:

> *'The Convention is strongly committed to recognising and promoting the integral yet distinct roles that women and men play in conserving, sustainably using, and sharing biodiversity. For example, the Convention has recognised the vital role of women in its preamble, and the Conference of the Parties has adopted the Gender Action Plan, that included women's needs into the Aichi Biodiversity Targets, emphasized the importance of mainstreaming gender into all the programmes of work under the Convention, and called for the full support of women in the implementation of the Strategic Plan for Biodiversity 2011–2020.' (CBD Secretariat, 2012).*

Selection done by farmers is usually based on visual observation of traits, or relies on other human senses. Studies on farmers' selection criteria reveal that farmers select simultaneously for a large number of traits, including post-harvest, culinary and nutrition-related traits, and sometimes with high selection intensity. They actively seek to increase the frequency of some desired traits in their local varieties, or observe and select off-types to form new sub-populations of an existing variety (Brush, 1995; Longley, 2000; Louette, 2000; Christinck, 2002; Siart, 2008).

Besides, there are also situations where farmers try to maintain the typical varietal characteristics of a preferred variety, be it local or 'improved', by active selection for its typical traits. Whether and to what degree this can be successful depends on the size of landholdings, the presence of other varieties, the outcrossing rate, and flowering times that may provide conditions for physiological isolation. Molecular marker analyses show that, for example, in some areas of Rajasthan, India, farmers are able to maintain typical 'village varieties' of pearl millet in spite of this crop being highly cross-pollinating (vom Brocke et al., 2003). Rabbi et al. (2010) studied the impact of farmers' practices and seed systems on the genetic structure of sorghum populations in Kenya and Sudan, including the 'fate' of modern varieties in these systems. Fragmentation of farmland along with seed mixing can lead to extensive gene flow between varieties, and make it difficult for farmers to maintain varieties in practice, whereas in other situations varieties remain more stable (Deu et al., 2014).

Farmers' seed management practices are not systematically applied in a similar way year after year; rather, they are flexibly adapted depending on the seasonal variability of conditions and actual needs. A further feature of the farmers' approach to plant breeding is that all operations are not done by one person alone. Seed does not only travel along many hands within one family: it also travels along their social networks. Seed is exchanged, sold, borrowed and given away, pooled with other seed lots, both within a village community and beyond. It is essentially collective in nature (Perales et al., 2003; Aleman et al., 2010; Samberg et al. 2013).

However, the farmer-managed breeding system has some limitations. Significant productivity gains through farmer breeding alone are not very likely to occur, unless there is access to breeding materials with new sources of variability for relevant traits. The farmers' breeding and selection progress is less pronounced for traits with low frequency, low heritability, or the presence of which cannot easily be observed by the means that are available to the

farmers[6]. Through collaboration, e.g. with NGOs and scientific plant breeders, new options for farmer-led breeding initiatives have been developed, that build on farmers' knowledge and selection skills, and give priority to their own breeding goals (see, for example, Cruzada and Wright, 2009; Chaves Posada, 2013; de Boef et al., 2013).

When the ITPGRFA states (in Article 9.1) that the contracting parties 'recognize the enormous contribution that the local and indigenous communities and farmers of all regions of the world [...] have made and will continue to make for the conservation and development of plant genetic resources which constitute the basis of food and agriculture production throughout the world', it refers to this collective and dynamic approach to plant breeding, which relies on long-standing practices. The question whether these practices of farmers can be considered to have a customary law status will be addressed in Chapter 5 (Section 5.1.3).

In the farmers' collective breeding system no special remuneration is usually paid to those who engage in the breeding process, though exceptions from this general rule may exist. The practice of sharing seed is usually embedded in social norms and systems of reciprocity (see Section 3.3). Many breeding activities of farmers would fall under the 'breeding exemption' in UPOV-based PVP law (see Section 5.4). However, this may not apply to cases where farmers try to maintain protected varieties on farm, or where the degree of similarity remains high between a protected variety and a variety in farmers' field, or where there is only slow and gradual change. In such cases, it may also be difficult to distinguish between breeding and other use of seed, as both rely on the same on-farm activities. This should be considered when establishing rules or exemptions for farmers' practices to save, use, sell and exchange seed of protected varieties.

Key points

- The traditional farmer breeding and seed system is part of normal agricultural activities. It is collective in nature, and relies on traditional knowledge and the farmers' practices of saving, using and exchanging seed.
- It is a dynamic and flexible system that does not focus on some defined and stable 'landraces' or 'farmer varieties', but allows for flexible adaptation of seed lots to arising challenges and needs.
- It is not purely traditional as it can also include the use of varieties from the formal (scientific) breeding system.

3.2.2 'Scientific' plant breeding

Plant breeding as a scientific discipline has emerged since the beginning of the 20th century. Before that time, plant breeding relied on the activities of farmers and dedicated 'amateurs', in European countries as well. Based on the (re-)discovery of Gregor Johann Mendel's work on inheritance laws[7], along with the discovery of pure lines and single-gene resistances (all between 1900 and 1905), modern genetic science developed (Robinson, 2009: 368). Rapid and ongoing scientific progress led to the current state of knowledge with regard to molecular genetics and genomics, unimaginable without simultaneous development of computer technologies allowing for the processing of large amounts of data.

Scientific plant breeding includes methods and insights that are not generally available to small-scale farmers; these include (1) access to the global pool of genetic resources provided by gene banks, and the related information systems; (2) scientific methods to discover the presence or non-presence of traits that are not easily observed visually or by using human senses; (3) technical possibilities for targeted crossing or isolation of single plants or populations, particularly where crossing does not easily occur naturally or at a low rate, or where isola-

[6] See Soleri and Cleveland, 2009: 345–346, for farmers' understanding of heritability and genotype by environment interactions (G×E).

[7] This work was originally published in 1866.

tion requires technical equipment and knowledge; (4) methods for conducting and evaluating trials that allow for predictions of performance under diverse growing conditions; and (5) methods that allow for predictions with regard to the heritability of traits.

Based on these features, the scientific approach to plant breeding can lead to rapid and targeted breeding progress towards the traits sought. Whether progress can be made towards complex quantitative traits, e.g. adaptation to environmental stress, yield stability, etc., depends mainly on the level of understanding a breeder has with regard to the context in which a variety has to fulfil its functions, and how these are methodically addressed in a breeding programme (see also Section 3.4).

In European countries, the United States of America and some other countries that followed the path of specialisation and intensification of agriculture, yields per hectare have more than doubled over the last 50 years, for example in maize in North America and wheat in Europe. Although these productivity gains are not due to breeding progress alone, plant breeding is considered to have played an important role, along with increased use of other external inputs. In Germany, yield progress obtained in the last 30 years in major crops was found to rely mainly on genetic improvements (Laidig et al., 2014). Significant yield gains could justify a higher seed price for improved varieties from the formal sector, provided that the benefits exceed increased production costs.

The same breeding progress as described for North America and Europe has, however, not been achieved in all crops and all geographical regions. Thus FAO data show stagnating yields or very moderate yield increase for important food crops, e.g. beans in eastern Africa, sorghum in West Africa or barley in North Africa (Figure 1).

This may have multiple reasons, one of which is that the necessary scientific and technical knowledge has not yet been developed to the same extent for all crops and production conditions that occur worldwide. Particularly for the conditions of small-scale farmers in developing countries, standard approaches to agricultural intensification have largely failed to provide benefits, as outlined by Bellon (2006). Important challenges to be addressed include breeding for marginal environments, incorporating risk and vulnerability as important dimensions of crop research, recognising the demand for multiple traits and diverse varieties, as well as addressing neglected and underutilized species important to poor people. Scientific understanding and methods for addressing these challenges has made only slow progress and lags behind knowledge that exists for more favourable production conditions, including with regard to plant breeding (see also Section 3.4).

A further reason is that the necessary capital investment has not been realised for many crops and production conditions due to lack of funding and economic incentives. Developing a new plant variety in the scientific breeding system requires 10–15 years and high investment. Here, the fundamental difference between funding mechanisms of the private and public breeding sector come into play (Figure 2).

Publicly funded plant breeding programmes exist as national breeding programmes in many developing countries, and also in the United States of America; further included are the breeding programmes of the international research centers of the CGIAR. They are basically government-financed, that means based on tax payments of citizens in their own country or donor countries. This basic funding may be complemented by donations, for example by private foundations that manage funds that originally stem from the private sector for humanitarian purposes.

Publicly funded plant breeding programmes are based on *ex ante* commitments of their donors, so that farmers as clients of these breeding programmes do not have to pay for the breeding process itself. Public breeding programmes are thus in general committed to goals pursued by their donors; that means policy priorities of the governments or donors, such as food and nutrition security, or benefits for particular user groups. Whether these

goals are achieved in reality, and to what extent, depends on many factors, including: whether a scientific understanding is developed of the necessary approaches to be taken to make progress towards these goals; whether effective structures for monitoring and evaluation are in place; or how potential user groups can participate in the decision-making on breeding priorities.

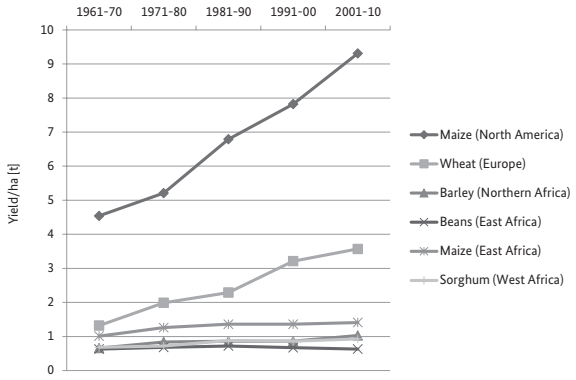

Figure 1. Development of average yields for various crops and regions per decade; the average yields for sorghum (West Africa), beans (eastern Africa) and barley (northern Africa) have remained below 1 metric ton per hectare with a slight increase for sorghum and barley. Adapted from Christinck and Weltzien (2013) based on FAOSTAT data.

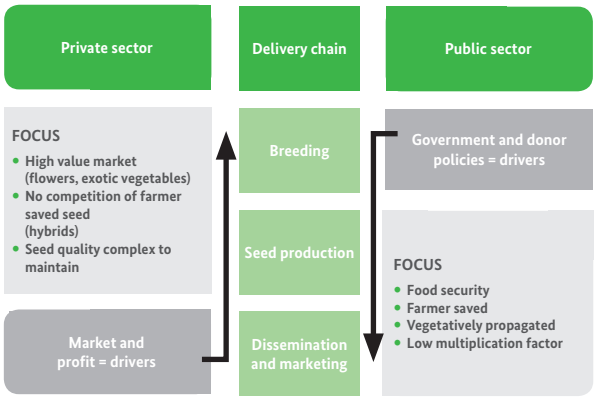

Figure 2. Drivers and outcomes of commercial and public plant breeding, seed production and marketing chains. Adapted from Louwaars and de Boef, 2012.

In contrast, private-sector breeding initiatives do not receive public funds for their investments, unless engaged in public-private partnerships (PPP), or otherwise supported directly or indirectly by public funding schemes (e.g. seed subsidies). Therefore, farmers as clients of private breeding programmes have to pay for the service provided to them, so that there is a flow of financial capital that provide a return on investment, and an incentive for further breeding work in the future. The flow of financial capital is realised through exclusive rights for marketing seed of protected varieties, with royalties to be paid to the holder of the intellectual property right included in the final seed price. The private breeding sector thus relies on *ex post* funding of their breeding work, and hence relies on a certain market volume and effective targeting of potential clients' needs. This funding mechanism explains the importance of PVP for the private breeding sector. PVP provides the basis on which claims for licence fees can be grounded.

Therefore, IPR for plant varieties is regarded as a basic requirement for the private sector to engage in breeding. However, it is by far not the only requirement for successfully building a private breeding sector in developing countries, as outlined by Bentley et al. (2011). Various other factors, on both the supply and demand sides, can determine the success or failure of private investment in breeding and seed marketing. Initial assessments of the effect of PVP regimes on private investment in breeding show mixed results; PVP seems to provide incentives under some circumstances but not others, and only for breeding work in some crops. There are also examples that seed and plant breeding industries have developed without any legal protection (Tripp et al., 2007). These authors conclude that establishing a PVP regime in developing countries should thus be seen as part of a broader strategy to developing breeding and seed systems.

Obviously, private sector investment in plant breeding, based on this model of deferred payment, can only address certain crops of major economic importance, and tends to concentrate on some broadly adapted varieties that can be grown

throughout countries and larger regions. For many crops and specialised crop varieties, such as those adapted to highly specific agroecological conditions or smaller market segments, the potential seed market volume may simply be too small to justify investment by the private sector, and demand may be too uncertain. Nevertheless, there could also be potential opportunities for small private breeding companies to serve special market segments, e.g. for crops that are economically important in certain localities or regions.

Along with the development of scientific plant breeding, a formal system of variety testing and release was established. In most countries, a variety derived from the formal sector needs to be registered for marketing seed officially under the variety's name. Official registration and 'release' often implies several years of multi-location testing and evaluation under a standardised set of conditions, although this depends on the national legislation in each country. In such official tests, varieties for release have to be found superior to existing varieties, mainly with regard to yield, but also other traits, such as resistance to relevant diseases, or certain quality or use-related traits. This criterion is called 'Value for Cultivation and Use' (VCU). However, it is not easy to design official evaluation trials in such a way that they reflect the diverse conditions faced by small-scale farmers, or the value a variety may have for certain user groups (see also Section 3.4). Such considerations have led some countries, e.g. India, to allow for regional or state-wise evaluation, registration and release of varieties (Virk, 1998).

Furthermore, in order to be protected under UPOV-based PVP law, varieties need to comply with the four NDUS criteria (UPOV, 1991; see also Sections 3.1 and 5.3 below). The aim is to describe a plant variety as a more or less standardised product, so that clients may expect identical properties whenever they buy seed of a variety under a particular name. Furthermore, protection requires that the protected item should be described as exactly as possible, in order to avoid intellectual property claims later on a broad range of other similar varieties.

Against this background, the interest of the private breeding sector on harmonisation of plant variety release procedures and seed laws throughout larger regions is understandable, as it helps to increase the potential market volume for certain varieties while reducing transaction cost, e.g. related to variety release procedures. This interest can be shared by governments, based on the consideration that cost for variety registration and protection are not fully covered by the applicants and require budgetary funds for implementation.

Farmers could, at least for a few years after buying seed of a protected variety, re-sow seed from their own harvest, so that they use the service provided by plant breeders without paying for the plant breeder's work. This is why commercial plant breeders emphasise their requirement for PVP as a basis for claiming royalties and also strive for restrictions on the farmers' practices to save, use, exchange and sell seed, as far as protected varieties are concerned. Hybrid varieties have a built-in protection against re-use, as they have to be reproduced from parent lines that are not freely available, and 'lose' their properties if simply re-sown.

Hence, the scientific approach to plant breeding has a large potential for achieving breeding progress based on highly specialised scientific and technical knowledge. Whether and to what extend this knowledge can help particular groups of farmers depends on various factors, including available knowledge on production conditions and needs to target breeding activities, and also on the modes and amounts of funding for breeding initiatives to be applied to certain crops and target groups of clients. Each breeding approach, whether the public, private or farmers' approach, can thus deliver different products and impacts, and each can make a useful contribution to the future development of food and farming systems. This is why pluralistic approaches are needed that allow for the simultaneous development of different breeding and seed systems, in order to fully tap their diverse and complementary potentials. This is also why approaches such as the Integrated Seed sector Development (ISSD) suggested by Lou-

waars et al. (2013) provide governments with a model in which they can explore ways to promote private investment of companies acting at various scales, and to complement these by public investment and support to farmer initiatives.

Furthermore, a large potential is also there for collaboration between the actors of different breeding systems. Unlike private companies that need to be client-oriented (but can only serve those farmers who are able to pay), client orientation in public breeding programmes needs to be established on a different basis, as the farmers who use the varieties are not the ones who pay for the breeding work. Nevertheless, public breeding programmes that cooperate closely with farmers can be successful and achieve high impacts, as shown for example by Witcombe and Yadavendra (2014) for one maize and two rice varieties that were more widely adopted in several states of northern India than any other varieties that had been previously available.

Key points

- The scientific plant breeding system has contributed to higher agricultural yields of certain major food crops under favourable agricultural conditions; the same breeding progress has not been achieved for many other crops and regions worldwide.
- The scientific breeding system requires highly specific technical knowledge and capital investment, and relies on different sources and modes of funding in the public and private sectors. It is only the private breeding sector that relies on PVP for claiming royalties; varieties developed by public breeding institutions, e.g. the CGIAR or national programmes, are usually treated as public goods.
- All different approaches to plant breeding can lead to useful products and impacts, but require different conditions and rules to tap their full potential. To address potential imbalances, e.g. with regard to crops and client groups addressed, government action may be necessary.

3.3 The importance of formal and farmer-managed seed systems [8]

The most important source of seed worldwide is the farmer's own harvest, followed by seed obtained from neighbours and relatives, and from traders, local markets and fairs. Almekinders et al. (1994) [9] estimated that 80–90 per cent of the entire seed used in global agriculture stem from the farmer-managed seed system, varying for different countries and crops (Almekinders, 2000). These figures make the room for a potential expansion of the commercial seed system large and attractive.

Even though seed systems change constantly and dynamically, making global estimates uncertain, it is broadly accepted that in developing countries, farmer-managed seed systems provide more than 80 per cent of the seed used in food crops (FAO, 2004a). In Southern Africa, small-scale farmers obtain just 10 per cent of their seed from formal markets, and even in India, where the seed industry and commercial farming are gaining impetus, an estimated 80 per cent of farmers rely on farm-saved seed (Smale *et al.*, 2009). Hybrid maize is an important exception to the general trend. Sperling *et al.* (no year) state that 'maize hybrids have been the main growth engine for formal sector seed and for profitable commercial enterprise in Africa'; they explain, however, that this is due to certain characteristics of the maize crop, which do not necessarily apply to most other food crops.

Whereas the farmer-managed seed system is grounded in a network of social relationships, the formal seed system corresponds to the model of a supply chain. Source seed provided and maintained by a commercial or public breeder is multiplied over several generations and made available to farmers as 'certified seed', which includes testing for a set of defined quality criteria. These can include, for exam-

[8] Farmer-managed seed systems are also referred to as 'informal' seed systems in the scientific literature.

[9] See Siart (2008: 7) for various other sources.

ple, varietal purity; germination capacity; phytosanitary status; and absence of unwanted components (e.g. seed of other species or varieties).

Because seed production in the formal seed system is a specialized activity that has to comply with quality standards and involves distribution costs, the seed price is generally higher than the normal grain price. The price for certified seed can easily exceed the normal grain price 10 to 20-fold, with large differences, however, between countries and crops (see Table 2). In the case of protected varieties, the breeders' licence further increases the seed price; it usually ranges between 5 and 10 per cent of the final seed price[10]. This means, however, that the largest share of the seed price in the formal system does not derive from the IPR as such, but rather is related to the production and distribution cost for certified seed. Some farmers, if they have sufficient land and the required technical knowledge, can participate in the production of certified seed of many agricultural crops, e.g. based on contracts, and thus capture some of the value addition involved.

Important differences exist between both systems also with regard to modes of payment. Seed from the formal sector can only be purchased for cash, typically in agricultural shops and outlets of seed producing companies. If farmers do not have sufficient cash to buy certified seed at the time of sowing, they have to take a loan, either from a bank or a local money lender. In contrast, it is typical of farmer-managed seed systems that the majority of all seed transactions take non-monetary forms. That means that farmers, if not from their own harvest, can get seed as gifts from relatives or neighbours, as studied, for example, in India (Christinck, 2002), Mali (Siart, 2008), Mozambique (Rohrbach and Kiala, 2007) or Mexico (Badstue et al., 2003). In other situations, the same amount of grain has to be returned after harvest, or payment can be made in kind or in exchange for services (e.g. seed for work). Whether or not a person has to pay for seed depends on the social relationship between the person who gives and the person who requests seed (Badstue et al., 2003). Thus seed either has no price, or the price does not exceed the normal grain price, except where local traders are involved and offer seed grain separately from food grain. In some regions of Africa, it can be observed that traditional seed giving practices of farmers decline where commercial seed transactions increase in importance (Rubyogo et al., 2010).

Without PVP laws putting restrictions on the farmers' practices of saving, using, selling and exchanging seed, farmers could decide freely when to buy the more expensive certified seed of protected varieties, or in which situations to use seed obtained from relatives and neighbours. The lower seed cost, along with flexible modes of payment and social practices and obligations that facilitate access to seed even if a person does not have cash, contribute to the importance of farmer-managed seed systems for poor and disadvantaged groups of farmers. This was also highlighted in a report by the former Special Rapporteur on the Right to Food, Olivier de Schutter (United Nations, 2009a).

The potential interchangeability between food and seed grain for local varieties and the possibility to restore seed stocks from local markets plays an important role in emergency situations, as described by Sperling et al. (no year; see also FAO, 2004b). Even though farmers may usually carefully select and store seed and food grain, they can also buy grain of preferred (and locally known) varieties from a local market and use it for sowing, e.g. after cleaning and grading.

[10] Estimate based on price calculations provided by Krull *et al.* *(1998) and personal communications of private plant breeders.*

Table 2. Seed-to-grain price ratio for different crops and countries or regions; the higher-end prices apply usually for private sector hybrids.

Crop	Seed-to-grain price ratio	Country or region	Source of information
General	10:1 to 30:1	Developing countries	Nagarajan and Smale, 2005.
Maize	4:1 to 26:1	Developing countries	Krull, Prescott and Crum, 1998.
Maize	13:1 to 40:1	Ruvuma region of Tanzania (in 2012)	Philipp Kumria, pers. comm., 26 February 2015.
Pearl millet	10:1 to 20:1	Rajasthan, North-West India	Tripp and Pal, 1998; Christinck, 2002.
Maize	2:1 to 4:1	Ethiopia	Dr Reinhard von Broock, pers. comm., 22 February 2015.
Sorghum	2:1 to 6:1	Burkina Faso	Adana, 2014.
Sorghum	2:1 to 5:1	Mali (in 2014/15)	Dr Eva Weltzien, pers. comm., 28 February 2015
Common beans	2:1 to 4:1	Several African countries	Rubyogo et al., 2010.

The prevailing opinion that quality of seed from informal sources is generally poorer than seed from the formal system is not supported by scientific evidence. Seed quality may be variable, but usually high for most crops (Bentley et al., 2011). A recent example is reported by Deu et al. (2014) from Mali: recycling an 'improved' sorghum variety over several years using different farmer practices did not negatively affect grain yield performance relative to commercial seed. This is in line with many other studies, but exceptions also exist for some crops where seed-borne diseases make it more difficult for farmers to maintain quality of seed or propagating material over longer periods. This is typical for some vegetatively propagated crops (e.g. potatoes) or legumes (see Bentley et al., 2011: 9–10).

Seed of new varieties from the formal system enter the farmer-managed seed system often via certain 'nodal farmers', who may have special contacts, mobility or access to information. These farmers play an important role for the dissemination of new varieties and related context-specific knowledge. In Nepal, for example, such 'nodal farmers' were found to be farmers with larger landholdings with varying agro-ecological conditions between different parcels of land, more head of livestock, higher educational level and more market participation (Subedi et al., 2003).

Furthermore, the farmer-managed seed system provides seed of many crops and varieties that have so far been 'neglected' by the formal breeding and seed system. Hence, their continued cultivation depends entirely on the farmers. One could thus conclude that the farmer-managed seed system is of particular importance for those crops where formal activities are not found. However, there are also many situations where traditional varieties of major food crops (e.g. rice, maize, potatoes) play an important role in local production systems.

Setting up new laws and rules that limit farmers' customary practices of accessing seed, including in emergency situations, is thus an issue that is linked to food and nutrition security and resilience of farming and food systems. Such new developments can affect different groups of farmers in different ways, depending, for example, on their ability to have cash at the time needed, and the crops they use. This is why there is also a clear connection to human rights, which will be discussed in more detail in Chapter 4. PVP laws can interfere to different degrees with these seed systems, depending on how far they restrict the farmers' use of seed in the case of protected varieties (Bentley et al., 2011; see also GIZ, 2014).

Key points

- Farmer-managed seed systems are the most important source of seed in developing countries. This is why it may appear attractive for private companies to increase their market share through PVP and formalised seed laws.
- Seed prices are usually much lower in farmer-managed systems compared with seed from the formal system, and modes of payment are more flexible, as they can take non-monetary forms.
- The farmer-managed seed system provides farmers with seed of many crops and varieties that are not covered by the formal seed system.
- The seed quality is not generally lower in farmer-managed seed systems compared with formal systems.
- PVP laws can interfere with farmer-managed seed systems to different degrees, and affect different groups of people in different ways, which is also relevant from a human rights perspective.
- The higher seed price of certified seed is mainly due to higher cost of the seed production itself, along with distribution costs. The breeder's licence share usually accounts for about 5 to 10 per cent of the final seed price.

3.4 Agricultural conditions in developing countries

It is not the focus of this study to give a comprehensive description of agricultural conditions in developing countries. Similar to other countries, varying conditions are found simultaneously. However, some more general considerations on different production systems may be helpful to understand certain discussions that relate to PVP laws, particularly with a focus on disadvantaged and marginalised groups of farmers.

Most agricultural biodiversity is found in low external input farming systems. Diverse agricultural systems are typically maintained, managed and used by small-scale farmers, often working under marginal production conditions, such as semi-arid lands with high variability of rainfall, or high altitudes and steep slopes, e.g. in tropical mountain areas. These physical conditions are often paired with unfavourable socio-economic conditions, like poor infrastructure and limited access to markets and government services, including research and other structures supporting agriculture, such as extension services. These conditions constrain the purchase of agricultural inputs, as they render their use uneconomical or contribute to increasing the production risk, or both (Kaufmann et al., 2013).

It is under these same conditions that food insecurity prevails: worldwide, the majority of people suffering from hunger and malnutrition live in marginal areas of developing countries. The word 'marginal' could suggest that it is a problem that applies only to some minor proportion of agricultural land and related production conditions; however, about 40 to 50 per cent of agricultural land in developing countries qualifies as marginal, if only agro-ecological production parameters are used. The share is 50 per cent or greater in Asia and sub-Saharan Africa; if isolation from markets were added as a factor (besides unfavourable production conditions), the numbers would increase dramatically (Oxfam, no year).

The ways in which production processes are operated differ quite strongly between low external input farming and input-intensive systems. The main difference is that in input-intensive systems, the production process is based on a sophisticated manipulation of the environment by using external inputs, such as fertilizers, agrochemicals and irrigation systems; and standardised production procedures that have been developed and tested previously under similar conditions, e.g. on research stations, can be implemented fairly well. This means that in cases where there are no severe constraints to agricultural production, or where they can be compensated for (e.g. with irrigation systems), small-scale farmers can also benefit from technologies that were developed for high-input conditions. This is why farmers in more favourable production environments tend to

'adopt' plant varieties with high yield potential delivered by the formal breeding sector, along with other agricultural inputs to manage the environmental conditions in such a way that the full yield potential of these varieties can be exploited.

In contrast, in low external input systems, actions are taken based on the farmers' knowledge of how a complex array of different environmental factors, many of which cannot be controlled, will influence the production outcomes. For example, in rainfed agriculture, the amount and distribution of rainfall cannot be controlled. The reasons for farmers taking this approach lie in the above-mentioned characteristics of the production context, mainly in the high temporal and spatial variability of environmental conditions. A simple transfer of technologies that have been developed under a different set of conditions, e.g. on research stations, does not generally work for low external input conditions ((Kaufmann et al., 2013)). Farmers working under low-input conditions in unfavourable production environments thus tend to not adopt these varieties, and to rather rely on local traditional varieties that are better adapted to the specific set of conditions and typical constraints. They may, however, use 'improved' varieties from the formal sector for their own breeding activities, testing purposes or as a component of seed mixtures (see Section 3.2.1).

The aforementioned decisions of farmers on variety use appear rational for the conditions faced by them. Several studies have looked at the effectiveness of high-performing varieties under the conditions of marginal production systems. They show that high-performing varieties of barley and pearl millet under marginal production conditions did not achieve higher yields than the local farmer varieties (Abay and Bjørnstad, 2009; Yadav and Weltzien, 2000; van Oosterom et al., 2003). Similar examples exist for various other crops. Under optimal conditions, in contrast, the high-performance varieties were superior to the local cultivars. Diversity not only among, but within varieties is an important aspect of environmental adaptation, e.g. to climate variability and change, as outlined by Haussmann et al. (2012) for the case of sorghum and pearl millet in West Africa. This is why highly uniform varieties are not necessarily the best option for all conditions under which people engage in agriculture.

However, if scientific breeding activities are clearly targeted towards the needs and conditions of farmers working under low input conditions, significant breeding progress can be achieved. Grando and Ceccarelli (2009) describe, for example, the methodological implications for targeting drought in a breeding programme, based on decentralized selection and participation of farmers. By taking a similar approach, considerable breeding progress was also reported for sorghum breeding in Mali. There, hybrids based on landraces showed on-farm grain yield superiority of 17–37 per cent over a landrace check, with the three top yielding hybrids showing 30 per cent yield advantages across productivity levels (Rattunde et al., 2013).

The question whether 'improved varieties' are beneficial to (all) farmers and justify the higher seed price and production costs can thus not be answered on a general level. The relation between benefits due to productivity increase versus higher production costs can be very different, for different varieties and locations, and also for different groups of farmers. Women farmers in West Africa, for example, often face particularly difficult conditions with regard to soil fertility and labour-related constraints. Case studies would be required to really assess costs and benefits in a range of situations. Doing this is not trivial, because costs and benefits may include non-monetary aspects, particularly if long-term perspectives are taken into account (e.g. effects on soil fertility).

The understanding that new varieties derived from scientific plant breeding can perform differently under various conditions and are thus not a user-neutral technology, appears to be new for many plant breeders and policy-makers alike. Different costs, benefits and risks may be involved in using a variety from the formal sector for different production conditions and groups of farmers. This is very

important in view of the discussion on how PVP laws affect human rights (Chapter 4).

Key points

- Different types of agricultural conditions exist simultaneously within developing countries.
- Farmers working under low-input conditions follow different approaches and strategies compared with those with high-input systems.
- 'Improved' varieties from the formal breeding sector do not generally perform better than local farmers' varieties under low-input conditions, e.g. under drought conditions.
- Farmers working under such low-input conditions require different varieties that are adapted to typical constraints of these production environments.
- Plant breeding does not generally result in products (varieties) that perform better than local farmer varieties under all conditions; associated costs, benefits and risks can differ for different conditions and groups of farmers.

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4 The 1991 Act of the UPOV Convention, and human rights

by Anja Christinck

The issue has been raised as to whether and how human rights may be relevant to regulations that concern plant genetic resources and related IPR (The Berne Declaration, 2014; Haugen, 2014a; de Schutter, 2011). There are several human rights that relate to the issues of food, knowledge and intellectual property, and that relate in some ways to plant genetic resources and seed. How direct this relation is, and what this could mean for establishing national PVP laws, will be looked into in this Chapter.

4.1 Human rights identified as relevant for the topic

The human rights that are most relevant with regard to this study are considered to be: (1) the right to adequate food; (2) the right to enjoy the benefits of scientific progress and its applications; and (3) the rights of indigenous peoples. Furthermore, the human rights principles underpin all processes relating to human rights and are therefore also relevant. Other human rights may also be touched, but the

relation to the issue of seed and PVP may be more indirect. This is why the potential relations will be noted here, but not addressed in further detail.

Changes in agricultural policies are likely to have impacts on farmers' incomes, and can also result in redistributive or negative effects on incomes of different groups of farmers, as well as other actors (e.g. traders and consumers). Such redistributive effects of agricultural policies have potentially far reaching consequences, particularly for people with low income. Such groups of people are thus more vulnerable than others with regard to a range of basic human rights, including their rights to adequate housing, health or education. However, similar effects on incomes can also result from many other policy measures. This is why we limit our assessment to those human rights that are more directly related to seed and intellectual property in plant varieties, or the process of implementing PVP law.

Although there are no differences in women's and men's rights with regard to plant genetic resources and PVP, it is important to acknowledge that gender equality is a very important aspect in the discussion on how human rights relate to these issues, as women and men can be affected by policies in different ways. Structural agrarian change and related policies can constrain and disempower women in agriculture, though less explicitly compared with some other forms of discrimination that can be observed at local levels (see, for example, Mullaney, 2012). Women and men also have different needs, e.g. food requirements for adequate nutrition. Here, the specific needs of women during pregnancy and lactation are of great importance, particularly in situations where chronic food insecurity prevails. Given their different access to productive resources, and the different economic activities women and men pursue, their preferences and needs for new, improved technologies (e.g. plant varieties) can also differ (Beuchelt and Badstue, 2013). As gender equality and non-discrimination are already incorporated as an issue in the human rights that are assessed here, the topic will not be treated separately; the United Nation's Convention on the Elimination of all Forms of Discrimination against Women (CEDAW) emphasizes the relevance and need to eliminate gender discrimination in relation to a range of issues, but does not create any (new) rights for women, e.g. in relation to food or plant genetic resources.

The right to adequate food and the right to benefit from scientific progress and its applications are both enshrined in the International Convenant on Economic, Social and Cultural Rights (ICESCR), and will therefore both be discussed in Section 4.2, as some aspects of the ICESCR apply to both human rights. The rights of indigenous peoples as declared in the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) and enshrined in ILO Convention No. 169 are relevant in the situation where indigenous peoples live in a country; what this could mean to establishing national PVP laws will be addressed in Section 4.3. The human rights principles and their relevance for establishing PVP laws will be discussed in Section 4.4., before summarizing the findings in some concluding remarks (4.5).

Key points

- The assessment in this chapter focuses on the right to food, the right to enjoy the benefits of scientific progress and its applications, and the United Nations Declaration on the Rights of Indigenous Peoples.
- Any changes in agricultural policies can result in redistributive effects on incomes of farmers, other actors along supply chains, and consumers. Such changes in income can positively or negatively affect other human rights as well.
- Women and men have the same rights relating to food, seed and genetic resources. However, both groups may be differently affected by changes in policies; this must be taken into account if the effects of such policies are assessed.

4.2 Human rights enshrined in the ICESCR: Right to food and right to benefit from scientific progress and its applications

The ICESCR was adopted and opened for signature in 1966 and entered into force in 1976. For those 164 countries that are State Parties to the ICESCR, the rights enshrined in this treaty are legally binding, on equal footing with the human rights prohibiting torture and protecting free speech and the press, which are enshrined in a separate treaty: the International Convenant on Civil and Political Rights. Five states have signed but not ratified the ICESCR [11].Under the Vienna Convention on the Law of Treaties, states that have signed but not ratified a treaty, have a legal obligation not to act in any way that might defeat the objectives and purpose of the treaty. 28 Member States of the United Nations have neither signed nor ratified the ICESCR.

The right to adequate food and the right to benefit from scientific progress and its applications are thus a legally binding right for the majority of developing countries and their donors, including Germany. However, if it comes to claiming rights enshrined in the ICESCR, it has to be assessed for each country separately whether it is a member or signatory of the ICESCR (or neither), and how the right in question is referred to in the legal system of the country. Some countries have incorporated the right to food into their constitutions or legislation; in others it can be directly applied after ratification. There is also an Optional Protocol to the ICESCR that has to date been signed by 26 and ratified by 20 states. This Optional Protocol establishes an individual complaint mechanism for the ICESCR (United Nations, 2008a).

States are the primary duty bearers for implementing human rights, including those enshrined in the ICESCR. The state obligations are often summarized under the three key headings: (1) to *respect* (refrain from interfering with the enjoyment of the right); (2) to *protect* (prevent others from interfering with the enjoyment of the right); and (3) to *fulfil* (adopt appropriate measures towards the full realisation of the right) (United Nations, 2008b: 11). These obligations extend to all state institutions. However, the Committee on Economic, Social and Cultural Rights emphasizes that all members of society including individuals, civil society organizations and private companies have responsibilities in the realisation of the human rights, for which the state should provide an enabling environment. With regard to private business enterprises in particular, the United Nations Guiding Principles on Business and Human Rights from 2011, while recognising the foremost obligation of states to respect, protect and fulfil human rights including in relation to the conduct of private business, stipulate that the responsibility to respect human rights is a global standard of expected conduct for all business enterprises.

Moreover, states not only have duties with regard to their own citizens, but they also have extraterritorial obligations, as clarified in the 'Maastricht Guidelines on Violations of Economic, Social and Cultural Rights' (United Nations, 2000a). Although not legally binding, these clarifications are a source of guidance on the implementation of the ICESCR, and have the status of an official United Nations document. The states have responsibilities with regard to the consequences of their policies for human rights in other countries, and they are also obliged to take 'deliberate, concrete and targeted steps [...] to create an international enabling environment conducive to the universal fulfilment of economic, social and cultural rights' (Article 29).

The Maastricht Guidelines further clarify (in Article15), that a state, as a member of an international organization, remains responsible for its own human rights obligations. This does also apply if a state transfers competencies to an international organization. In this case, the state has to ensure that the relevant organization acts consistently with the human rights obligations of that state. This is an important aspect concerning the supra-national implemen-

[11] At the time of writing, these are USA, Cuba, Palau, Sao Tomé and Principe, and the Comoros.

tation of UPOV-based PVP laws at regional scale, which will be discussed in Section 5.5. Organizations that act in these processes on behalf of their members, e.g. UPOV or regional organizations such as the African Regional Intellectual Property Organization (ARIPO), are obliged to act consistent with the human rights obligations of their members; the members in turn have to ensure that this really happens.

In general, states have an obligation to 'take steps' towards the progressive realisation of the rights under the ICESCR. This includes 'constant efforts' and, while the full realisation may be achieved progressively, steps towards that goal must be taken within a reasonably short time (United Nations, 2008b). While the ICESCR recognises the principle of progressive realisation of Economic, Social and Cultural Rights, this does not mean that states are free to postpone undertaking their duties under the ICESCR until a later date. There are certain minimum requirements, e.g. protection from starvation, for which it is a duty of governments to ensure them at all times, including in cases of economic downturn or other emergencies (see General Comment No. 3, paragraph 10 in United Nations, 1990).

State duties under the ICESCR further include regularly monitoring and assessing the progress made in the implementation of the plans and strategies; furthermore, there is an obligation towards non-retrogressive measures, which means that states should not allow the existing level of protection of economic, social and cultural rights to deteriorate unless there are strong justifications for a retrogressive measure (United Nations, 2008b).

Key points

- Rights enshrined in the ICESCR, e.g. the right to food and the right to benefit from scientific progress and its applications, are legally binding rights for the State Parties of the ICESCR.
- The legal situation of each country needs to be considered if it comes to claiming rights enshrined in the ICESCR.
- States are the primary duty bearers, but the responsibility to respect human rights is a global standard of expected conduct for all business enterprises as well.
- States have human rights obligations not only towards their own citizens, but also towards citizens of other countries, e.g. as members of international organizations or as donors.
- If competencies are transferred, e.g. to inter-governmental organizations, states have to ensure that their human rights obligations are fulfilled by these organizations.
- States have to make constant efforts towards the realisation of rights under the ICESCR, and to regularly report on the progress made. There is an obligation not to take any retrogressive measures, unless there are strong justifications.

4.2.1 The right to adequate food

Before it became enshrined in the ICESCR, the right to adequate food was already included in the United Nation's Universal Declaration of Human Rights of 1948 (Article 25). In the ICESCR, it is framed as follows (in Ar
ticle 11):

Article 11

1. *The States Parties to the present Covenant recognize the right of everyone to an adequate standard of living for himself and his family, including adequate food, clothing and housing, and to the continuous improvement of living conditions. The States Parties will take appropriate steps to ensure the realization of this right, recognizing to this effect the essential importance of international co-operation based on free consent.*

2. *The States Parties to the present Covenant, recognizing the fundamental right of everyone to be free from hunger, shall take, individually and through international co-operation, the measures, including specific programmes, which are needed:*

a. To improve methods of production, conservation and distribution of food by making full use of technical and scientific knowledge, by disseminating knowledge of the principles of nutrition and by developing or reforming agrarian systems in such a way as to achieve the most efficient development and utilization of natural resources;

b. Taking into account the problems of both food-importing and food-exporting countries, to ensure an equitable distribution of world food supplies in relation to need.

Hence, the right to food is presented in Article 11.1 as part of an adequate standard of living, including adequate food, and in Article 11.2 as a fundamental right to be free from hunger. Here, it is directly referred to agricultural production and food systems. The approach taken in Article 11.1 is obviously broader.

The authorative interpretation of the right to food within the United Nation's human rights system is the General Comment No. 12 issued by the United Nations Committee on Economic, Social and Rights in 1999, which is the treaty body that monitors the implementation of the ICESCR (United Nations, 1999). Here, the normative content of the right to food is framed as 'The right to adequate food is realised when every man, women and child, alone or in community with others, has physical and economic access at all times to adequate food or means for its procurement' (in paragraph 6). It is further clarified that the right to food should not be interpreted narrowly, e.g. as right to a minimum package of calories or nutrients.

The General Comment specifies the legal content of the right to food with regard to 'adequacy', 'availability' and 'access' (summarized in Jonsen and Söllner, 2006; BMZ, 2010). Important for the purpose of this study is that the right to food implies that people have entitlements to access food either *directly* from using productive resources or *indirectly* through means for its procurement. Hence, the access to productive resources, such as land or seed, plays an important role for the realisation of the right to food.

The General Comment No. 12 further specifies that 'the notion of sustainability is intrinsically linked to the notion of adequate food or food security, implying food being accessible for both present and future generations' (Article 7). This close link between sustainable development and the right to food has recently been highlighted by the United Nation's Special Rapporteur on the right to food, Ms Hilal Elver, in her first interim report to the United Nations General Assembly (United Nations, 2014). She calls for treating the relation between climate change, the right to food and sustainable development as a priority, and for mainstreaming gender in all policies that relate to food security and nutrition.

Moreover, the General Comment No. 12 also specifies the necessary focus on vulnerable groups (Article 13), which is based on a notion of economic and physical accessibility of food. The right to food thus requires that special attention is given to the situation of these groups with regard to their possibilities to access food, including through special programmes.

Using the right to food and its legal content has gained new impetus since the 'Voluntary Guidelines to support the progressive realisation of the Right to Food in the context of national food security' were established by international experts and adopted by the FAO Council in November 2004 (FAO, 2005). The Voluntary Guidelines help states to fulfil their obligations by suggesting a range of possible measures in various fields of action. Access to resources and assets is addressed as an issue in Guideline 8: states should consider, *inter alia*, specific national policies, legal instruments and supporting mechanisms to prevent the erosion of genetic resources and to promote their sustainable use, along with measures to protect traditional knowledge, benefit sharing and participation of communities and farmers in decision-making at the national level (Guideline 8d). The Voluntary Guidelines thus relate to the quite similar provisions of the ITPGRFA, highlighting that there

is a close relationship between the right to food and the conservation and sustainable use of agrobiodiversity.

The Right to Food does not prescribe any particular economic or agricultural policies and is flexible about the methods countries use to achieve the required level of food and nutrition security. According to General Comment No. 12, national food and nutrition security policies should be based on the normative content of the right to adequate food, as well as on human rights principles, namely non-discrimination, accountability, transparency and participation (see Section 4.4). In order to comply with this requirement, states would have to assess the need for and possible impacts of policies and other measures, and particularly their possible positive or negative impacts on vulnerable groups. There is, to our knowledge, no example that such policy assessments have been done by a government of a state that has recently opted for joining UPOV.

Potential human rights impacts of the 1991 Act of the UPOV Convention were recently assessed *ex ante* based on case studies in three countries, namely Kenya, Peru and the Philippines (The Berne Declaration, 2014). Risks identified for the right to adequate food that are related to the 1991 Act of the UPOV Convention were, *inter alia*: restricted access to seed (financially and physically); sub-optimal dissemination of protected variety seed; fewer coping strategies; risk of low yields; and less household income.

Such negative effects *could* occur, possibly besides positive effects on yields, coping strategies and incomes that could also occur. This depends, for example, on the crops for which new varieties are made available if a country joins UPOV, and on the properties of these varieties, particularly how well they are adapted to the production conditions of different groups of farmers in the respective country, and how well they fit to other constraints faced by the farmers (see Section 3.4). If a variety performs much better than local varieties, even under marginal conditions, it could contribute positively to the right to food of people exposed to such conditions. Similarly, positive contributions could derive from better nutritional quality, or if it opens up new opportunities for value addition and marketing in such a way that farmers and (others) can benefit from it through increased income.

Increased production cost, e.g. due to a higher price for seed of a protected variety, are more important where the general level of productivity in agriculture is low due to agro-ecological constraints that prevail under marginal production conditions (see Section 3.4). Farmers working under such conditions need to sell a higher share of the total harvest to recover expenses for seed, compared with farmers working in more favourable production environments where average yield levels are higher (see Christinck, 2002: 131 for an example). Without substantial benefits (e.g. higher yield or market value) under the unfavourable production conditions, such investments are uneconomical. This problem can be further aggravated in cases of recurrent risks, such as if a crop is destroyed through flooding, excessive rainfall, drought or pests. Such incidents may require re-sowing, with the higher seed price to be paid a second time.

However, if the benefits of a particular protected variety do not outweigh the increase in production costs, farmers would usually not adopt this variety (see Section 3.4). Increased production costs of certain varieties are as such not threatening the right to food, as long as viable alternatives are available to the farmers, e.g. locally adapted varieties from farmer-managed breeding and seed systems, or from public breeding programmes Hence, the threats to the right to food from UPOV-based PVP laws need to be assessed in more detail for different conditions, and should include assessment of long-term effects on farmer-managed seed systems, as will be discussed in Chapter 5.

It is a strength of the above mentioned study (The Berne Declaration, 2014) that it establishes qualitative links between the effects of PVP laws and the right to food; however, a weakness is that potential risks relating to increased seed and production costs

are not balanced against potential benefits from the use of protected varieties. Similar to risks, benefits may also be unequally distributed among different groups of farmers.

Furthermore, states have a range of measures at their disposal to address these risks, such as to:

- establish or strengthen agricultural knowledge and extension systems targeting the situation of vulnerable groups (to improve or adapt coping strategies);
- establish exemptions for small-scale farmers in national PVP law, or provide alternative options for accessing seed of protected varieties (to counterbalance suboptimal dissemination);
- promote breeding of well adapted varieties for local production conditions and nutritional needs of specific user groups, e.g. via public breeding initiatives (to increase yields and other benefits); or
- take other measures to secure incomes of small-scale farmers and vulnerable groups, including market-based approaches (e.g. promote value chain development, insurance) and direct measures (subsidies, social security benefits, etc.).

The effectiveness of such measures would need to be assessed in each particular case, and also in comparison with other existing options. Thus, whether or not joining the 1991 Act of the UPOV Convention affects the right to food depends on a wide range of other measures and policies a state could put in place that could effectively address and counteract potential risks, particularly for vulnerable groups. Hence, the implementation into national law, along with other measures taken to ensure access and avoid adverse effects, will decide whether or not the 1991 Act of the UPOV Convention is in harmony with the right to food, as was also described by Haugen (2005) with regard to the TRIPS agreement and patents.

The main obligation of states regarding the adoption of UPOV-based PVP law and the right to food would thus be (1) to acknowledge that adopting such PVP laws is a matter that concerns the right to food; (2) to assess the need for and possible human-rights effects of such policies, also in comparison with other options that exist; (3) to implement such policies in a way that corresponds to a human rights-based approach, that means based on human rights standards and principles; and (4) to consider implementing the PVP law along with a range of other measures to avoid adverse effects on the right to food.

Key points

- The right to food implies a comprehensive notion of food that goes beyond being free from hunger.
- It implies that people need to have access to productive resources, e.g. agricultural land, water or seed, to produce their own food, or to income that enables their access to food.
- The right to food does not prescribe any particular policies that states should or should not take. In states where the right to food is legally binding, however, any policies affecting food and nutrition security should be assessed for their human-rights impacts, and implemented based on the legal content of the right to food concept, as well as human rights standards and principles.
- UPOV-based PVP laws involve risks regarding the realisation of the right to food. These risks need to be assessed prior to implementation; if risks are identified, states have to take appropriate measures to mitigate risks and ensure that human rights are not violated.
- The implementation into national PVP law along with other measures taken will decide whether UPOV-based PVP law is in harmony with the right to food or not.

4.2.2 The right to enjoy the benefits of scientific progress and its applications

Another human right of significant importance to our study is the right to enjoy the benefits of scientific progress and its applications. This is a cultural right that is enshrined in Article 15.1(b) of the ICESCR, and is thus a legally binding right for the state parties of the ICESCR:

Article 15

1. The States Parties to the present Covenant recognize the right of everyone:

a. To take part in cultural life;

b. To enjoy the benefits of scientific progress and its applications;

c. To benefit from the protection of the moral and material interests resulting from any scientific, literary or artistic production of which he is the author.

This right is less well-known than the right to food and the progress that has been made towards its realisation is limited. However, the World Conference on Human Rights, Vienna, 1993, re-affirmed that 'all human rights are universal, indivisible and interdependent and interrelated' and that 'the international community must treat human rights globally in a fair and equal manner, on the same footing, and with the same emphasis' ('Vienna Declaration', United Nations. 1993).

Just as in the case of the right to food, attempts have been made to clarify the normative content of this human right and to generate a discussion among stakeholders with a view to facilitating its implementation. One result is the so-called 'Venice statement', a paper that summarizes preliminary findings and proposals of three expert meetings convened by UNESCO between 2007 and 2009 (UNESCO, 2009). In this process, the right to enjoy the benefits of scientific progress and its applications was found to be of increasing relevance, given that the 'acceleration of the production of knowledge in the context of globalization has increased the effects on human rights in both positive and negative ways, with consequences for inequalities among and within States and across generations' (UNESCO, 2009).

The field of food production is mentioned as an example, where 'scientific advances significantly increased crop yields, but [...] also reduce crop genetic diversity, widen the gap between poor farmers and large-scale producers, and thus affect the right to food' (UNESCO, 2009). The close connection between the right to food and the right to enjoy the benefit of scientific progress and its applications is also underlined by many other cross-references, e.g. in the Voluntary Guidelines (see above).

The Venice statement emphasizes that science has different meanings and implications in different contexts, and that 'processes, products and applications of science should be used for the benefit of all humanity without discrimination, particularly with regard to disadvantaged and marginalised persons and communities.' In this regard, the tension between a need for intellectual property protection and societal benefits is also mentioned, saying the intellectual property regimes should be managed in accordance with common responsibility 'to prevent the unacceptable prioritization of profit for some over benefit for all.'

Furthermore, the Venice statement clarifies that 'a human rights-based approach requires that science and its applications are consistent with fundamental human rights principles such as non-discrimination, gender equality, accountability and participation, and that particular attention should be paid to the needs of disadvantaged and marginalised groups.' It further clarifies the state duties regarding this human right. Most relevant for the context of this study are the state duties to *fulfil* the right, that include, for example, to promote the access to the benefits of science and its applications on a non-discriminatory basis and including measures necessary to address the needs of disadvantaged and marginalised groups; to monitor potential harmful effects; to strengthen international cooperation and assistance; and to provide opportunities for public engagement in decision-making about science and technology and their development (UNESCO, 2009).

The United Nations Special Rapporteur in the field of cultural rights, in 2012, issued a report in which she outlined the normative content of the right to enjoy the benefits of scientific progress and its applications (United Nations, 2012). According to this

report, the right encompasses (1) access by everyone without discrimination to the benefits of science and its applications including scientific knowledge; (2) opportunities for all to contribute to the scientific enterprise and freedom indispensable for scientific research; (3) participation of individuals and communities in decision-making and the related right to information; and (4) an enabling environment fostering the conservation, development and diffusion of science and technology.

This can be interpreted in such a way that adopting a PVP law would require an implementation that ensures that everyone could benefit from the scientific progress and its applications without discrimination. This implies particular attention for ensuring that marginalised groups have access to the benefits of plant breeding and to varieties bred by applying scientific methods. The latter is further supported by the guidelines on state reporting (United Nations, 2009b), where states are called to report on 'the measures taken to ensure affordable access to the benefits of scientific progress and its applications for everyone, including disadvantaged and marginalised individuals and groups.' Furthermore, it is required that individuals and communities have a right to participate in decision-making and the right to the necessary information. The human rights principles (see Section 4.4) have to be applied for such processes.

To summarize, the human right of everyone to benefit from scientific progress and its applications is important to the content and implementation of PVP laws in three respects: (1) states that are parties to the ICESCR have to ensure that scientific breeding progress is accessible to small-scale farmers, particularly vulnerable groups; (2) states that are parties to the ICESCR have to ensure that scientific progress reaches the vulnerable groups in practice. Hence, if seed of 'improved', protected varieties is accessible to all farmers, yet does not meet their needs, then a state would have to ensure that scientific progress is directed towards the needs of these farmers; and (3) states that are parties to the ICESCR have the obligation to ensure that the process of implementation for PVP laws complies with human rights standards and principles, e.g. with regard to participation in decision-making.

There are a number of possible options to do this in practice. One way is to allow for the customary practices of farmers to access seed of protected varieties via farmer-managed seed systems to continue to some defined extent, including where seed of protected varieties is concerned. This is an option that has been followed by several countries by incorporating Farmers' Rights into their national PVP laws, also beyond the narrow limits set by the 1991 Act of the UPOV Convention (see Chapter 6). Other ways to ensure access would be vouchers or subsidies that ensure that poor farmers can access seed of protected varieties at prices that are affordable to them.

Furthermore, states could take a variety of measures that facilitate breeding progress that is directed towards vulnerable and marginalised groups, and this does not necessarily depend on a particular PVP regime. Such measures could include targeted investments into breeding, e.g. for publicly funded breeding initiatives for the benefit of small-scale farmers or certain groups of farmers (e.g. women) who are not sufficiently reached by existing breeding programmes. Such initiatives could include national breeding programmes and cooperation with international agricultural research centres; funding provisions for local farmer-led or NGO-led initiatives; social entrepreneurship; and similar. Most important for all publicly funded breeding initiatives would be transparent and effective mechanisms for participation at all stages of a breeding programme to ensure that the resulting varieties serve the needs of those who should benefit. Furthermore, guidelines and tools for implementing PVP laws following a human rights-based approach have been provided by the United Nations Environmental Programme (UNEP) (UNEP, 2008; 2012).

Key points

- States have to ensure that everyone have access to scientific progress and its applications, e.g. new varieties of plants.
- PVP laws need to be implemented in such a way that access to new varieties of plants is ensured in practice for all farmers without discrimination.
- States have to ensure that scientific breeding progress is directed to those groups that are insufficiently addressed by existing breeding programmes.
- Complementary breeding initiatives are required based on public funding targeted towards the needs of resource-poor farmers and vulnerable groups.
- Implementation processes for PVP laws should comply with human rights standards and principles.

4.3 The United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) and ILO Convention No. 169

The rights of indigenous people have been clarified and declared under UNDRIP, which was adopted by the United Nations General Assembly during their 61st Session at United Nations Headquarter, New York, in September 2007 (United Nations, 2008a). As a General Assembly Declaration annexed to a General Assembly resolution, it is not a legally binding instrument under international law. Rather, it represents a development of legal norms and 'reflects the commitment of the UN's Member States to move in certain directions' (United Nations, no year).

In this regard, it is noteworthy that a legal definition of indigenous peoples does not exist in international law. Instead, the United Nations follow an approach that is based on self-identification of indigenous peoples; it is, however, clear that it applies to groups within the society of a country, that are distinct by cultural expressions and identities, and not to the general population, even if it may otherwise be described as indigenous. In some countries, however, a large share of the inhabitants identify themselves as indigenous, e.g. in the Andean states of Bolivia (62 per cent) and Peru (45 per cent) (MRG, 2007; 2008).

UNDRIP is a comprehensive statement addressing the rights of indigenous peoples and clarifies how states should cooperate with their indigenous populations, particularly with regard to their participation in decision-making in all matters that concern them; IPR, if they could include plant species used by indigenous peoples, are surely a matter that concerns them. In Article 19, it asserts the Free Prior and Informed Consent (FPIC) as a standard procedure:

'States shall consult and cooperate in good faith with the indigenous peoples concerned through their own representative institutions in order to obtain their free, prior and informed consent before adopting and implementing legislative or administrative measures that may affect them.'

FPIC sets a high standard on consultation processes between states and the institutions representing their indigenous peoples. Major requirements are that the process has to be implemented *before* legislative or administrative measures are taken, that there is full freedom *not* to give consent, and that the indigenous peoples are fully informed about procedures and consequences of the planned measures (Hill et al., 2010; Indigenous Peoples Foundation, 2011). FPIC is thus more than what has been observed in stakeholder consultation processes related to UPOV-based PVP law so far.

Of further relevance may be Article 20 of UNDRIP, saying that 'Indigenous peoples have the right to maintain and develop their political, economic and social systems or institutions, to be secure in the enjoyment of their own means of subsistence and development, and to engage freely in all their traditional and other economic activities.' This could be interpreted in such a way that traditional breeding and seed systems as economic and social systems or

institutions cannot be restricted without the FPIC of the indigenous people concerned.

Article 31 refers to the right indigenous peoples have to 'maintain, control, protect and develop their cultural heritage, traditional knowledge and traditional cultural expressions, as well as the manifestations of their sciences, technologies and cultures, including human and genetic resources, seeds, medicines, knowledge of the properties of fauna and flora [...] They also have the right to maintain, control, protect and develop their intellectual property over such cultural heritage, traditional knowledge, and traditional cultural expressions.'

Genetic resources, seed and properties of flora and fauna are explicitly mentioned here, also in relation to IPR. There is a clear relation between UNDRIP and Article 8j of the CBD, which calls on their contracting parties to, under their national legislation, 'respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity and promote their wider application with the approval and involvement of the holders of such knowledge' (United Nations, 1992).

Similarly, there is a relation to Article 12.4 of the Nagoya Protocol, which requests parties to 'not restrict the customary use and exchange of genetic resources and associated traditional knowledge within and amongst indigenous and local communities [12]' (CBD Secretariat, 2011). The 'Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization (ABS) to the Convention on Biological Diversity' is a supplementary agreement to the Convention on Biological Diversity.

Besides UNDRIP, there is also a Convention of the International Labour Organization (ILO) on the rights of indigenous and tribal peoples (ILO Convention No. 169; ILO, 1989), which entered into force in 1991. This convention is a legally binding international instrument that has been put in force in 22 states to date, among them several countries of South and Central America [13]. It sets rules with regard to participation for matters that affect the indigenous and tribal peoples directly, including their lands and territories and natural resources. ILO Convention No. 169 is quite explicit with regard to requirements for consultation processes: In Article 6, the convention provides guidelines as to how consultation with indigenous and tribal peoples should be conducted: consultation with indigenous peoples should be undertaken through *appropriate procedures*, in *good faith*, and through the *representative institutions* of these peoples; the peoples involved should have the opportunity to *participate freely at all levels* in the formulation, implementation and evaluation of measures and programmes that affect them directly (Article 6). The supervisory bodies have provided guidance and good practice recommendations on these issues (compiled, for example, in ILO, 2009); here, it is stated that pure informational meetings are not compliant with the requirements of the convention, and that consultations have to be held beforehand, as early as possible in a process, and based on a sincere wish to reach a common accord (ILO, 2009: 111).

ILO Convention No. 169 further states a right of indigenous and tribal peoples to the natural resources pertaining to their lands, including the right to participate in the use, management and conservation of these resources (Article 15.1). Moreover, Article 7 of ILO Convention No. 169 states that indigenous and tribal peoples have the right to

[12] It is noteworthy that the CBD and the Nagoya Protocol have a broader scope, mentioning local communities as well and not only indigenous peoples.

[13] A list of all countries that have signed the convention is available at the ILO website: www.ilo.org.

'decide their own priorities for the process of development as it affects their lives, beliefs, institutions and spiritual well-being and the lands they occupy or otherwise use, and to exercise control over their economic, social and cultural development.'

This could imply the future of their social and cultural institutions that govern the use of plant genetic resources, seed and related traditional knowledge.

Key points

- UNDRIP is a General Assembly Declaration and as such not a legally enforceable law. However, it shows a direction in which United Nations Member States have committed themselves to move.
- UNDRIP explicitly mentions the rights indigenous peoples have with regard to their genetic resources, as well as to maintaining customary practices and institutions.
- Before changing policies that could potentially affect indigenous peoples' rights (such as PVP laws), it has to be clarified whether indigenous peoples are present in a state's territories, and seek their consent. UNDRIP calls for FPIC as a standard procedure that should be followed.
- For the signatory states of ILO Convention No. 169, it is a legally binding obligation to establish dialogue and appropriate processes of consultation with their indigenous and tribal peoples through their representative institutions on matters that concern them directly.

4.4 The human rights principles

The human rights principles (HRPs) apply to all processes that relate to human rights. A first set of HRPs clarifies issues relating to the validity of the human rights. Human rights are *universal and inalienable*, which means that all people everywhere in the world are entitled to them. Human rights are also *indivisible*, that means all human rights have equal status, and cannot be positioned in a hierarchical order, or compromised at the expense of other human rights. The principles of *interdependence and interrelatedness* point to the same direction: The fulfilment of one right often depends, wholly or in part, upon the fulfilment of others (UNFPA, 2005). The same can be observed, for example, in the case of the right to food and the right to enjoy the benefits of scientific progress and its applications, both being closely interrelated (de Schutter, 2011).

Other HRPs define process-related criteria for rights-based approaches and the implementation of human rights (based on UNFPA, 2005):

- *Equality and non-discrimination:* The need to avoid any discrimination with regard to age, gender, religion, geographical origin, property, disability, sexual orientation or any other status.
- *Participation and inclusion:* All people have the right to participate in and access information relating to the decision-making processes that affect their lives and their well-being. This implies that disaggregated data and qualitative information are required to identify those who are potentially affected.
- *Accountability and Rule of Law:* Governments have to comply with the legal norms and standards enshrined in international human rights instruments. Where they fail to do so, rights-holders are entitled to institute proceedings for redress before a competent court in accordance with the rules and procedures provided by law.

The human rights principles are considered to be intrinsic to the human rights, such as non-discrimination being a 'consequence' of equality (Bielefeld, 2010). Moreover, they are also enshrined in various forms in the treaties to which United Nations Member States are parties, e.g. in ICESCR and the International Convenant of Political and Civil Rights. Hence, human rights principles are legally enforceable in many situations, depending on the processes and rights in question and the legal situation in each country.

The human rights principles are closely linked to various key attributes of 'good governance', e.g. transparency, accountability, responsibility, partici-

pation and responsiveness to the needs of people (United Nations, 2000b). The progressive realisation of human rights relies on an enabling environment, which can be created through appropriate legal frameworks, as well as institutions and processes. There is no evidence so far how these key attributes of 'good governance' are taken into account in the process of establishing UPOV 91-based PVP laws in developing countries.

Key points

- The human rights principles are inherent to human rights and are enshrined in the various human rights treaties. In general, they should be followed in all processes that relate to human rights.
- They are legally enforceable in many situations, depending on the legal situation in each country and the processes and rights in question.
- Human rights in general rely on appropriate legal frameworks, processes and institutions for their realisation; the human rights principles are closely related to key attributes of 'good governance'.

4.5 Concluding remarks: UPOV-based PVP law and human rights

This section discusses whether the regulations under the 1991 Act of the UPOV Convention support or oppose the right to adequate food, and other relevant human rights. The right to adequate food and the right to enjoy the benefits of science and its applications, both enshrined in ICESCR, as well as UNDRIP as a General Assembly Declaration and ILO Convention No. 169 are all relevant in this regard.

Farmers' access to seed of new plant varieties is an issue that concerns the right to food as well as the right to benefit from scientific progress and its applications. Improved access to seed of new, improved varieties could make a positive contribution towards their realisation, provided that varieties were made available that are beneficial to farmers, and particularly to disadvantaged and marginalised groups. It has been outlined earlier (in Section 3.4) that plant varieties are not user-neutral technologies. They bring about different risks and benefits for different groups of farmers. Progress for vulnerable groups can thus not simply be assumed, but needs to be assessed constantly, and particularly if changes in related policies are envisioned.

What has been said above on the legal content of these laws could help to put the common posit into perspective, that states could better fulfil their obligations if general economic growth allowed for structural measures to improve the situation of small-scale farmers: Even though this could be true, it is not a valid option to achieve economic growth by taking retrogressive measures, based on a vague promise to improve the situation of small-scale farmers or vulnerable groups in the future. The right to food and the right to benefit from scientific progress and its applications demand targeted measures that reach the vulnerable groups in practice, and for avoiding any measures that could deteriorate their situation. Economic growth helps the realisation of the right to food, particularly if targeted and clearly defined strategic measures are taken to ensure that vulnerable groups benefit directly from the economic growth.

The adoption of a UPOV 91-based PVP law would need to be 'weighed' against other options that are available to promote food and nutrition security and farmers' access to new plant varieties. Based on the general aspects discussed previously (Section 3.2), it is not likely that private sector engagement, encouraged to investment by incentives of intellectual property laws, will by itself focus on the situation of poor and marginalised groups. Rather than on basic food crops for highly specific conditions, its focus will be on breeding varieties for larger and high value market segments, to get the necessary return on investment (see Tripp *et al.,* 2007; de Schutter, 2011; Bentley *et al.,* 2011). Without states taking complementary measures that more directly target progressive realisation of the rights of mar-

ginalised and vulnerable groups, it would need to be assessed whether or not the regulations under the 1991 Act of the UPOV Convention constitute a retrogressive measure with regard to the right to food and farmers' enjoyment of scientific progress and its applications, compared with to the present situation. This can, however, not be assessed in general, for all vulnerable groups, all crops and varieties, and all agricultural conditions in all developing countries. It would need to be studied separately for each country that plans to take such policy measures.

It is the strength of the study provided by The Berne Declaration (2014) that it points to the risks that need to be taken into account when developing countries join the 1991 Act of the UPOV Convention. The United Nations Committee on Social, Economic and Cultural Rights shares the view that UPOV 91-based PVP laws tends to threaten rather than to support the realisation of the right to food, and criticizes the so-called TRIPS-plus agreements between states that urge developing countries to adopt PVP laws that not only comply with TRIPS, but also with the 1991 Act of the UPOV Convention:

> *'[...] the Committee is of the view that the so-called 'TRIPS-plus' provisions concerning accession to the International Convention for the Protection of New Varieties of Plants [UPOV] increase food production costs, seriously undermining the realisation of the right to food' (United Nations, 2010).*

However, establishing a national PVP law under the 1991 Act of the UPOV Convention is not *per se* a setback for the right to food. It depends on other measures taken by states to balance risks and address the situation of vulnerable groups, and whether clear and tangible benefits can be achieved through plant breeding initiatives. Besides effects of PVP laws that potentially restrict farmers' access to and use of protected varieties, there are other risks to Farmers' Rights and the right to food that arise from restrictive seed legislation (see Chapter 5.6), and that could severely affect farmer-managed seed systems in general. Hence, if developing countries adopt PVP laws, this should not be accompanied by restrictive seed laws that render farmer-managed breeding and seed systems illegal, so that farmers are more or less forced to use formal breeding and seed systems.

Moreover, the right of everyone to benefit from scientific progress and its applications requires states to take very clear and targeted measures to ensure that breeding progress for vulnerable groups will materialize, also irrespective of a particular PVP regime. States have to provide options for farmers, including poor farmers, to access seed of new varieties and to participate in scientific progress that serves their needs.

As pointed out by de Schutter (2011), scientific progress can take different paths and accordingly produce different types of impact. Access to the benefits of science and its applications can, therefore, not be separated from a discussion of the direction of scientific progress, and the necessary requirements, e.g. institutional and funding requirements. Relying entirely or predominantly on the activities of the private sector without a proper monitoring process for progress towards the realisation of the human rights that are enshrined in the ICESCR cannot be considered compliant with human rights obligations under the ICESCR. Moreover, it would need to be discussed whether the adoption of a PVP regime, based on the 1991 Act of the UPOV Convention, is a way to manage intellectual property in such a way that profit for some is responsibly balanced with regard to a common responsibility, as is called for in the Venice Statement. The assessment of the UPOV Convention in relation to Farmers' Rights (see Chapter 5) shows that there are a number of issues where breeders' rights are prioritized over the rights of farmers.

What can be concluded from these discussions is that any transparent process for at least appropriately *addressing* these questions has obviously not taken place so far. The obligations of states with regard to human rights under ICESCR go clearly beyond just *claiming* that certain acts are beneficial for society or for farmers in general. Further details are provided by the guidelines on state reporting

relating to ICESCR. These guidelines call for states to report on 'developments in law and *in practice* affecting the full realisation of the rights recognised under the Covenant' (United Nations, 2009b; emphasis added by the author).

Of further importance is also Guideline No. 3, which asks for 'measures taken to ensure that a State party's obligations under the Covenant are fully taken into account in its actions as a member of international organizations and international financial institutions, as well as when negotiating and ratifying international agreements, in order to ensure that economic, social and cultural rights, particularly of the most disadvantaged and marginalised groups, are not undermined.'

There is no evidence so far that these obligations of the ICESR Member States have been fully taken into account, e.g. as members of UPOV. Furthermore, there is no evidence that human rights' standards and principles were taken into account for the recent processes leading towards the adoption of the UPOV-based PVP laws by developing countries. There have been complaints from civil society and farmer organizations regarding severe deficits with regard to participation and inclusion of people whose lives and well-being may be affected, and also with regard to accountability of the institutions that lead such processes. For the 'New Alliance' Cooperation Framework for Tanzania, which includes adopting new UPOV-compliant PVP legislation, a group of civil society organizations complains: '[...] the entire process has been non-participatory, shutting out the very farmers that the Bill purportedly benefits. We are deeply concerned that farmers' organizations and relevant civil society organizations have not been consulted on the Plant Breeders' Rights Bill [...]' (ACRA *et al.*, 2013).

This same process has also been critically assessed by Haugen (2014b; unpublished). As outlined above, states have human rights obligations also in situations where competencies are transferred. They can thus not leave such processes to the secretariats of intergovernmental organizations, if effective control mechanisms with regard to human rights obligations are not put in place. Haugen states that own interests of these secretariats are obviously influencing the processes. It is easy to sideline civil society and farmer organizations indirectly, e.g. by not effectively ensuring transparent flow of information, or by not providing funding for their participation. It can be questioned whether states act responsibly towards their human rights responsibilities if appropriate processes, control and redress mechanisms are not guaranteed. A minimum would be to define a transparent process of stakeholder selection, to ensure transparent flow of information, and to set procedures for participation, including funding mechanisms and defined processes for solving conflicts if consent cannot be reached. The state parties to ICESCR have obligations to work towards the full realisation of human rights that go beyond was is 'enforceable' in a strict sense; and to actively contribute to creating an enabling environment for the progressive realisation of these rights. They also have the responsibility to urge for appropriate, human-rights based processes of implementation within the international organization(s) of which they are members.

Lastly, even if UNDRIP is currently not a legally binding instrument, states do not comply with the declared rights of indigenous peoples it if they adopt UPOV-based PVP law without putting an appropriate consultation process in place. For State Parties to ILO Convention No. 169, such processes are compulsory and well defined. If consent with indigenous peoples cannot be reached with regard to a UPOV-based PVP law, alternative *sui generis* approaches could be considered that expand the options to adapt the rules with regard to the plant genera and species that can be covered by PVP, as well as for Farmers' Rights to save, use, sell and exchange seed.

Key points

- Farmers' access to seed of new plant varieties is an issue that concerns the right to food as well as the right to benefit from scientific progress and its applications.

- The human rights enshrined in ICESCR do not prescribe any particular policies that have to be followed. However, the adoption of UPOV-based PVP laws would need to be weighed against other options available with regard to their contribution to the progressive realisation of the right to food and the right to enjoy the benefits of scientific progress and its applications.
- Whether a UPOV-based PVP law supports or hinders progress towards these rights cannot be answered in general; it depends on the situation in each country and a range of other measures a country could take to address and balance potential risks and to comply with human rights standards.
- States have to ensure human-rights compliant processes of implementing PVP laws, also where competencies are transferred to inter-governmental organizations.
- States have to consult and actively seek consent with indigenous and tribal peoples; this is a non-legally enforceable commitment for all United Nations Member States and compulsory for the signatories to ILO Convention No. 169.

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5 The 1991 Act of the UPOV Convention, and Farmers' Rights

This chapter investigates where the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) and the 1991 Act of the UPOV Convention overlap, and in particular to what extent the UPOV Convention advances or contradicts the implementation of Farmers' Rights, as defined by ITPGRFA.

The structure of this chapter is that a closer look at some basic aspects of the legal situation is offered in the first section (5.1). In the next section (5.2), the core elements of Farmers' Rights are identified; it further includes a reflection on the possible customary law status of farmers' seed-related practices and possible implications for property rights. Each criterion relevant for granting a plant breeder's right in the UPOV system is then explored in relation to these Farmers' Rights (Section 5.3). Section 5.4 addresses particularly the scope and extent of the plant breeders' rights according to the UPOV Convention. Issues relating to the recent trend of supranational implementation at a regional level in developing countries are brought up in Section 5.5. Other challenges to Farmers' Rights (not directly related to

the UPOV Convention) are addressed in Section 5.6. Finally, some concluding remarks on the relation between UPOV-based PVP law and Farmers' Rights are presented (Section 5.7).

5.1 Level of law and of rights to be explored

5.1.1 International obligations and implementation into domestic law

When exploring the relationship between two concepts of law, these two concepts of law must be at the same legal level to be comparable. Common for Farmers' Rights and the UPOV Convention is that both operate at the international level and are parts of international law. In international law the primary legal subjects are states (apart from human rights law where persons can also be right holders). This means that states are handed both rights and obligations according to the international treaty in question. One task of this chapter is, therefore, to compare the rights and obligations of states at the treaty-level in international law, concerning how the 1991 Act of the UPOV Convention will interact with the realisation of Farmers' Rights. They represent two branches of international law that cover overlapping subject matters. Thus, there is a need to discuss them at the international level.

In addition to treaty law, international law recognises international customary law, according to the Statute of the International Court of Justice (United Nations, 1946: Article 38.1.b). The International Court of Justice is the principal judicial organ of the United Nations; its Statute is annexed to the Charter of the United Nations, of which it forms an integral part. Customary law is relevant both in the international arena and in domestic law. In the area of plant genetic resources and intellectual property, this concept has been particularly explored with regard to the traditional knowledge and practices of indigenous peoples (see, for example, GIZ, 2012; WIPO, 2013). The question of which elements of Farmers' Rights could have customary law status at either international or domestic level will be addressed in Section 5.2.2.

One core challenge for international law is its implementation into national law. For an international obligation to become binding in a country, the organs of that state must incorporate the obligations into the national or domestic legal sphere. For constitutional law, most countries operate with a distinction between international law being binding for the state, and domestic or national law being binding for the citizens and companies (legal persons) of that country. Hence, farmers, plant breeders and others are legal persons under domestic law and rely foremost on domestic legislation in the country where they operate. International law is thereby in general not directly applicable to determine the rights and obligations of legal persons in domestic law. This however depends on the constitutional system of each country. In some jurisdictions, a legal person can challenge implementation of an act or a policy on the basis it violates international law, although there is no domestic legislation. However, the manner in which international obligations are formulated could make it difficult for national courts to apply them without further implementation.

Hence, when discussing the relationship between the UPOV Convention and Farmers' Rights, the discussion must be held respecting two levels: the international sphere and domestic legislation. This view is based on the traditional principle of each country having sovereignty inside its own territory. Both, the realisation of Farmers' Rights as well as the granting of a PVP right happen inside the jurisdiction of each country. Therefore, one of the core questions to explore here is whether implementing a PVP system based on UPOV 91 in the country limits the realisation of Farmers' Rights in that country.

The question of how an obligation of international law is implemented varies among different areas of law; for example, intellectual property law is generally implemented in a more rigid manner than envi-

ronmental law. There are several reasons for this, one is because of the manner in which the wording is being used in different treaties; language used in the UPOV Convention, for example, is far more concrete and detailed than in most rules established in the CBD or the ITPGRFA. Through the choice of language and words, international treaties oblige the states to differing degrees and thus limit the national flexibility in their implementation to different degrees. For example, the language in Article 9.2 of ITPGRFA uses terms such as 'as appropriate' and 'subject to its national legislation'; whereas the 1991 Act of the UPOV Convention (Article 2) uses language such as 'Each Contracting Party shall grant and protect breeders' rights.'

Furthermore, the UPOV-based PVP act sets up a legislative system for granting individual rights to specific breeders based on their application. The PVP act works then as the legal basis for developing a practice of granting rights, within the discretionary rules of the act. This discretionary practice can evolve without amending the act and can to some extent also lead to re-interpreting the concepts that are laid down in the act. In comparison, Farmers' Rights would be outlined in rather general terms in the legislation. Changing or specifying a statutory right is much more difficult as a process than altering the practice in a discretionary administrative system established to grant individual private rights. This leaves PVP rights potentially more dynamic than a statutory set of Farmers' Rights.

These differences are important to consider for understanding the relationship between the UPOV Convention and Farmers' Rights. Moreover, UPOV operates with a strict revision system, where a country that wants to become a member state must get its national implementation act approved by the UPOV as an organisation before becoming accepted as a member. Examples where the draft national implementation of plant breeders' acts was not found to conform to UPOV 91 are Ghana and Tanzania (UPOV, 2012a, b). In both cases, the UPOV Secretariat suggested deletions and additions in the respective draft acts for them to become regarded as compliant.

Dutfield (2011) quotes Professor Hafiz Muminjanov from Tajikistan on his view on the process:

> *'What I did not like in UPOV is too strict rules and too much formality. Believe me, it is not easy to convince the national officials with all UPOV requirements. UPOV wants to have exact expressions and formulation of the articles. I understand that it is easy for examination of the law, but it is difficult for the national one who drafts the law and agrees with the officials. It took 5 years for us to have a draft law that is now in conformity with UPOV. But, the Parliament members would like to make some comments/amendments and changes. If it happens, then we have to submit the draft law to the UPOV Council once again. I think it is too strict.' (Dutfield, 2011: 17))*

National legislators would have to change the draft law before membership to the UPOV is granted. According to The Berne Declaration (2014: 7, 16), Malaysia is a country that needs to alter its legislation to become a member. Also according to the same Report, Peru changed the disclosure requirement in its plant variety protection act in 2008–2009 to accede as a member of UPOV under the 1991 Act (The Berne Declaration, 2014: 16).

The regular process of law-making in democracies is that an act is adapted to the national circumstances after a consultation process among the stakeholders in that country. It is not the general rule for international organisations that it carries out an approval round before a state is taken on board as a member to the international convention. This means that the UPOV system limits the national consultative process for the farmers and other stakeholders in the country in course of prioritising the rights of breeders (Dutfield, 2011: 17–18).

In comparison with the above-described procedure, other treaty obligations leave different amounts of discretion or flexibility for countries when implementing obligations within domestic legal and political systems. ITPGRFA, for example, does not review national legislation before granting membership.

This leaves more flexibility for the member states in their respective implementation of Farmers' Rights at the national level, compared with the case with the UPOV Convention. This lack of flexibility when implementing UPOV and large discretion when implementing Farmers' Rights, exposes the latter to losing out in the 'implementation game'.

Key points

- When discussing the relationship between the UPOV Convention and Farmers' Rights, one needs to differentiate between domestic law on the one hand and international law on the other. Whereas the UPOV Convention and ITPGRFA are both treaties in international law, the practical realisation of Farmers' Rights and granting of plant breeders rights both occur within the national jurisdiction of countries.
- There are core differences between how UPOV requires its members to implement the obligations and how a general international commitment such as ITPGRFA requires member countries to take action. These differences have an effect on how the democratic and participatory processes in the countries take place.
- By reviewing and approving the national PVP law prior to granting membership, the UPOV system limits the possibilities of countries to implement a national consultative process with the farmers and other stakeholders in the country, thus prioritising the rights of breeders.
- Joining UPOV under UPOV 91 narrows the possibilities for states to adapt PVP law to individual country's needs and to involve stakeholders effectively.

5.1.2 Overlap or conflict between different treaties

Under globalisation, where continuously more international treaty obligations are concluded, the relationship between these treaties becomes a challenge, which it is sought to address by formulations in the treaties themselves. The preamble to ITPGRFA aims at contributing to resolving this potential conflict, by stating:

> *Recognizing that this Treaty and other international agreements relevant to this Treaty should be mutually supportive with a view to sustainable agriculture and food security;*
>
> *Affirming that nothing in this Treaty shall be interpreted as implying in any way a change in the rights and obligations of the Contracting Parties under other international agreements;*
>
> *Understanding that the above recital is not intended to create a hierarchy between this Treaty and other international agreements;*

This means that there is no hierarchy among ITPGRFA and other treaties, such as CBD, UPOV or the TRIPS Agreement, in international law. If there is overlap or even conflict between two rules, other principles of legal harmonisation need to be drawn upon. In such cases it is usually either ruled, that the more specific obligation prevails over the more general one (*lex specialis*); or the more recent of the conflicting obligations prevails over the older one (*lex posterior*). In this particular case, ITPGRFA is more recent than UPOV 91, whereas UPOV 91 is probably more specific. This indicates that the ITPGRFA did not intend to alter the legal situation which was in place prior to its agreement.

Conflicting issues arising from the implementation of both treaties can thus not be resolved 'technically' by applying common principles and rules at the international level. Rather, the recognition of the need for mutually supportive implementation in the preamble leads any overlap with other international agreements with a view to sustainable agriculture and food security rather to be resolved by countries through implementation in a mutually supportive manner. It is also a general rule that international obligations should ideally be implemented in a harmonious manner.

However, uncertainty and a lack of clarity between two norms in international law make the situation for countries implementing them in domestic legislation more difficult. The likely consequence is that rules of international law with the strongest measures for implementation and clearest obligations might easily become the strongest legal system in domestic law, unless the areas of overlap between different treaties are properly analysed and addressed in the implementation process. By doing so, states can effectively expand their policy space and ensure more consistent implementation (Haugen, 2014a).

Key points

- No formal hierarchy is established among ITPGRFA and other obligations in national law.
- Which of two conflicting norms will prevail at the international level is not clear from the ITPGRFA preamble or from the UPOV Convention itself. Areas of overlap or conflict will need to be resolved through the implementation in domestic legislation.
- There is a tendency that the system concerning the implementation of the respective treaties will determine which norms will be most enforceable. To ensure implementation in a harmonious manner, areas of overlap need to be identified and addressed.

5.1.3 The status of the explanatory notes from UPOV in international and national law

Over the course of the last few years, UPOV has negotiated 14 Explanatory Notes [14]. During the negotiations these drafts had limited accessibility, which in effect prevented an open and democratic discussion of their content. The preamble of the explanatory notes states for example that:

> *'1. The purpose of these Explanatory Notes is to provide guidance on the definition of 'Variety' under the 1991 Act of the International Convention for the Protection of New Varieties of Plants. The only binding obligations on members of the Union are those contained in the text of the UPOV Convention itself, and these Explanatory Notes must not be interpreted in a way that is inconsistent with the relevant Act for the member of the Union concerned.' (UPOV, 2010a)*

There is a level of contradiction in this preambular text. First, the objective of the Explanatory Notes is set to provide guidance on how to understand and implement core concepts in the convention; whereas, second, '[t]he only binding obligations' is contained in the text of the convention itself. From the perspective of sovereignty, it is easy to explain why the preamble states that the legally binding obligation follows from the convention. If the Explanatory Notes had been given formally binding status, then probably a new round of ratification would have been required, as new obligations in international law require the consent from the member states according to their respective constitutions. In such a situation, the Explanatory Notes would probably have had to be discussed more openly in the process leading to adapting them in the UPOV Council, which consists of all member states.

It is an open and interesting question what the normative value of these Explanatory Notes will be in the future. What exactly does it mean that the Explanatory Notes 'shall provide guidance'? The 'guidance' will primarily be directed to the implementation and practice of PVP in domestic law. For the legislator, there is no firm requirement of including their wording into the domestic PVP act. The question would become valid if a country chose to implement an article in their domestic legislation that implies a different understanding than the one provided in the Explanatory Notes. It is quite probable that this draft PVP Act would not be recognised as compliant with the UPOV Convention.

[14] All explanatory notes are listed under www.upov.int/explanatory_notes/en.

For the public authorities handling the administrative system of PVP, the national act is the main source of law. However, where the act and the convention leave doubt in their interpretation and application, then the administrative body will probably choose an interpretation that harmonises with the one provided for in the Explanatory Notes. If the number of other sources is limited, Explanatory Notes, even if not formally binding, will become of high normative value.

When a question of interpretation comes up before a court, the legal situation is similar to that of the administrative authority mentioned above. It is probable that the court will choose an interpretation that is in line with the one specified in the Explanatory Notes [15]. Thereby, these apparently non-binding notes probably will have important interpretative, and thereby normative, effect.

The Explanatory Notes are in fact fixing the more specific content of the core concepts of the UPOV 91 convention. Thereby flexibility in the national implementation of PVP systems is narrowed down based on a rather informal law-making process. The underlying aim is probably to prevent practices based on domestic PVP acts could take different directions. Even though this approach does not alter the binding nature of international rules, it becomes an effective method for material law-making.

From both a democratic perspective and regarding the sovereignty of states, however, this manner of spelling out the details of interpretation appears problematic. First, since members of UPOV agree to these Explanatory Notes without the regular procedures for assuming obligations in international law; and, second, because the negotiations leading to these Explanatory Notes are not open to a broad consultative process and civil society participation.

[15] Concerns about exactly this issue were raised by the Delegation of the Netherlands; for details see www.upov.int/edocs/mdocs/upov/en/caj_ag_12_7/upov_exn_hrv_draft_7_comment_nl.pdf.

Key points

- Explanatory Notes in the UPOV system are meant to provide guidance for the interpretation of certain aspects of the UPOV Convention.
- Despite the preamble stating that the Explanatory Notes shall not change the binding obligations of the UPOV Convention, they are likely to have a normative effect on the legislator, as well as executive and judicial powers of countries, when implementing plant breeders' rights based on UPOV 91 in their domestic legislation and in practice.
- The Explanatory Notes thus limit the flexibility in implementation of UPOV-based PVP law at the domestic level as they put forward a particular interpretation.
- In addition, courts and administrative authorities could rely on these Explanatory Notes to guide their judicial decisions.

5.2 Farmers' Rights as a concept of law

5.2.1 The elements of Farmers' Rights according to ITPGRFA

After having had a look at the overall legal questions relevant for the relationship, the next step is to look at Farmers' Rights from a legal point of view. The most detailed reference in international law for the concept of Farmers' Right can be found in Article 9 of ITPGRFA, which reads:

> ***Article 9 – Farmers' Rights***
> *9.1 The Contracting Parties recognize the enormous contribution that the local and indigenous communities and farmers of all regions of the world, particularly those in the centers of origin and crop diversity, have made and will continue to make for the conservation and development of plant genetic resources which constitute the basis of food and agriculture production throughout the world.*

9.2 The Contracting Parties agree that the responsibility for realizing Farmers' Rights, as they relate to plant genetic resources for food and agriculture, rests with national governments. In accordance with their needs and priorities, each Contracting Party should, as appropriate, and subject to its national legislation, take measures to protect and promote Farmers' Rights, including:

*a. protection of **traditional knowledge** relevant to plant genetic resources for food and agriculture;*

*b. the right to **equitably participate** in sharing benefits arising from the utilization of plant genetic resources for food and agriculture; and*

*c. the right to **participate in making decisions**, at the national level, on matters related to the conservation and sustainable use of plant genetic resources for food and agriculture.*

9.3 Nothing in this Article shall be interpreted to limit any rights that farmers have to save, use, exchange and sell farm-saved seed/propagating material, subject to national law and as appropriate.

The elements of Farmers' Rights that are codified in this article concern both procedural and substantive issues. Article 9.1 gives a general recognition of the work farmers have done over the course of history, and will continue to do. This recognition could be an argument in the discussion of customary law (see Section 5.2.3 below), but does not in itself establish any clear legal obligations or rights.

One first substantial right mentioned is the right to protection of traditional knowledge relevant to plant genetic resources for food and agriculture, which is enshrined in Article 9.2(a). This sets a clearer recognition than Article 8j of the CBD concerning traditional knowledge, as it refers specifically to traditional knowledge held by farmers and on plant genetic resources relevant to agriculture and food. It does, however, not describe the manner in which traditional knowledge should be protected or the purpose for which it should be protected.

The second substantial right is the right to equitably participate in benefit sharing according to ITPGRFA Article 9.2(b). The article does, however, not specify the manner in which benefits shall be shared. The right to equitable participate in sharing benefits adheres to all use of plant genetic resources. Thus, in principle the ones drawing benefits from their use could fall under this obligation. In CBD Article 15, the, norms for the sharing of benefits in the national arena are not established; the benefit-sharing obligation of CBD concerns rather the sharing between the user and the country of origin, but does not specify further who in the national system should benefit. The Nagoya Protocol (Article 5.2) more specifically refers to internal benefit sharing to 'indigenous and local communities' concerned. Thus, only some groups of farmers would be covered by this particular rule on internal benefit sharing. The benefit sharing obligation connected to Farmers' Rights in ITPGRFA goes one step further in spelling out core principles for the internal distribution of benefits. One example for a relevant mechanism of sharing benefits is the Multilateral System (MLS) established under ITPGRFA itself. It prescribes that benefits are to be shared with farmers. However, there are structural challenges in ITPGRFA to obliging the users of plant genetic resources to conduct such a fair sharing of benefits (more on this topic in Section 5.6.1).

Article 9.2(c) of ITPGRFA specifies the right to participate in decision-making at the national level. The wording of the introductory part of Article 9.2 implies that these three elements are not an exhaustive list, so others can be added. These three rights are to be qualified and implemented at the national level. The right to be included in decision-making at a national level can be seen as a procedural right on the way to establishing the material rules, or it can be considered a substantive right to decision-making concerning plant genetic resources.

The most specific legal content of Farmers' Rights is the one which is referred to in Article 9.3: 'Noth-

ing in this Article shall be interpreted to limit any rights that farmers have to save, use, exchange and sell farm-saved seed/propagating material, subject to national law'. Here, four well-defined acts by farmers are stipulated as substantive rights (The Berne Declaration, 2014: 2–4). Also the ITPGRFA preamble reinforces Article 9.3 as being fundamental to the realisation of Farmers' Rights.

In summary, Farmers' Rights in ITPGRFA could be defined as:

- the right to a protection of their relevant traditional knowledge;
- the right to equitably participate in sharing benefits from the utilisation of plant genetic resources;
- the right to participate in decision-making;
- the right to save farm-saved seeds/propagating material;
- the right to use farm-saved seeds/propagating material;
- the right to exchange farm-saved seeds/propagating material; and
- the right to sell farm-saved seeds/propagating material.

These are seven elements of the broader concept of Farmers' Rights. Two caveats must be taken: The first three elements are subject to national legislation in accordance with needs and priorities and as appropriate for each country. The last four elements are formulated in Article 9.3 so that nothing in this Article should be interpreted limiting these elements of Farmers' Rights. Also the wording 'subject to national law' refers this question to the legal situation in each country. This indirect diction contributes to weakening the obligations of states in international law.

Few of the signatory states had any provisions on Farmers' Rights in their national legislations at the time the Treaty was signed. Therefore, Article 9 could also be read in such a way that *creating* such provisions on Farmers' Rights, in accordance with needs and priorities as appropriate, is the obligation. Article 9.2 says that the responsibility for realising Farmers' Rights lies with the parties, and the preamble makes clear that the above mentioned key elements are fundamental for realising Farmers Rights, and for their promotion at national and international levels. Article 9.2 also obliges Parties to take measures to protect and promote Farmers Rights. This view is supported by Article 6.1 of the treaty: 'The Contracting Parties shall develop and maintain appropriate policy and legal measures that promote the sustainable use of plant genetic resources for food and agriculture.' In Article 6.2, which is a list of suggestions how this could be achieved, the possibility of 'reviewing, and, as appropriate, adjusting [...] regulations concerning variety release and seed distribution' is explicitly mentioned. This could be of great importance for implementing Farmers' Rights. How State Parties will actually do this will vary according to needs and priorities of each country. Nevertheless, there is an obligation on Parties to ITPGRFA to protect and promote Farmers' Rights; and there is also a clear obligation to take measures in this direction. The legal basis for such an obligation in the ITPGRFA itself is, however, not a very firm one.

Key points

- There are both procedural elements (like the right to participate in decision-making) and substantive rights (like the rights in respect of the utilization of plant genetic resources) that are covered by Farmers' Rights as a concept in international law.
- The wording used in the text of the ITGRFA leaves flexibility to states to implement Farmers' Rights in their national legislations in a way that is appropriate for each country.
- There is a clear obligation to take steps for protecting and promoting Farmers' Rights and for developing policies that promote the sustainable use of plant genetic resources. This explicitly includes revising existing policies, e.g. relating to seed diffusion and PVP.

5.2.2 Farmers' Rights as customary law

In addition to the Farmers' Rights as spelled out in ITPGRFA, it is interesting to explore whether Farmers' Rights could be said to be a customary law. If Farmers' Rights had customary law status, they would have a clearer recognition and thus a firm legal basis. One particular question to be explored here is whether farmer practices could be considered international customary law, or national/local customary law.

Broadly accepted criteria for a customary law are that there is a practice which is consistently being followed, and that it is considered as law or binding by the relevant actors. If looking at farmers' seed management practices, the saving, use and exchange of seeds has been a core of agricultural practices since the first pre-cultivation of crops some 11 000 years ago. These practices can be considered to have been consistently followed by farmers for all traditional crops and varieties that continue to exist in farmers' fields to date. Discontinuation of these practices inevitably leads to loss of a traditional crop or variety unless it has been stored in ex situ collections of botanical gardens or gene banks [16]. So if a farmer variety is there in reality, this is the proof for the continuation of the farmers' practice and increases the argument that there is a customary right of farmers. The practice of saving, using and exchanging seeds could be thus argued to have a customary status.

A next question will be whether such a practice has been followed as a legally binding one. From the farmers' point of view, through history, it would be surprising if their reflection on the legal status of their actions was anything else than they were assuming that they had a legal right to saving, using and exchanging seeds, particularly as other sources of seed did not exist until recently. The requirement for forming a customary law is, however, whether there was a *consciousness* of these practices being followed because of being legal, or whether they were so strongly established patterns of conduct that they were treated as having a binding quality (e.g. see WIPO, 2013: 2). In a situation where farmers have followed these seed management practices as legally binding, one could argue that a customary law expressing such rights exists in national legal systems where such practice can be proven. From this perspective, the wording used in Article 9.3 of ITPGRFA – that nothing should be interpreted to limit these rights – makes good sense and confirms that existence of an understanding that there are existing customary norms. However, the question of whether and to what extent such norms exist in national laws must be answered country by country, and it would be difficult to respond to this generally and on the international level. Whether farmers have viewed their legal situation as them having a *property right* to their seeds or not is a somewhat more difficult question that goes beyond the question whether they have considered their seed management practices as being legal (see also Section 5.2.3).

In a situation where the core acts of Farmers' Rights are recognised as national customary norms, the legal status of a PVP right in relation to the rights of farmers remains a question to be explored. One manner to understand rights is that an issue could be taken to a court and the court would rule on the existence of the right, so that the right wins in conflict with either factual situations or other existing regulations. IPR established in a PVP system (and/or in the patent system) are subject to laws that have the rank of acts in national systems. So it becomes a question again for the national legal system of a country as to whether the rights that are embedded in the act or in the norm of customary status would prevail.

As mentioned before (Section 5.1.2), there are certain common principles for solving conflicts between competing laws. Unless there is a clear difference in the rank of one law compared to the other, the application of these common principles could prob-

[16] Ex situ collections in botanical gardens have been established since the 18th century; early collections stored in gene banks date back to the early decades of the 20th century (approximately 1920–1930).

ably lead to PVP laws being recognised as later established (*lex posterior*) and more specific (*lex specialis*) legal norms compared with the customary law. This is why establishing PVP law under national legislation has a potential to weaken the legal status of Farmers' Rights as customary law, unless their legal status is addressed and clarified in the PVP law.

Santilli (2006) draws attention to the fact that parallel legal systems exist in pluralistic and multi-ethnic societies, including the customary laws of local communities, e.g. regarding traditional knowledge and practices relating to genetic resources. It would thus be the role of states to accommodate these within a national legal system that accepts this plurality.

Clarifying the relations between formal and customary law is a key to avoid conflicts and impediments, particularly in the area of plant genetic resources and related traditional knowledge (GIZ, 2012; WIPO, 2013). States could, for example, recognise pre-existing customary law and define rules for its continuation in a broader legal context. Practical approaches include elements such as: extending the legal effect of rules that exist under customary law by incorporating them in formal law; defining explicit exceptions for the continuation of customary rules; recognising or granting separate rights and obligations based on clear and objective criteria; or defining procedures for clarification and consent between different legal systems (WIPO, 2013). Some existing *sui generis* PVP laws include such elements (see Chapter 6).

For a norm to be of customary status in *international law* the practice must be among states, and state organs must express that they view the practice as legally binding internationally. It is far more difficult to document that the core acts of Farmers' Rights have obtained such a status in international law. In ITPGRFA Article 9.1 it is stated that 'Contracting Parties recognise the enormous contribution' from farmers. As such, this recognition is not an expression with clear legal content. However, it might be regarded as one step to construct rights of farmers as a concept of international customary law. This can be further supported by the preamble of ITPGRFA stating that:

> *'**Affirming** that the past, present and future contributions of farmers in all regions of the world, particularly those in centres of origin and diversity, in conserving, improving and making available these resources, is the basis of Farmers' Rights;'*

This affirmation of the *past, present and future contribution* can thus be argued to be an expression of recognition of the rights of farmers. Both these two statements in ITPGRFA could be evidence of an emerging international customary law. These expressions could be seen as recognition by states that there exist rights of farmers based on customary norms, at least in national legal contexts.

Key points

- Customary law is an accepted concept of law, but remains relatively unexplored with regard to Farmers' Rights.
- There is some clear evidence that the farmers' practices of saving, using and exchanging seed have been followed continuously for a sufficiently long time to classify them as a customary rule. The question whether these practices have been followed consciously as legal is more difficult to answer in general terms, but it would be difficult to argue the converse.
- If a customary law is found to exist in a country for farmers' seed-related practices, its relation with other types of rights, like the UPOV-based PVP rights, needs to be clarified based on the national legal system of that country.
- Taking existing customary law into account and clarifying its content and scope in relation with other legal systems (e.g. PVP law) could help avoid conflicts and impediments in the future.
- In spite of the recognition of farmers' contributions to the past, present and future development of plant genetic resources and the reference to Farmers' Rights made in the ITPGRFA, this does probably not provide a firm legal basis sufficient to classify to Farmers' Rights as international customary law.

5.2.3 'Property rights' of farmers to the plant genetic resources they use

This section departs from a situation where a farmer grows a variety that is not protected by a plant breeder's right under a UPOV-based PVP law of a country. This could be a landrace or farmer variety that has developed certain specific traits that are original, or a certain combination of traits that is unique.

The point of departure is that usually the legitimate holder/owner of any biological resources has a subsequent right to any aspect of that organism, unless it follows from any other type of legislation that these rights are limited by any means of law (e.g. acts or customary laws). This means that the most probable view in any country is that the farmers have the rights to save, use, exchange and sell farm-saved seed/propagating material of genetic resources used by them. Limitations to a right to the biological material could be any laws establishing competing rights to the same biological material that limit the rights of the original owner.

The more difficult legal question arises where there is a discussion of where do the rights of the farmer end; and where the rights of another legal person start to become effective. The right to the biological material is a property right inherent to the physical samples; whereas IPRs targets another dimension of property, the immaterial one. Therefore, when exploring the relationship between Farmers' Rights as a legal concept and others, like UPOV-based PVP systems, the point of departure is that the Farmers' Right is a comprehensive right which flows subsequently from the ownership to the biological resources, in this case the grain, seed or other propagule. Any limitations to the right of the farmers must be justified. Hence, the discussion of the legal content of the Farmers' Rights is relevant in all situations where the right of a farmer meets other legal systems, e.g. the inclusion into the MLS, UPOV-based national PVP systems and seed legislation systems.

In a legal system where there were existing rights of farmers, one question could be whether narrowing these rights implies curtailing already existing rights in a manner that would trigger constitutional or human right or constitutional protection of property rights. Strategically, one could argue that Farmers' Rights are related to human rights in such a way that their protection has a similar legal status. However, as seen above (Chapter 4), it is difficult to establish a clear line of argumentation to substantiate this view. For UPOV-based PVP rights, previously existing property rights will normally not be a problem as one basic criterion for granting a plant breeder's right under the UPOV system is that of being novel. As we shall see later, the novelty criterion however might be a problem for the relationship between UPOV-based rights and Farmers' Rights. If a PVP right is granted on plant material which is also under the property right of another legal person, conflicting rights might arise.

Bavikatte (2014) argues in his book 'Stewarding the Earth' that indigenous peoples have been recognised as having a legal position with regard to their land, based on a principle of 'custodianship', that relates to their connections to the land and resources they have been taking care of. Drawing a parallel to his line of thought, one could also argue that farmers also have a stewardship-based right to the plant material they use. This concept further relates to the provision of Prior Informed Consent (PIC) as a principle of international law referred to in the CBD, where countries and groups within countries have been recognised to have the right to give or (necessarily) deny access to the genetic resources used and maintained by them.

The question is however the scope of this type of right; it will thus be necessary to explore what kind of legislation could have the potential to challenge or restrict farmers in exploiting these 'rights'. In the next Section (5.3), this will be explored for the challenges deriving from UPOV-based PVP laws. Further challenges to Farmers' Rights will be addressed in Section 5.6.

Key points

- Generally, farmers can be said to have a right to their genetic resources, including seed and planting material, unless it is challenged by other legislation.
- PVP is a set of IPRs that limits these rights to the biological material of farmers, justified by the breeding investments in the seeds.

5.3 The provisions for granting a plant breeder's right in the UPOV system and Farmers' Rights

The issue to be addressed in this section is to assess how the seven elements of Farmers' Rights (see Section 5.2) relate to each of the relevant provisions in the UPOV system. The discussions that follow aim at identifying areas of overlap or potential conflict, and should not be interpreted as precluding the relationship of the weight the norms of UPOV or Farmers' Rights respectively would be given before an international court.

The point of departure is sought in the wording of the UPOV Convention. There is limited domestic jurisprudence or case law concerning plant variety rights; questions concerning the plant breeders' rights entail a cluster of laws that are relatively seldom brought before a court. The task is thus to discuss whether and to what extent implementing UPOV 91-based PVP law in national legislation in developing countries would hinder the elements of Farmers' Rights from being realised.

5.3.1 Definition of 'variety' and 'breeder' under the 1991 Act of the UPOV Convention

Core issues for assessing the relationships between rights of farmers and breeders in UPOV-based PVP law are the definition and implicit understanding of what is a 'variety' and a 'breeder'.

The definition of a plant variety, which is legally binding for UPOV-members, is presented as follows in Article 1 (vi) of the UPOV 91 Convention:

> ***Article 1 Definitions***
> *(vi)'variety' means a plant grouping within a single botanical taxon of the lowest known rank, which grouping, irrespective of whether the conditions for the grant of a breeder's right are fully met, can be*
> - *defined by the expression of the characteristics resulting from a given genotype or combination of genotypes,*
> - *distinguished from any other plant grouping by the expression of at least one of the said characteristics and*
> - *considered as a unit with regard to its suitability for being propagated unchanged;*

According to this, a grouping of plants can be defined as a plant variety, even if it does not qualify as a *protectable* plant variety, because not all plant varieties meet all the four NDUS criteria as defined in Articles 6–9 of the UPOV 91 convention; this problem will be explored below (Sections 5.3.2 to 5.3.5). For a deeper understanding of the variety concept referred to in the UPOV system, it is useful to look at the definition provided above in more detail. Taxonomists are generally concerned with *species* rather than *varieties* as the base rank, but recognise variety as an intraspecific rank below that of *subspecies* (Judd et al., 2002: 553). It has been claimed that *plant variety* is more developed and better defined as a legal concept than as a biological one (Hellstadius, 2001: 41)[17]. A lot of attention has been paid to *plant variety* as a plant subcategory (Westerlund, 2001: 318–404; Dutfield et al., 2010: 574–575; Bently and Sherman, 2004: 393; UNCTAD/ICTSD, 2005: 389–390). Article 1(iv) of the UPOV 91 Convention develops more specific criteria according to which a 'plant variety' is 'a plant grouping within a single botanical taxon of the lowest known rank'. This botanical taxon sub-group is defined by a sin-

[17] In botanical sciences, for instance, the concept of 'cultivar' is well defined and commonly used for cultivated plants with distinctive characteristics that originate from and persist under cultivation.

gle specific common characteristic of all specimens belonging to that plant variety. Such a characteristic can be defined phenotypically by observing a visible particularity of those grains or plants. Alternatively, it can be defined at the gene level by specifying the genotypic characteristic which is at the core of that plant variety (UPOV 91 Article 1(iv)).

A plant variety will typically share a bulk of common genetic material with the organisms belonging to the same *species*. For individuals of plants to be counted as one variety they must share one or more common features. They must possess characteristics unifying or delimiting them towards the rest of individuals that are not part of the same variety. This shows a core feature of *plant variety*, a variety as an intellectual or legal size, that are counted as one grouping of organisms. The subject matter is the *variety*, not the genetic structure *per se* or single genes. The plant variety is defined at least by one characteristic in combination with the whole set of traits, which according to this alternative can be explained as the expression of a certain gene structure or a particular set of genes. This means that a plant breeders' right according to the UPOV 91 convention does not mainly establish parts of a plant as part of the main subject matter of the right. This is an important difference from the patent system, where parts of individual plants may be the subject matter for the exclusive right. From the perspective of the right of farmers to their varieties, a variety protected under UPOV-based PVP law can consist of general components that are common for many varieties in a geographical area and have one identifying feature that is different.

The definition of a breeder is given in Article 1 of the UPOV 91 Convention as follows:

> ***Article 1 Definitions***
> *(iv) 'breeder' means*
> - *the person who bred, or discovered and developed, a variety,*
> - *the person who is the employer of the aforementioned person or who has commissioned the*
> - *latter's work, where the laws of the relevant Contracting Party so provide, or*
> - *the successor in title of the first or second aforementioned person, as the case may be*

This definition is then further specified in an Explanatory Note (UPOV, 2013) in the sense that the term 'person' entails both physical and legal persons, and could thus refer to more than one person as well. However, what is required is an 'entity with rights and obligations in accordance with the legislation of the member of the Union concerned' (UPOV, 2013), so that rather informal groups of people, or communities, do not qualify as 'breeders' unless they have obtained the status of a legal person. This might raise problems in the case of traditional varieties that could be regarded as a form of collective heritage, or for farmer varieties derived from collective activities such as community breeding, to apply for PVP rights in an UPOV-based system. Santilli (2012) emphasises the *essentially collective* and not individual nature of farmers' innovations and knowledge, and Farmers' Rights. Dommen (2013) has thus highlighted the fact that countries should consider whether this rather narrow definition of a 'breeder' is appropriate for the specific situation in each country, particularly where the informal breeding sector is important for ensuring food and nutrition security.

Key points

- A plant variety is a grouping where all the individuals share 'something' in common; a feature of any kind.
- There is a relationship between farmers' varieties and a potentially protected variety, which does not exclude that a trait which is in use by farmers could be used as the defining characteristic for a protected variety (see also next section).
- The definition of a breeder in the 1991 Act of the UPOV Convention impedes plant breeders' rights from being granted for varieties that originate from collective, informal breeding systems where no 'legal person' can be identified as the potential holder of a PVP right. This type of breeding system is, however, important for many crops that ensure food and nutrition security in developing countries.

5.3.2 Novelty and concerns for Farmers' Rights

One of the exclusive four criteria for being protected as a variety is that the variety must be deemed novel. Article 6 of the UPOV 91 Convention reads:

> ***Article Novelty***
>
> 1. *[**Criteria**] The variety shall be deemed to be new if, at the date of filing of the application for a breeder's right, propagating or harvested material of the variety has not been sold or otherwise disposed of to others, by or with the consent of the breeder, for purposes of exploitation of the variety*
>
> i. *in the territory of the Contracting Party in which the application has been filed earlier than one year before that date and*
>
> ii. *in a territory other than that of the Contracting Party in which the application has been filed earlier than four years or, in the case of trees or of vines, earlier than six years before the said date.*
>
> 2. *[**Varieties of recent creation**] Where a Contracting Party applies this Convention to a plant genus or species to which it did not previously apply this Convention or an earlier Act, it may consider a variety of recent creation existing at the date of such extension of protection to satisfy the condition of novelty defined in paragraph (1) even where the sale or disposal to others described in that paragraph took place earlier than the time limits defined in that paragraph.*
>
> 3. *[**'Territory' in certain cases**] For the purposes of paragraph (1), all the Contracting Parties which are member States of one and the same intergovernmental organization may act jointly, where the regulations of that organization so require, to assimilate acts done on the territories of the States members of that organization to acts done on their own territories and, should they do so, shall notify the Secretary-General accordingly.*

The wording defining the novelty criterion is complex and comprehensive. Often 'novelty' is perceived in daily language as completely new or non-existing before a certain point in time. The definition of what is regarded as a novel variety, however, does not mean 'novel' in an absolute sense. It rather refers to commercial novelty. The term in the wording reads: 'propagating or harvested material of the variety has not been sold or otherwise disposed of to others'. The essence here is the term 'variety'. This means that if the variety *as such* has not been commercially sold before the application, then it qualifies as being novel.

This raises questions from the perspective of the rights of farmers. Farmers can have used, but not commercialised as such, a variety which includes characteristics that are later used by a plant breeder as the defining characteristic of a new protected plant variety. This means that the manner in which 'novelty' is defined does not prevent a well-known and used farmers' variety from becoming appropriated through a later formalisation where its main characteristic is the defining property of a newly registered variety.

This notion of commercial novelty is further developed by the time-limits for prior use in different territories. The UPOV 91 convention does not guarantee that a plant with a certain characteristic that was developed by farmers in one country cannot become appropriated under the system of another country by someone else. For developing countries the manner in which this novelty criterion is formulated and practised might become an area of conflict between Farmers' Rights and UPOV-based plant breeders' rights. The same view has been expressed by The Berne Declaration:

'Further the definition of 'novelty' in UPOV 1991 is narrow. If a variety 'has not been sold or otherwise disposed of to others, by or with the consent of the breeder, for purposes of exploitation of the variety' (Article 6 in UPOV, 1991) it is considered to be 'new'. This suggests varieties in farmer fields may not destroy novelty. This facilitates misappropriation of farmer varieties.' (The Berne Declaration, 2014: 10)

To further draw one more parallel to the ITPGRFA: the commercial approach to defining novelty also means that finding and cultivating an accession with a certain characteristic from the MLS could happen to be regarded as a novel plant variety accordingly. Thus, by making farmers' varieties available through the MLS, the UPOV system might end up in establishing an exclusive right to such a plant with a certain characteristic.

In another Explanatory Note (UPOV, 2013), the concept of who is entitled to be granted a PVP is explored in more detail:

> *9. With regard to 'discovered and developed', a discovery might be the initial step in the process of breeding a new variety. However, the term 'discovered and developed' means that a mere discovery, or find, would not entitle the person to obtain a breeder's right. Development of plant material into a variety is necessary for a breeder to be entitled to obtain a breeder's right. A person would not be entitled to protection of an existing variety that was discovered and propagated unchanged by that person.*

Accordingly, the 'mere discovery' of a new variety *alone* does not qualify for someone to achieve a right as a breeder; but the one who discovers a certain characteristic in an existing (not protected) variety and who breeds that characteristic into a variety where it then becomes a defining characteristic can be granted a plant breeder's right, that then limits the farmers' previously existing rights over their variety.

Key points

- A variety with a certain characteristic that has not been sold or marketed as such with this defining characteristic could become recognised as meeting the novelty criterion under UPOV 91.
- This means that well known and used farmers' varieties can be developed into a protected variety, at least if some (not very clearly defined) breeding activity has been involved.
- In the longer run, this exposes the farmers to limitations regarding their previous rights (e.g. to save, use, exchange and sell seed of that variety).

5.3.3 Distinctness and concerns for Farmers' Rights

The 'distinctness' criterion is foremost to avoid that more than one registered plant variety captures the same essential characteristic. Thus, the main aim is to avoid that more than one breeder is granted a right to the same subject matter; this is indicated in the second sentence of Article 7 of the UPOV 91 Convention:

> ***Article 7 Distinctness***
> *The variety shall be deemed to be distinct if it is clearly distinguishable from any other variety whose existence is a matter of common knowledge at the time of the filing of the application. In particular, the filling of an application for the granting of a breeder's right or for the entering of another variety in an official register of varieties, in any country, shall be deemed to render that other variety a matter of common knowledge from the date of the application, provided that the application leads to the granting of a breeder's right or to the entering of the said other variety in the official register of varieties, as the case may be.*

The aim is thus to assess whether the new variety is distinct from previously registered and/or protected varieties. The assessment does not ascertain that there is no other overlapping right to existing (non-registered) farmer varieties, which would of course be much more complex. However, in many countries

there is no system in place that would allow for official registration of farmer varieties[18].

Thus, the distinctness criterion required under UPOV-based PVP law, similar to the novelty criterion, will not prevent characteristics of farmer varieties from becoming the defining characteristic for a newly registered variety. This means that a newly protected variety can be close or similar to a variety that is grown by farmers, but has not been protected or registered. Here one interesting link to the scope of protection can be made: When making yet a new plant variety, where a protected one is used, Article 14 of the UPOV Convention requires that the new variety is further distinct than just being 'essentially derived' from the previously existing protected variety. The same does however not apply to non-protected farmer varieties. It thus appears 'easier' from a legal point of view to use non-protected farmers' varieties for breeding a new protected variety than basing the breeding process on an already existing protected variety. A farmer or a breeder could easily get into legal trouble if using a protected variety for further breeding, whereas farmers' own varieties are less protected from appropriation by breeders.

The distinctness criterion, as it does not give equal consideration to varieties that exist in the informal system (non-protected and non-registered varieties) and already protected varieties, has a potential to limit Farmers' Rights, particularly in view of protection of traditional knowledge, benefit sharing and future use. It has an implicit tendency to prioritise the rights of plant breeders over Farmers' Rights.

Key points

- In cases where there is no system that allows for registration of the existing farmers' varieties, the assessment of distinctness cannot be done in a complete and comprehensive manner, as the diversity and characteristics of farmer varieties in use will be largely unknown.
- The distinctness criterion is not sufficient to prevent new protected plant varieties being similar to previously non-protected and non-registered farmer varieties.
- There is a discrepancy between the degree of distinctness required between a farmer variety and a variety that qualifies as distinct in the UPOV system, if compared with the requirement for the use of a previously protected variety by a farmer/breeder to escape the 'essentially derived variety' requirement.

5.3.4 Uniformity and concerns for Farmers' Rights

The 'uniformity' criterion targets that the plant variety shall be of a kind that the relevant properties that define the variety shall be present in all the specimens of the variety, so that a breeder's' right granted does not automatically apply to various plant types present in a 'variety'. The criterion is spelled out like this:

> ***Article 8 Uniformity***
> *The variety shall be deemed to be uniform if, subject to the variation that may be expected from the particular features of its propagation, it is sufficiently uniform in its relevant characteristics.*

The 'uniformity' criterion in particular has been criticised in view of agricultural biodiversity and the situation in developing countries, because less uniform plant populations may contribute to food security by improving adaptation, e.g. to climate variability and change, but also to other biotic and abiotic stress (as outlined in Chapter 3). Farmers' varieties, particularly certain landraces, could not be sufficiently uniform to qualify for being protected. A strictly applied uniformity criterion could thus be a problem for farmers who seek to protect a local variety under the plant protection legislation of that country; however, it could also be a problem for plant breeders who develop varieties that are better

[18] Note that informal registers or inventories of traditional varieties have been suggested as a means to fill this gap; how-ever, such inventories are a means of documentation rather than having a clear legal status.

adapted to highly variable and stress-prone environments, where food insecurity prevails.

A PVP system that strictly applies the uniformity criterion could thus tend to be biased towards more favourable agricultural conditions and high-input systems, and inhibit, rather than promote, breeding progress targeting less favourable, stress-prone and low-input conditions, with important implications for food and nutrition security and resilience of farming systems. Moreover, this is related to human rights as well, because scientific breeding progress should reach all farmers equally, not only those working under favourable production conditions (see Chapter 4).

Key points

- A strictly applied uniformity criterion could prevent farmers from protecting local varieties that are less uniform under national PVP law.
- A strictly applied uniformity criterion could become a challenge to developing (protected) varieties targeting stress-prone environments and low-input farming systems, thus hindering rather than promoting breeding progress for such conditions.

5.3.5 Stability and concerns for Farmers' Rights

The 'stability' criterion is presented in the UPOV Convention in the following manner:

> ***Article 9 Stability***
> *The variety shall be deemed to be stable if its relevant characteristics remain unchanged after repeated propagation or, in the case of a particular cycle of propagation, at the end of each such cycle.*

This criterion is not generally difficult for most varieties, including farmer varieties, to be met. One would in generally not talk of a 'variety' if a population is unstable and changing its properties from year to year. Depending on the farmers' seed management, genetic materials they use can be stable or not, but applying for variety protection under PVP law would not make much sense for unstable populations, e.g. early in a breeding process. Traditional landraces, however, would in most cases meet this criterion, as do varieties developed by plant breeders.

Key points

- The stability criterion is not found to be problematic with regard to Farmers' Rights.
- Farmers' varieties could only be protected under UPOV-based PVP law if stable, analogous to varieties developed by plant breeders.

5.3.6 Exhaustive list of criteria and concerns for Farmers' Rights

UPOV establishes its own criteria as the only legal ones in the granting and assessment of the validity of the plant variety right (Article 5.2 of the UPOV Convention). In respect to Farmers' Rights in developing countries, making these four criteria mandatory for the protection of a new plant variety closes the door for establishing an additional criterion that the applicant must document the legal provenance of the plant genetic resources used to reach the plant variety for which they apply for an exclusive right. This means that in a case where a plant breeder has accessed farmers' varieties in that (or another) developing country in a manner that is against the laws protecting these or against the private rights of the farmers to their seeds in the field and on farm, the UPOV 91-based system for granting plant breeders' rights does not ensure that the material used in breeding a variety was legally obtained, and does not establish legal certainty in this regard. Hence, the process of applying for a plant breeder's right in UPOV 91-based PVP law does not provide for designating one or several checkpoints as is required by

Article 17 of the Nagoya Protocol [19] under the CBD (CBD Secretariat, 2011). If a PVP act cannot be used as an effective checkpoint, the UPOV-based domestic legislation can hinder the functional implementation of the CBD and the Nagoya Protocol.

However, it is legal and possible to choose a model such as that which Norway implemented in the Act relating to Plant Breeder's Right, particularly Section 4(3) of the Act relating to Plant Breeder's Right (Government of Norway, 1993; Tvedt, 2008). Identical wording is used for the Patent Act, and both are enforceable through the General Civil Penal Code (Government of Norway, 1902; 1967). The required disclosures under the Patent Act involve several different but complementary types of information:

- the countries from which the inventor received or collected the biological material;
- if prior informed consent is required in the provider country, information about the existence of such consent shall be included;
- the country of origin, if different from the provider country; if information concerning the country of origin is not known, this shall be stated;
- if prior informed consent is required in the country of origin, information about the existence of such consent shall be included; and
- if access to the biological materials has been provided in pursuance of Articles 12.2 and 12.3 of ITPGRFA, a copy of the standard material transfer agreement shall be enclosed with the patent application.

Common for these requirements in the Plant Breeders' Rights Act and the similar wording in the Patent Act is that the reactions for infringement follow the rules in the General Civil Penal Code concerning false statement. In the case of a *false statement*, such as falsely stating that relevant information was not available, the applicant can be penalised by sanctions under Section 166 of the General Civil Penal Code (in cases of non-compliance with the Act relating to the Plant Breeder's Right). It is relatively difficult to apply penal sanctions because the judgement has to fulfil the evidentiary standards of in *dubio pro reo*, that means infringers shall be presumed to be innocent until they are proved, or have pleaded, guilty. The prosecutor must establish whether the information is in fact wrong and/or deliberately misstated, and provide sufficient evidence thereto, *beyond any reasonable doubt*. The penalty for giving false statements about the origin or the provider or regarding prior informed consent is fines or imprisonment for a maximum of two years. Fines are paid to the Norwegian government. There is no procedure to ensure that benefits must be shared with the provider or the country of origin, nor any rule whereby the guilty party is liable to pay compensation. There is thus a discrepancy between the objective of benefit sharing and the procedures to be applied when the law is broken. This might lessen the effectiveness of the requirement.

One additional and significant reason why the disclosure requirements are unlikely to contribute effectively to benefit sharing is the lack of specific and automatic legal consequences of non-compliance. The consequence of not meeting the disclosure obligation 'is without prejudice to the processing of patent applications or the validity of rights arising from granted patents', according to Section 4(3) of the Act relating to the Plant Breeder's Right.

[19] The 'Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization (ABS) to the Convention on Biological Diversity' is a supplementary agreement to the Convention on Biological Diversity that aims to provide a transparent legal framework for the implementation of one of the three objectives of the CBD: the fair and equitable sharing of benefits arising out of the utilization of genetic resources. It was adopted in 2010 in Nagoya, Japan, and entered into force on 12 October 2014.

Key points

- The UPOV 91-based system does not foresee that any other criteria than the four established NDUS criteria are required for granting a plant breeder's right.
- Therefore, this system cannot be used to control whether the plant genetic material was legally obtained by a breeder, and the UPOV 91-based right cannot be regarded as an effective manner to establish legal certainty in this regard.
- The exhaustive list of criteria could become an obstacle for the effective implementation of the CBD and its Nagoya Protocol.

5.4 The scope of a plant breeders' right and Farmers' Rights

The scope of the right granted to a plant breeder is important as it potentially limits the rights farmers had previously when using non-protected varieties (see Section 5.2.2). In order to get a clearer picture of how UPOV 91-based PVP law can limit Farmers' Rights, the scope of plant breeders' rights is presented first (Section 5.4.1), followed by a section on the exceptions to these rights (Section 5.4.2).

5.4.1 The scope of plant breeders' rights

Raising the question of the scope of the PVP right requires a situation where the farmer at some point in time has got hold of a protected variety. If farmers have no contact with the formal seed system and protected varieties, then discussing this relationship is less relevant. In order for this question to be relevant, a farmer thus needs to have had access to seed of a protected variety and used it for sowing, so that the protected variety finds its way into the farmers' production system. Farmers can source seed of protected varieties from both formal and informal sectors; if farmers save, use, exchange or sell seed of their own harvest obtained based on protected varieties, protected plant varieties become integrated into the farmer-managed breeding and seed sector.

The degree of adoption of protected varieties, and the farmers' possibilities to reproduce them on farm, will determine the relevance of this issue. Moreover, when the PVP system expands it can be anticipated that the formal sector will grow over time and it might be more difficult for farmers to stay outside the formal system, should they wish so. The scope of the plant breeders' rights will thus increase in importance if more farmers use protected varieties.

The scope of the breeder's right is defined as follows in Article 14 of the UPOV Convention:

> ***Article 14 Scope of the Breeder's Right***
> *Article 14(a)*
>
> *(1) [**Acts in respect of the propagating material**]*
> *(a) Subject to Articles 15 and 16, the following acts in respect of the propagating material of the protected variety shall require the authorization of the breeder:*
> *i. production or reproduction (multiplication),*
> *ii. conditioning for the purpose of propagation,*
> *iii. offering for sale,*
> *iv. selling or other marketing,*
> *v. exporting,*
> *vi. importing,*
> *vii. stocking for any of the purposes mentioned in (i) to (vi), above.*

If a farmer exerts any of the seed-related actions identified as elements of Farmers' Rights in the ITPGRFA (see Section 5.2), such as saving, using, exchanging or selling farm-saved seed or propagating material, the right of the owner of the PVP right is infringed. This means that once a variety used by a farmer is protected by a PVP right, then almost any relevant action relating to seed falls under the right of the owner of the protected plant variety. So if propagating material of a protected variety is found on a farm and used for any of these actions, then it is a violation of PVP legislation, unless the farmer can prove that it was legally acquired. There is no requirement in the UPOV system that the farmer needs to be conscious about breaching the legislation to be prosecuted.

Hence, a PVP right covers (under (vii) above) stocking of a protected variety for any of the purposes mentioned in the list. This corresponds in Farmers' Rights to the right to save seeds. If the farmer saves seeds, this would possibly be with the purpose either of production or reproduction as mentioned under (i), which may need conditioning (ii). Offering for sale (iii), selling and other marketing (iv), or export (v) would all be activities of farmers that would require the authorisation of the breeder. With the exception of export, these are activities that farmers in many developing countries commonly do with seed of their own harvest. Unless the PVP system establishes exceptions for the right to save seeds, then this kind of activity will become illegal. The exceptions will be discussed in Section 5.4.2.

The subject matter for the plant breeder's right is the 'protected variety' as it is described in the application. Therefore, there is a link between the discussion in Section 5.3 above (what could qualify as protectable subject matter) and the scope of the protection provided for by the plant breeder's right. There could be cases where material used by farmers is quite similar to a protected variety, as outlined in Section 5.3. For example, traditional varieties might be similar to a protected variety, or there may be effects of mixtures and unwanted gene flow (as outlined in Chapter 3). In other areas of IPR the question of infringement is a question of assessing similarities between the claimed subject matter and the process or product applied by the accused infringer. For PVP this becomes a question of whether the characteristics that define the plant variety are present in the propagating material used by farmers. The propagating material must be sufficiently similar to that plant variety for the PVP right to be infringed. This is why cases of legal uncertainty can arise where populations or varieties used by farmers cannot be distinguished clearly enough from protected varieties.

The breeder as the right holder can impose different conditions and limitations to his authorisation of the use of the protected plant variety, as outlined in Article 14 (b) of the UPOV Convention:

> ***Article 14 (b) The breeder may make his authorization subject to conditions and limitations.*** *(2) [**Acts in respect of the harvested material**] Subject to Articles 15 and 16, the acts referred to in items (i) to (vii) of paragraph (1)(a) in respect of harvested material, including entire plants and parts of plants, obtained through the unauthorized use of propagating material of the protected variety shall require the authorization of the breeder, unless the breeder has had reasonable opportunity to exercise his right in relation to the said propagating material.*
>
> *(3) [**Acts in respect of certain products**] Each Contracting Party may provide that, subject to Articles 15 and 16, the acts referred to in items (i) to (vii) of paragraph (1)(a) in respect of products made directly from harvested material of the protected variety falling within the provisions of paragraph (2) through the unauthorized use of the said harvested material shall require the authorization of the breeder, unless the breeder has had reasonable opportunity to exercise his right in relation to the said harvested material*

This means that the right of the breeder extends to harvested material, including material that has been harvested from the farmers' fields, under certain conditions. Here the holder of the PVP right is given discretion to extend his right to plants and parts of plants if the propagating material was used without authorisation. Article 14.1(b)(3) extends this right further to cover products directly made from the harvest. These rights allocated to the PVP holder establish broad and comprehensive rights to authorise or deny the use of propagating material, however recognising the exceptions and exhaustion of the rights according to Articles 15 and 16.

In an explanatory note on conditions and limitations concerning the scope of plant breeders' rights (UPOV, 2010b), there is a list of examples of conditions and limitations that might be relevant to impose on the user of a protected plant variety. These examples illustrate that the holder of the PVP rights is allocated a strict right to control all aspects

of the use of the variety for the period the right is in effect.

> Article 14 ***(b)*** The breeder may make his authorization subject to conditions and limitations.
> *(4) [**Possible additional acts**] Each Contracting Party may provide that, subject to Articles 15 and 16, acts other than those referred to in items (i) to (vii) of paragraph (1)(a) shall also require the authorization of the breeder.*

Article14(b)(4) even extends the discretion of the contracting parties to provide for a more extensive right, whereas there is no general discretion in Article 14 of the UPOV Convention for taking measures that go to the opposite direction. Thus, member countries are allowed to extend the scope of protection, but not to set limits to it (as far as they go beyond the exceptions described in Section 5.4.2). Interestingly, other treaties could bind countries to extend the scope of the rights beyond what is the minimum requirement in the UPOV 91 Convention. A practical example would be bilateral trade agreements that bind a developing country to apply a more comprehensive scope of protection than required in the UPOV Convention.

One important aspect to consider with regard to the scope of the PVP right is its exhaustion. Article 16 of the UPOV Convention sets a comprehensive rule for the time *after* the right holder has been remunerated and has had the possibility to exercise his right to the protected variety (see next page).

An important observation here is that exhaustion of the right is made territorial. A right becomes exhausted only in the territory where the right holder had the chance to use his right; it is however possible to continue enforcing the plant breeder's right if the formerly protected material is brought to another country where it could be further propagated.

Furthermore, the breeder's right does not exhaust in cases where further propagation is involved, even in the same country where the right exhausted. That means that farmers who wish to further propagate and use a formerly protected variety after exhaustion of the right would still need the authorisation of the breeder. The protected variety does thus not regain the status of a non-protected variety after exhaustion of the PVP right.

> ***Article 16 Exhaustion of the Breeder's Right***
> *1. [**Exhaustion of right**] The breeder's right shall not extend to acts concerning any material of the protected variety, or of a variety covered by the provisions of Article 14(5), which has been sold or otherwise marketed by the breeder or with his consent in the territory of the Contracting Party concerned, or any material derived from the said material, unless such acts*
> *i. involve further propagation of the variety in question or*
> *ii. involve an export of material of the variety, which enables the propagation of the variety, into a country which does not protect varieties of the plant genus or species to which the variety belongs, except where the exported material is for final consumption purposes.*
>
> *2. [**Meaning of 'material'**] For the purposes of paragraph (1), 'material' means, in relation to a variety,*
> *i. propagating material of any kind,*
> *ii. harvested material, including entire plants and parts of plants, and*
> *iii. any product made directly from the harvested material.*
>
> *3. [**'Territory' in certain cases**] For the purposes of paragraph (1), all the Contracting Parties which are member States of one and the same intergovernmental organization may act jointly, where the regulations of that organization so require, to assimilate acts done on the territories of the States members of that organization to acts done on their own territories and, should they do so, shall notify the Secretary-General accordingly.*

Key points

- The scope of the plant breeder's right in UPOV 91-based PVP law is broadly defined, especially since harvested seed of the protected variety is covered by the right, e.g. in farmers' fields and on farm.
- The scope of protection is an obstacle to all the four elements of Farmers' Rights that concern farmers' practices relating to seed and its use, as spelled out in Article 9.3 of ITPGRFA in the cases where the farmers uses protected varieties.
- The broad main rule for protection gives a comprehensive and strong legal status for the breeder or owner of the plant variety, in spite of possible exceptions.
- Even after the exhaustion of the right, the breeder still has some possibilities to decide on the future use of the formerly protected variety.

5.4.2 Exceptions from plant breeders' rights

The UPOV system is regarded as more flexible, containing more discretion for exceptions than is the case for the patent system (see also Dutfield, 2011: 4:5). This means that countries are assumed to have broader flexibility in their implementation of their domestic plant breeders' right system than when applying the patent system to inventions in the plant sector (UPOV, 2002). To what extent the possibilities for exceptions are used by developing countries in a manner conducive to the realisation of Farmers' Rights depends on the PVP laws of each country.

Generally, it can be observed that in legal systems often a broad main rule is followed by more specialised rules and even exclusions or exceptions from the main rule. Establishing a broad main rule has the potential effect that it will maintain its broad and comprehensive extension, whereas the exclusions and exceptions may tend to be specific and more narrowly defined. In terms of the TRIPS Agreement, de Carvalho (2005: 306) even argues normatively that an exception *should be* interpreted narrowly because it is an exception; he states that '[t]he word 'exception' means that the derogation is small and necessarily limited'. De Carvalho's general statement that exceptions should be interpreted narrowly is generally not a valid argument in international legal methodology according to the principles set out in Articles 31 to 34 of the Vienna Convention on Law of the Treaties (United Nations, 1969). His line of argument is however interesting as illustrative of the risk that exceptions in international law run for being interpreted and applied narrowly. If a core characteristic of the UPOV system is that it holds more flexibility than the patent system, then it is relevant for this study to better understand the options available and how they relate to the realisation of Farmers Rights.

Article 15 of the UPOV Convention establishes the legal basis for the exceptions from plant variety rights. Certain exceptions are *compulsory*, meaning that all members to UPOV must implement them into their domestic PVP legislation. The 'farmers' privilege' referred to in previous versions of the UPOV Convention, and that could be regarded as a recognition of certain elements of Farmers' Rights, is made an *optional* exception in the 1991 Act of the Convention.

We will first look into the compulsory exceptions that refer to the use of protected varieties in plant breeding. The plant breeder's right is strongly limited here to allow for the breeding of new varieties, even based on existing protected varieties. This compulsory exception works as statutory limitation to the scope of the breeder's right, as outlined in Article 15 of the UPOV 91 Act of the Convention:

> ***Article 15 Exceptions to the Breeder's Right***
> *1. [**Compulsory exceptions**] The breeder's right shall not extend to*
> *[...]*
>
> *iii. acts done for the purpose of breeding other varieties, and, except where the provisions of Article 14(5) apply, acts referred to in Article 14(1) to (4) in respect of such other varieties.*

The wording starts out with a broad definition excepting all acts done for the purpose of breeding other varieties. Hence a pure reading of the wording could indicate that there is a broad exception for plant breeding, which could also be applied by farmers when using a protected variety for their own breeding activities. However, the wording itself refers to a narrowing of the exception set out in Article 14.5:

> ***Article 14***
> *5. **[Essentially derived and certain other varieties]** (a) The provisions of paragraphs (1) to (4) shall also apply in relation to*
> *a.*
> *i. varieties which are essentially derived from the protected variety, where the protected variety is not itself an essentially derived variety,*
> *ii. varieties which are not clearly distinguishable in accordance with Article 7 from the protected variety and*
> *iii. (varieties whose production requires the repeated use of the protected variety.*
>
> *b. For the purposes of subparagraph (a)(i), a variety shall be deemed to be essentially derived from another variety ('the initial variety') when*
> *i. it is predominantly derived from the initial variety, or from a variety that is itself predominantly derived from the initial variety, while retaining the expression of the essential characteristics that result from the genotype or combination of genotypes of the initial variety,*
> *ii. (it is clearly distinguishable from the initial variety and*
> *iii. except for the differences which result from the act of derivation, it conforms to the initial variety in the expression of the essential characteristics that result from the genotype or combination of genotypes of the initial variety.*
>
> *c. Essentially derived varieties may be obtained for example by the selection of a natural or induced mutant, or of a somaclonal variant, the selection of a variant individual from plants of the initial variety, backcrossing, or transformation by genetic engineering.*

One core issue when determining the scope of the right is thus the degree of similarity between the initial (protected) variety and the variety that is derived from it. The concept of 'essentially derived varieties' has been developed in an Explanatory Note (UPOV, 2009a). The meaning of the term 'derived' is explained as: 'Essentially derived varieties are obtained, either directly or indirectly, from a variety which is called the 'initial variety'' (UPOV, 2009a: 5). That the essentially derived variety could be obtained indirectly from an initial variety implies that the characteristics could be obtained from another source, e.g. including from gene flow. It is further explained that to be 'essentially derived', a variety must retain expression of essential characteristics of the protected variety; it must be clearly distinguishable from the protected variety; and, it must be conform to the protected variety in essential characteristics (UPOV, 2009a: 4). One practical example here is if an existing variety is changed by introducing one gene to make it, for example, herbicide resistant, the clause on 'essentially derived varieties' leads the new genetically modified previously protected variety to be too dependent on the previously protected variety to be a new variety. That means as long as 'essential characteristics' of the initial variety are present, the variety will be considered essentially derived, even if it is distinct in some other characteristics.

However, the information provided in the UPOV Convention itself or the Explanatory Notes does not give much more guidance. One observation is that the issue of 'essentially derived variety' is becoming an important one in the enforcement of PVP. Whereas the Explanatory Note suggests that similarity in the 'defining character' is at the core of the assessment, there are also a court cases from the Netherlands suggesting that a broader assessment of all characteristics must be conducted (Overdjik, 2013).

Hence, if a protected variety finds its way into the farmer-managed breeding and seed system, where it may be altered through farmers' seed management activities, it would be important to assess whether the 'essential' characteristics of the protected variety are still present. If so, the plant breeder's right would still be enforceable. This could occur when a protected variety is used for example in community breeding, e.g. with the aim to adapt it to local climatic or growing conditions.

A new variety could be assessed as novel and qualify as a new protected variety even if it is essentially derived from another protected one (UPOV 2009a: 4). In this case, however, the protected variety can only be used commercially with the authorisation by the right holder. This indicates that the UPOV 91-based PVP grants a strong legal position to the breeder.

It can thus be concluded that for the realisation of Farmers' Rights, the issue of essentially derived varieties may cause some degree of legal uncertainty as to when a farmer or community is allowed to freely save, use, exchange or sell seed of harvested material or not, because breeding, seed multiplication, storage, processing, selling and exchanging seed are closely interrelated activities in the farmer-managed breeding and seed system (see Chapter 3, Sections 3.2 and 3.3).

Compared with patent law, the exception for breeding new varieties in the UPOV system is far better adapted to the reality of plant breeding than the scope of the exclusive rights allocated generally under the patent law. Thus, this exception is an important one for the breeding industry as breeding can continue even on a protected variety, though in some cases its commercialisation could be subject to the authorisation by the PVP holder of the initial variety. For on-farm breeding and collective informal breeding systems, it is more difficult to see how the exception could serve the needs of the farmers and how legal certainty could be achieved, once already protected varieties are being used.

A further important type exception refers to acts other than breeding, e.g. other forms of use that would normally be within the scope of the plant breeder's right (as outlined in Section 5.4.1). These are further specified in Article 15 of the 1991 Act of the UPOV Convention:

> ***Article 15 Exceptions to the Breeder's Right***
> 1. *[**Compulsory exceptions**] The breeder's right shall not extend to*
>   i. *acts done privately and for non-commercial purposes,*
>   ii. *acts done for experimental purposes and*
>   iii. *[...]*
>
> 2. *[**Optional exception**] Notwithstanding Article 14, each Contracting Party may, within reasonable limits and subject to the safeguarding of the legitimate interests of the breeder, restrict the breeder's right in relation to any variety in order to permit farmers to use for propagating purposes, on their own holdings, the product of the harvest which they have obtained by planting, on their own holdings, the protected variety or a variety covered by Article 14(5)(a)(i) or (ii).*

The first compulsory exception concerns 'acts done privately and for non-commercial purposes'. The wording here could suggest that there is a certain level of discretion for developing countries, e.g. with regard to small-scale or merely subsistence-oriented farmers. However, the views expressed in the respective Explanatory Note rather indicate a narrow understanding (UPOV, 2009b). Here, examples are given on what would *not* be covered by the exception:

'The wording of Article 15(1)(i) indicates that acts which are *both* of a private nature *and* for non-commercial purposes are covered by the exception. Thus, non-private acts, even where for non-commercial purposes, may be outside the scope of the exception.' (UPOV, 2009b: 5)

The notion of the conjunction 'and' could mean either the one or the other or both together. Nor-

mally it would be expected to mean both together. If there are two criteria of law, both must be met for the law to apply. In a given context, it can however not be excluded that in a contextual interpretation of a given wording that 'and' could be interpreted as either one of the two. The Explanatory Notes goes on specifying that:

'Thus, a farmer saving his own seed of a variety on his own holding might be considered to be engaged in a private act, but could be considered not to be covered by the exception if the said saving of seed is for commercial purposes.'

When moving on to discuss acts that might fall under the exception, the first example is an 'amateur gardener', before moving on to the example that could be important for realising Farmers' Rights:

'Equally, for example, the propagation of a variety by a farmer exclusively for the production of a food crop to be consumed entirely by that farmer and the dependents of the farmer living on that holding, may be considered to fall within the meaning of acts done privately and for non-commercial purposes. Therefore, activities, including for example 'subsistence farming', where these constitute acts done privately and for non-commercial purposes, may be considered to be excluded from the scope of the breeder's right, and farmers who conduct these kinds of activities freely benefit from the availability of protected new varieties.' (UPOV, 2009b: 5)

From a Farmers' Right perspective this exception for a farmer is very narrow, as it would not allow for any selling of the surplus of the harvest. Also any form of exchange of the harvested product for the use on other farms would probably be covered by this narrow interpretation of the discretion. This shows the relevance of the Explanatory Notes. If a country implemented an exception that would go beyond what is recognised in the these explanations, probably that country would be regarded as infringing its obligations under the 1991 Act of the UPOV Convention, since it is stated in the preamble that the content of the Explanatory Notes is merely reformulating the legally binding obligations following already from the Convention.

The additional discretion for optional exceptions is specified in Article 15 (2) of the 1991 Act of the UPOV Convention. It opens up possibilities for a limited exception to 'permit farmers to use for propagating purposes, on their own holdings, the product of the harvest which they have obtained by planting, on their own holdings'. The double reference to 'on their own holdings' limits the reuse of the harvest as seeds must both be harvested on the farm and be reused on the same holding. Despite the wording of the Convention itself being detailed here, the same also applies for the Explanatory Note; it is more detailed here than for other topics, dealing with the issue on four pages (UPOV, 2009b: 8–11). The essence is a very well defined and specific discretion allocated to the members to implement such an optional exception. This holds a potential to limit local exchange of seeds, which is important in informal seed systems in developing countries.

In the European Union, for example, some limited rights to small-scale farmers are secured in the form of such an optional exception; the derogation rule from the Community Plant Variety Rights Act (European Council, 1994) provided for in Article 14 (3) of this act sets a system for small-scale farmers to reuse seed of certain species without paying royalties to the holders of the PVP right. The exception applies to nine fodder plants, nine cereals, potatoes, as well as three oil and fibre plants. In the case of fodder plants, for example, where the area grown with these plants exceeds the area which would be required to produce 92 tons of cereals per harvest, then the farmers would be required to pay royalties even if reusing seed of their own harvest[20].

For a developing country to implement this optional exception the Explanatory Note will probably be of core interest. Here, the normative effect of the Explanatory Note can be expected to be considerable

[20] This area is defined separately for different crops; e.g. for potatoes it is different.

in narrowing the scope of the discretion. De Jonge (2014: 106) is very critical concerning the effects for Farmers' Rights from the narrow scope of farmers' privilege as embedded in the 1991 Act of the UPOV Convention. The manner in which the exception is formulated results in many challenges for applying it to developing countries where the number of small-scale and subsistence farmers is high. The limited exceptions linking the core elements of Farmers' Rights to the very private and non-commercial use could thus become a legal tool *preventing* economic development for these already marginalised groups.

Thus, based on a deeper look at these exceptions to the plant breeder's right, once a farmer starts buying seed of protected varieties, or once such seeds otherwise make it into their use, then a number of questions arise that concern the relationship between the UPOV-based right and the Farmers' Rights to save, use, exchange and sell seed.

Key points

- The UPOV system for granting PVP provides for better adapted exceptions for further use of protected varieties in breeding compared with patent law.
- It is not equally easy to predict how this exception will benefit on-farm breeding or participatory plant breeding.
- The use of protected varieties by farmers, however, results in legal uncertainty, as breeding and seed production and use are not clearly separated in farmer-managed (informal) breeding systems; it may not be easy in some cases to clarify whether populations or 'varieties' used by farmers are considered to be 'essentially derived' from a protected variety.
- There are also some legal uncertainties regarding the exact definition of 'essentially derived varieties', as seen in the court cases from the Netherlands.
- The exemptions relating to farmers' use of seed harvested on their own farm are very narrowly defined ('private and non-commercial use'). Seed exchange between farmers, which is an important element of farmer-managed seed systems, does not fall under the exception if it is narrowly applied.
- In Europe, the broad main rule for PVP is paired with a limited exception for small-scale farmers. In developing countries, the realisation of Farmers' Rights through optional exceptions maybe challenged if countries are not fully aware of the options available for implementing such exceptions, or if there is political pressure to implement narrower exceptions than urgently needed.

5.5 Supra-national implementation of UPOV-based PVP law at regional level in developing countries

A tendency can be observed in regional law that challenges the traditional separation between international law and domestic law. Countries in a region establish a common executive power granting rights that would automatically be legally binding under their domestic law. Such a system can be called *supra-national*. This means that powers that traditionally belonged under the sovereignty of individual countries are now carried out outside the national state. Sovereignty is usually separated into legislative, executive and judicial powers. A supra-national system could therefore happen in any or all these powers.

The European Union is an example of a supra-national legislator when implementing an EU Regulation with direct effect in all its member countries. The European Patent Organization with its European Patent Office is an example of a supra-national executive power, as patents are granted with (more or less) direct effect in the member countries. Furthermore, the European Union established a regional PVP office vested with elements of supra-national authority.[21]

[21] www.cpvo.europa.eu/main/en/home/about-the-cpvo/contact-and-location.

Similar processes are underway in Africa. The African Intellectual Property Organization (OAPI), uniting West African member states, has joined UPOV, and the African Regional Intellectual Property Organization (ARIPO), with members mainly from East and South Africa, is on its way to establish a regional PVP office (Haugen, 2014c; unpublished work). 'Supra-national' means here the authority to assign IPR that are directly valid in the member states and binding for legal persons under their jurisdiction. As a consequence, a new level of jurisdiction and public authority is thus established above the nation-state in those contexts.

The granting of a PVP right is normally an act of executive and administrative authority in each country where the right is granted. It is thus an act exercising the sovereignty of that country. When certain acts are moved to a supra-national authority, parts of the sovereignty of the country are transferred. This is why most constitutions include formal provisions for transferring parts of the sovereignty to a supra-national level [22].

ARIPO is the African Regional Intellectual Property Organization, based in Zimbabwe. ARIPO has proposed to get a mandate granting plant variety protection rights for all members of the system in common. Several authors have described the process and how it has resulted in a lack of transparency for the member countries (The Berne Declaration, 2014: 13–14; Haugen, 2014c). The participation by farmers' representatives and other stakeholders has been very limited, which indicates a breach or limitation of the rights of farmers to participate in decision-making as outlined in Article 9.2 of ITPGRFA. Haugen (2014c) is clear in his recommendation of ARIPO not becoming member of UPOV and calls for more work on how to adapt possible alternative *sui generis* systems of PVP to the conditions of sub-Saharan Africa (Haugen, 2014c). Also de Jonge is very critical of the implementation of the draft ARIPO, based on an analysis of the impact it will have on the realisation of Farmers' Rights (de Jonge, 2014: 103). Although some analysis has been done (Haugen 2014b; 2014c; de Jonge, 2014), the decision-making process in the ARIPO member countries does appear to be difficult to halt. The larger effect of regionalisation of PVP systems, paves the way for increasing global standardisation at a global 'supra-national' level.

Key points

- Supra-national administrative plant protection authorities limit national discretion.
- The existing system in OAPI and the forth-coming system in ARIPO are examples of regionalisation of PVP by removing national discretion, and establishing strict systems at the regional level outside the democratic control of nation states.
- Supra-national administrative authorities show that the right of farmers to contribute in decision-making to be limited.

5.6 Other challenges to Farmers' Rights

5.6.1 Limitations to the rights of farmers by the Multilateral System (MLS)

Plant genetic resources collected from farmers' fields have been (and continue to be) assembled in collections. By such activities, the rights of farmers are potentially altered. When such an act of transfer happens, this is not free of legal consequences.

Louafi and Bhatti (2013) suggest, that 'countries – particularly developing countries – take the legal and administrative steps to identify the materials in their countries that are part of the multilateral system.' The mandatory scope for the inclusion of PGRFA in the MLS does not extend into material that is present in nature or in private holding (Tvedt, 2015a). For example, ITPGRFA does not oblige countries to mandatorily include private collections of plant genetic resources in the MLS. The same also applies

[22] See also Chapter 4 regarding the consequences of such acts for human rights obligations of countries.

to plant genetic resources held by farmers. However, when seed samples are collected from farmers' fields to be included into collections of gene banks, and these gene banks in turn grant access to their collections on the terms of the Standard Material Transfer Agreement (SMTA), then the farmers' plant genetic resources become part of the MLS. ITPGRFA Article 12.3.h establishes specific rules for the relationship to the in situ context:

> *(h) Without prejudice to the other provisions under this Article, the Contracting Parties agree that access to plant genetic resources for food and agriculture found in in situ conditions will be provided according to national legisla-tion or, in the absence of such legislation, in accordance with such standards as may be set by the Governing Body.*

The wording here clearly refers this matter of collection to the regular Access and Benefit Sharing (ABS) rules of the country or under standards adopted by the Governing Body of ITPGRFA. Countries are in the process of implementing ABS rules, and the Governing Body has also not yet dealt with this question. This means that the ABS situation for this collecting activity is unclear in many countries. Since the MLS is based on a principle that what is included into the system is no longer the property of the initial holder, the system allows for the use of farmers' varieties in breeding without any direct benefits being shared with the farmers (Tvedt, 2015b). Thus, the property rights of the farmers cease to exist for material made available from farmers to the MLS.

This process reintroduces an imbalance that was sought to be adjusted by the recognition of the sovereign right to genetic resources, as embedded in the CBD. In fact, since the Nagoya Protocol is to only apply to situations where access to the genetic resources happens *after* the entry into force in the two countries between which the exchange takes place, these incidents of collection are of a kind that will still concern new and potentially unknown genetic material. Therefore, there are strong reasons for claiming that no such collections from farmers' fields, landraces or wild relatives should happen without strict legal governance, and preferably based on a Material Transfer Agreement (MTA) or Mutually Agreed Terms (MAT) between the actual provider of the genetic resources and the authorities of the providing country. Otherwise farmer's seeds will be provided freely with only very lax legal regulation, but a protected plant variety is not available on the same terms and conditions.

Hence, whenever plant genetic resources collected from farmers are included into the MLS, the legal position of the first owner in effect ceases to be enforceable. For a plant variety protected by a PVP right, however, the right is not exhausted by including it as an accession into the MLS; here, the breeders' exemption and not the availability in the MLS determines the legal use in further breeding. Including plant genetic resources into a collection, however, aims not only at conserving the genetic diversity, but also at making it available for further breeding. There is a global recognition of the need to increase the number of accessions in the MLS, including new material. On the one hand, such inclusion could be argued to increase the global good of available plant breeding material. On the other hand, the legal systems that exist in the MLS and PVP legislation are able to establish new rights to plant genetic resources previously held by farmers, even in the case of samples collected from the farmers' fields. Whereas for every accession going *out* of a collection the legal status is clarified by a private law contract (the SMTA), the same is not the case when a sample *enters* the collection. Thus, the consequence of leaving the situation of law-free collection renders the farmers' legal situation to be open to appropriation (Medaglia et al., 2013).

This situation challenges Farmers' Rights in several respects. In the case that farmers' varieties are included into the MLS, there is a potential to curtail their rights to participate in decision-making on questions relevant for utilisation of this material. The remote link from the individual farmer to the benefits sharing mechanisms in the MLS also reduces the opportunity for the farmers to benefit from the utilisation of their genetic resources. All

these issues could be dealt within PIC and MAT as well as in national ABS legislation. Thus, the tools of CBD and its Nagoya Protocol could be used in a strategic manner to promote the realisation of Farmers' Rights.

Moreover, not all countries where plant genetic resources from the MLS are used are parties to ITPGRFA, including the United States of America, China, Russia, Argentina, Chile, South Africa, Colombia, Mexico, Bolivia and New Zealand. This raises the question of whether 'free riders' should have the same access to the MLS as entities from countries that contributed to the establishment of the common pool by becoming members of ITPGRFA. There are no regulations in the MLS that treat users from non-member states differently from those from member countries (Halewood, 2013).

Granting companies from non-member states access on the same terms as member countries tends to create a misbalance in the system as these countries do not share their plant genetic resources with the global community. Furthermore, the enforcement mechanisms under the MLS vis a vis a private company based in a member country are stronger than the enforcement on a company where its government has not acceded to the MLS. This line of argument should not be understood as negative towards the MLS, but it intends to show how delicate the questions of rights of farmers can become from the perspective of the global system, where UPOV-based PVP plays an important role.

Key points

- If plant genetic resources are collected from farmers' fields and included in collections held by gene banks that make their accessions available in the MLS, the legal status of these plant genetic resources is altered.
- Including farmers' varieties into the MLS has a potential to curtail the element of Farmers' Rights to participate in decision-making on questions relevant for the utilisation of their plant genetic resources.
- The benefit-sharing element of Farmers' Rights might be constrained by such actions.

5.6.2 Challenges to the rights of farmers by seed laws

Different countries have implemented different types of seed legislation. The core of this tool of law is that a public authorisation is required for making seeds commercially (and sometimes otherwise) available to other farmers. Such seed legislation can imply that *only* certified seed is allowed to be distributed to other farmers, and in this case the Farmers' Rights, particularly to exchange and sell seed, are heavily restricted for any type of seed, irrespective of whether or not it is seed of a protected variety.

Besides technical quality, seed certification generally requires that the variety needs to be 'registered'. Depending on the seed laws of each country, this may need additional testing based on criteria that are partly similar to the UPOV criteria for granting a plant breeder's right (DUS criteria). If this is the case, many landraces and farmer varieties may not meet these criteria and distributing the seed to other farmers becomes illegal. Moreover, variety registration is often based on the so-called 'Value for Cultivation and Use' (VCU), which is assessed in official trials. The value a variety may have for small-scale farmers or particular user groups in developing countries may, however, be insufficiently captured in such trials.

As seed exchange between farmers is often an integral part of the management of local gene pools, limiting exchange and access to seed leads to degeneration and subsequently to loss of these varieties. Many useful varieties that are important under certain conditions could be affected.

The probable effects of seed legislation in developing countries are an issue that goes beyond the scope of this study, but needs to be taken into consideration for future studies because of its potentially large effect on Farmers' Rights, food and nutrition security, organic seeds and agricultural biodiversity.

Key points

- Restrictive seed legislation can impede the cultivation of useful varieties if they do not meet the criteria for approval.
- Seed legislation can limit Farmers' Rights, particularly with regard to exchanging and selling seed, even of non-protected varieties.
- The potentially large effects of seed legislation in developing countries on Farmers' Rights, food and nutrition security, organic seeds and agricultural biodiversity are an issue that needs to be further explored.

5.7 Concluding remarks: UPOV 91-based PVP law and Farmers' Rights

In the previous sections, the legal situation and the core elements of Farmers' Rights were identified. Departing from a situation where farmers grow non-protected varieties, it becomes clear how PVP rights along with some other challenges have a large potential to limit the rights of farmers.

One important point is that UPOV 91-based PVP law does not adequately address the critical junctions between the formal and informal breeding and seed systems in a way that facilitates the implementation of all aspects of Farmers' Rights. Where seed moves from the farmers' collective breeding and seed system into the formal system and vice versa, changes occur in legal status. Addressing these points of contact was found to be an important requirement for PVP laws that take the situation in developing countries into account, where the farmer-managed breeding and seed sector continues to be important (see Section 3.2).

The scope of the plant breeder's right limits the Farmers' Rights with regard to those elements that concern the management and use of seed from the farmers' own harvest. Possible exceptions are rather narrowly defined, and allow exclusively for re-using seed of the farmers' own harvest in their own land under certain conditions. However, the scope of exceptions would need to be expanded also to actions such as sharing, exchanging and selling seed of a farmer's own harvest at a certain defined scale to better comply with Farmers' Rights. The existing room for exceptions should be used by UPOV members to create space specifically for small-scale and poor farmers to improve access to varieties protected under PVP law.

Furthermore, if farmers themselves would like to have varieties protected in order to address potential imbalance between the rights of breeders and farmers arising from the UPOV system, there could be obstacles, at least for some variety types that are less uniform than most commercial varieties. Many farmer varieties and landraces would not meet the uniformity criterion, if strictly applied. The same could, however, also apply for certain formally bred variety types that target stress-prone environments or the needs of certain user groups. Hence, the uniformity criterion is a challenge to biodiversity conservation and for improving food security under certain conditions.

The UPOV system in its present form does not provide much space for the implementation of Article 6 of ITPGRFA on sustainable use of plant genetic resources, and particularly the measures suggested under Article 6.2(b-g). These include, for example, promoting the use of locally adapted crops, varieties and under-utilised species; developing varieties particularly adapted to particular social, economic and ecological conditions, including in marginal areas; and maximising intra- and inter-specific variation for the benefit of farmers, especially those who generate and use their own varieties and apply ecological principles in maintaining soil fertility and in combating diseases, weeds and pests.

Besides the aforementioned elements of UPOV-based PVP law, several other challenges to the implementation of Farmers' Rights were identified, namely the change of status if seed and planting material moves from farmers' fields to the MLS, and

restrictive seed legislation that requires formal registration of varieties based on VCU and DUS criteria for legal seed commercialisation.

Since the TRIPS agreement requires that WTO Member States put national PVP laws in place, either by a UPOV-based system or a sui generis system, states should particularly consider how the aforementioned critical junctions can be addressed in their legislation. A further challenge for developing countries, and particularly LDCs, are the institutions required to allow a national PVP system to function. It cannot be a priority for LDCs to dedicate budgetary funds to building the necessary institutions and capacities, unless there are proven benefits, including for their small-scale farming sector.

In bilateral trade agreements, typically between the USA, the European Union and Japan on one side and a developing country on the other, becoming a member of UPOV is often set as a condition for having access to markets. This is a means to expand UPOV membership beyond those countries that find it in their own interest to become a member.

Supra-national processes for implementing UPOV-based PVP law require carefully designed processes to allow states to fulfil their commitments made by joining ITPGRFA (and human rights treaties). These commitments include adequate processes of consultation with farmers and other stakeholders, and their participation in decision-making. The UPOV system as such, by requiring approval of the national PVP law before granting membership, is not supportive of democratic processes and meaningful stakeholder consultation in the process of developing national PVP legislation.

The common supposition that UPOV-based PVP laws would not affect the farmer-managed breeding and seed systems can as such not be confirmed. Restrictions on farmers' practices to save, use, exchange and sell seed, including of protected varieties, weaken the informal seed system, particularly as breeding and seed multiplication activities cannot be firmly separated in these systems. The scope of the breeder's right, and particularly also the issue of 'essentially derived varieties', create elements of legal uncertainty. Rather than restricting exchange between the formal and informal systems, one could regard these systems as being highly complementary and interdependent. For example, the farmers' collective breeding system continuously provides highly diverse base populations with new and interesting trait combinations, including adaptive traits, for future breeding activities. The farmers are thus not only 'clients' of the formal breeding and seed system; they could rather be regarded as potential partners and in some cases even right holders to breeding material entering into breeding programmes. In that case, however, legislative frameworks that define the rights and obligations of partners on a more equitable basis than foreseen in the UPOV system would appear to be more appropriate.

To summarise, it is difficult to see how an UPOV 91-based PVP system could be considered to advance the realisation of the Farmers' Rights as they are enshrined in ITPGRFA, especially for small-scale farmers. Rather, it results in *restricting* these rights in several ways. If countries took the multiple commitments made under the different treaties into account, and tried to address them in an integrated manner, other options would probably appear as more promising than adopting the UPOV system. Such alternative options exist in the form of sui generis PVP laws designed according to the specific situation of the farming sector in each country or region, and to better integrate the commitments made under other treaties (see also Chapter 6).

However, the Farmers' Rights do not have a legal basis that is firm enough to actually *prevent* a country from joining UPOV; the legal basis for Farmers' Rights exposes them to be implemented in a weaker manner than PVP rights. Hence, it is also a question of how to use and expand the space for more consistent policies within UPOV itself to allow developing countries to design policies that take the specific situation, needs and rights of farmers into account, along with other commitments they may have, such as human rights obligations.

Key points

- UPOV 91-based PVP laws were found to not advance the realisation of Farmers' Rights; rather they are effective in the opposite direction.
- The main critical issues identified with regard to Farmers' Rights are the novelty criterion, the distinctness criterion, the absence of a disclosure of origin requirement, and the restrictions on farmers' practices relating to seed as far as protected varieties are concerned. The scope for the exceptions in the 1991 Act of the UPOV Convention are too limited to properly address the situation of small-scale farmers in developing countries.
- The uniformity criterion is not directly hindering the implementation of Farmers' Rights as stated in Article 9 of the Plant Treaty, but could be an obstacle for achieving breeding progress targeted at certain stress-prone environments and user groups. Moreover, it limits the space for activities relating to the sustainable use of plant genetic resources, particularly breeding activities that are based on more diverse varieties (e.g. measures suggested in Article 6 of ITPGRFA).
- Further challenges to the implementation of Farmers' Rights arise both from rules for accessing genetic resources under the MLS, and from restrictive seed legislation.
- The supra-national implementation of UPOV-based PVP law limits the space for countries to integrate commitments they have made in other treaties, particularly with regard to consultation and participation of farmers and other stakeholders. However, consistent policies would require that the commitments made under different treaties were addressed in a more integrated manner, which is currently not supported by the UPOV system.

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6 Looking at alternatives. Elements of *sui generis* approaches to Plant Variety Protection

The TRIPS agreement requires WTO members (in Article 27.3(b)) to provide protection for plant varieties 'either by patents or by an effective *sui generis* system or by any combination thereof'. Hence, it expressly grants members significant discretion to choose the manner in which they will protect plant varieties and allows for this discretion to be exercised differently by different states (see Helfer, 2004). The diversity of legal approaches that are possible allows countries to balance PVP rights against other societal goals or commitments made under other treaties, such as the CBD and its Nagoya Protocol, ITPGRFA and ICESR. It thus provides a space for governments to harmonise conflicting norms and policies, or to address them in an integrated way, as is called for also by Haugen (2014a).

We found in the previous chapters that this space is narrowed down considerably if a government decides to join UPOV under the 1991 Act of the Con-

vention. A number of difficulties could arise for the realisation of Farmers' Rights, and also in relation to human rights. These difficulties stem from the process of implementation, e.g. the possibilities of governments to design consultation processes and allow for effective participation of farmers and stakeholders in decision-making, and from the requirements of the 1991 Act of the UPOV Convention itself. Some developing countries might, therefore, look for alternatives that allow them to use the policy space more effectively to harmonise different goals, rights and obligations.

Other alternative *sui generis* approaches have been developed by several countries so far, including India, Malaysia and Thailand. Similarly, Zimbabwe's, Zambia's and Uganda's PVP Acts also deviate in some elements from the UPOV Convention and would possibly not comply with it[23]. Since these countries have not been faced with any complaints of non-compliance under the dispute settlement provisions of the TRIPS agreement to date, a pragmatic way to identifying elements of a TRIPS-compatible *sui generis* system could be to look at these already existing alternatives. Ethiopia has also followed this line, while not being a party to the TRIPS agreement; its agricultural sector has some other particularities as well, that are different from the conditions of other countries in the East African region (Husmann, 2015).

Some of the aforementioned countries have provisions that are similar to the UPOV system but include some additional requirements and exemptions, e.g. relating to eligibility of a variety, disclosure of origin, access and benefit sharing, prior informed consent (PIC), and elements of Farmers' Rights that relate to the use of seed of protected varieties by the farmers (Robinson, 2007). Others deviate more clearly from the UPOV system.

The Thai PVP law could serve as an example here. The Thai PVP Act divides plant varieties into two main categories: (1) new plant varieties, and (2) extant varieties, which refer to local domestic plants, general domestic plants, and wild plant varieties. Hence, the Thai PVP law allows for the protection of 'local domestic varieties' and a few further defined variety types, that cover basically all types of plant varieties that are found within Thailand, and also provide farmers with the right to save and use seed from their own harvest. The conditions for protection include an additional requirement regarding disclosure of origin and legal provenance. Moreover, breeders are to accept a profit-sharing agreement where a general domestic plant or a wild plant variety or any part thereof has been used in the breeding of a new variety for a commercial purpose (Lertdhamtewe, 2014).

Also for the Indian PVP system, there is a distinction made between new and extant varieties. Extant varieties do not need to meet the novelty criterion, but have to meet the DUS criteria. These seem, however, to be applied in such a way that they do not limit variety registration. Extant varieties constitute the vast majority (around 85 per cent) of all varieties registered with the national authority in India (Koonan, 2014). Furthermore; the Indian PVP law includes various elements of Farmers' Rights. Farmers can register varieties with a simplified procedure as regards data requirements; they have rights to save, use, exchange and sell seed of protected varieties, unless they sell 'branded' seed of a protected variety; farmers are entitled to get an award if genetic resources conserved or improved by them are used in new varieties; farmers can claim compensation from a breeder if a purchased variety fails to perform; and lastly, they are immune to legal infringement if innocent. Furthermore, the government can deny registration for certain genera or species, or if commercial exploitation of a variety bears risks, e.g. to human health or the environment. The Indian PVP law further includes disclosure of origin and benefit sharing requirements (Koonan, 2014).

The Ethiopian PVP law refers explicitly to Farmers' Rights (Government of Ethiopia, 2006). In its Article 27, it takes up the statement from Article 9.1 of

[23] PVP laws of many countries are archived by WIPO at www.wipo.int/wipolex/en/.

ITPGRFA on the 'enormous contributions farmers have made and will continue to make in the conservation and sustainable use of plant genetic resources that constitute the basis of breeding for food and agricultural production'. Based on this principle, the rights farmers have are specified (in Article 28.1(a–c)) regarding to save, use, exchange and sell farm-saved seed or propagating material of farmers' varieties and protected varieties, and to use protected varieties to develop farmer varieties. The only limitation made is that 'farmers may not sell farm-saved seed or propagating material of a protected variety in the seed industry as certified seed' (Article 28.2). Zimbabwe's Plant Breeders Rights Act (Government of Zimbabwe, 2001) addresses the problem of essentially derived varieties, originating from varieties protected by a plant breeder's right, that may be used by small-scale farmers, and creates an exemption for this situation (Article 12.2(c)).

Besides these examples of PVP laws that are already implemented in practice, elements of *sui generis* PVP laws or entire 'model laws' have been proposed by academics and/or civil society organisations. The points of departure for model laws are usually the different obligations of states under the relevant international treaties, such as TRIPS, CBD, ITPGRFA and UNDRIP. The African model law includes detailed provisions on access to genetic resources and PIC, and also addresses rights of indigenous and local communities in a comprehensive way. It further makes 'well defined multi-lines' eligible for variety protection. Similar to the Indian and Thai PVP laws, there are possibilities for the government to restrict plant breeder's rights if risks are identified with regard to food security or health (OAU, 2000). The African model law has not been adopted as such by any country, but governments could consider adopting elements from this model law while developing national PVP laws. Uganda's PVP law, for example, adopts elements of the African model law, as do the national PVP laws of Ethiopia and Zambia.

De Jonge (2014) takes a different starting point by identifying and addressing the main objections made by African civil society organisations with regard to UPOV-based PVP law. These concerns include 'biopiracy', insufficient protection of Farmers' Rights and inappropriateness of eligibility criteria for PVP. He presents possible solutions for all three concerns, based on existing alternative *sui generis* laws or model laws. As a protection criterion for more heterogeneous varieties he brings in the 'identifiability' of a variety, as it is also used in the Malaysian PVP law: Here, a variety has to be 'new, distinct and identifiable' (Article 14 of Malaysian PVP Law). A plant variety is considered identifiable if (1) 'it can be distinguished from any other plant grouping by the expression of one characteristic and that characteristic is identifiable within individual plants or within and across a group of plants'; and (2) 'such characteristics can be identified by any person skilled in the relevant art' (de Jonge, 2014). This criterion would be met by nearly all landraces and farmer varieties, as well as new varieties that show variability for certain (adaptive) traits.

Furthermore, a differentiated approach including various levels of protection and categories of farmers has been proposed by a group of researchers of Wageningen University, The Netherlands. Here, full protection is given for varieties of certain (e.g. high value) crops and Farmers' Rights are restricted, in a similar way as in UPOV-based PVP law. For other crops, farmers have the right to use seed produced on their own holding; small-scale farmers, defined by income, can freely use, exchange and sell seed of all varieties among themselves (de Jonge, 2013).

This approach is interesting also in its relation to the ISSD concept recommended by Louwaars, de Boef and Edeme (2013). They state that the so-called linear model of seed sector development, departing from farmer-managed (informal) breeding and seed systems towards highly regulated and specialised commercial systems has resulted in meagre success, for example in Africa, and make a case for taking more pluralistic approaches. Seed sectors in developing countries do not suffer from too much competition, so that measures should be taken to *exclude* certain 'players' from the seed market. Rather the opposite needs to apply—there is a high need to *facili-*

tate adapted breeding and seed marketing done by diverse actors, to *increase* farmers' options to access seed of new varieties, and to *develop* contextualised knowledge and skills (Bentley *et al.,* 2011). From this point of view, a general exemption for small-scale farmers points in the right direction. Farmers should be encouraged to experiment with new varieties from the formal sector, while also keeping all other options at their disposal which they find of value.

Key points

- Alternative *sui generis* PVP laws that comply with the TRIPS requirements exist already in practice.
- Additionally, 'model laws' and/or elements of these have been proposed by academics and civil society organisations that start from the requirements of different treaties and address concerns that exist in relation to UPOV 91-based PVP laws.
- Breeding and seed sectors in developing countries do not suffer from too much competition, so that it could appear useful that actors are *excluded*; rather the farmers' use of a range of different varieties and options should be *facilitated* by allowing for more pluralistic approaches to developing breeding and seed systems and initiatives taken by diverse actors.

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7 Final conclusions and resulting recommendations

In this final chapter, important results and conclusions are summarised and recommendations presented that are based on the findings of this study. These recommendations are structured in five sections: harmonising goals and obligations of different treaties (7.1); UPOV-based PVP laws and the progressive realisation of human rights (7.2); UPOV-based PVP laws and Farmers' Rights (7.3); UPOV-based PVP laws and agricultural conditions in developing countries (7.4); and research priorities and needs (7.5).

7.1 Harmonising the goals and obligations from different treaties while implementing PVP law

Goals and obligations from different international treaties, such as TRIPS, ITPGRFA and ICESCR, need to be harmonised if a country sets out to develop a national PVP law. The TRIPS agreement as such leaves sufficient discretion to governments to design PVP laws in such a way that the obligations of other treaties are addressed.

The provisions of the 1991 Act of the UPOV Convention, along with the required process of revision (see Section 5.1.1), limit this level of discretion to a large extent, and also much more than the 1978 Act of the same Convention. Therefore, the possibilities for developing countries to implement Farmers' Rights in their national PVP laws are very restricted once they become members of UPOV under the 1991 Act of the UPOV Convention (see also Section 7.3). The same applies to their possibilities to take measures suggested in Article 6 of ITPGRFA with regard to the sustainable use of plant genetic resources. ITPGRFA, however, calls for its members to develop or maintain appropriate policy and legal measures that promote the sustainable use of plant genetic resources for food and agriculture (Article 6.1). Therefore, 'upgrading' from the 1978 to the 1991 Act of the UPOV Convention could hinder the complete implementation of ITPGRFA.

Moreover, the process of application and revision currently practised by UPOV makes it difficult for parties of ICESCR and ITPGRFA to fulfil their obligations with regard to the participation of farmers and other rights holders in decision-making. This problem extends to all member states of the United Nations to comply with the UNDRIP, as far as rights of indigenous peoples are concerned. Signatory states of ILO Convention No. 169 have a further legally binding obligation to allow indigenous and tribal peoples to participate in decision-making on matters that concern them.

ICESCR requires its state parties to take a human rights-based approach to matters that concern these rights. This includes a non-discriminatory process of identifying stakeholders, and processes that are as such based on HRPs, including transparency and accountability. Participation not only of some selected stakeholders, but also particularly of those rights holders whose human rights may be concerned, is a key element of these approaches. Guidelines and tools for human rights-based approaches to establishing national PVP laws were proposed by the United Nations Development Programme (UNDP) (UNDP 2008; 2012). Furthermore, UNDRIP defines a human rights-based process known as Free Prior Informed Consent (FPIC) as standard procedure for matters that concern the rights of indigenous peoples. ITPGRFA requires participation in decision-making, which is more than just some form of consultation.

The above mentioned approaches go far beyond the level of participation that is currently found in processes relating to UPOV membership of developing countries. The legal requirements for such processes would need to be further clarified. If PVP laws are established at a supra-national level, and competencies transferred to inter-governmental organisations, clear mechanisms have to be established that ensure that human rights obligations are fulfilled. This would include effective control and review mechanisms if practice develops in a direction that is not supported by member states or does not comply with their human rights obligations.

Recommendation 1: If developing countries have not yet joined UPOV under either the 1978 or the 1991 Acts of the UPOV Convention, they should consider opting for an alternative sui generis system of PVP that allows for more flexibility to meet the obligations of different treaties.

Recommendation 2: If developing countries joined UPOV under the 1978 Act of the UPOV Convention, they should rather consider staying with it and not 'upgrade' to the 1991 Act of the Convention, in order to maintain the policy space they may need to fully implement ITPGRFA.

Recommendation 3: Developing countries, prior to establishing national PVP laws, should clarify the legal requirements for a process involving rights holders and other stakeholders, e.g. farmers, indigenous peoples and civil society organisations, and implement the process of developing their national PVP law accordingly.

Recommendation 4: The German government as a state party to the ICESCR could provide assistance to developing countries in designing human rights-based processes to establishing national PVP laws that also take the requirements of other treaties, such as ITPGRFA, into account.

7.2 UPOV-based PVP law and the progressive realisation of human rights

The development of national PVP laws, setting new conditions for farmers' access to seed, is a matter that concerns the human right to food and the right of everyone to benefit from scientific progress and its applications. Both human rights are closely related and interdependent, as breeding progress can improve availability and access to food, and its nutritional quality. Furthermore, PVP laws concern the rights of indigenous peoples as declared by UNDRIP and laid down in ILO Convention No. 169.

If new varieties of plants are made available to the farmers in a country, benefits and costs can be distributed unequally, which can have consequences for the right to food. The right to benefit from scientific progress and its application requires that these inequalities are addressed and progressively removed. States are to put priority on the rights of marginalised and disadvantaged groups. They are to avoid any retrograde measures, also if other groups within the society (e.g. private investors) may benefit from those measures.

Whether benefits of new plant varieties outweigh possible increases in production costs depends on how well new varieties made available after the implementation of a new PVP law are adapted to the conditions and needs of small-scale farmers under the various agro-ecological and socio-economic conditions that exist in a country. This question cannot be answered in general and needs detailed case studies to be conducted for each country.

The right to adequate food and the right to benefit from scientific progress and its applications do not prescribe any particular policy measures states should or should not take. It is left to the discretion of governments to design and adopt policies that support the progressive realisation of human rights in a way that appears adequate, also in view of other policy objectives they may follow. Hence, adopting UPOV-based PVP laws is one option available to developing countries if this is in their interest and if their human rights obligations are fulfilled. The human rights dimension needs to be carefully assessed prior to taking any decisions on a particular approach to PVP.

This is why opting for UPOV 91-based PVP law *without* a careful assessment of the effects of such policy measures on the human rights in the country could be regarded as non-compliant with the human rights obligations of these countries, if they are state parties to ICESCR. Trade agreements or donor initiatives that promote a particular PVP regime without taking into account the human rights situation in the developing countries that are addressed by such initiatives appear highly problematic in this regard, also in view of the human rights obligations of any donors or partners in the agreement.

To date, private sector breeding initiatives in developing countries have mostly been limited to some 'cash crops' (e.g. flowers, cotton), major food crops (e.g. maize), and vegetable crops. Some of these crops provide benefits to small-scale farmers, particularly where agricultural production conditions are favourable and markets can be accessed, e.g. for selling vegetables. However, these crops are less relevant to those farmers who work in low-input farming systems under marginal conditions. Breeding progress for such conditions can be achieved through decentralised breeding approaches that are targeted specifically to the conditions and constraints faced by different user groups. This type of approach is usually not taken by commercial breeding compa-

nies, as they depend on marketing varieties at larger scales, and to clients who are able to pay on a regular basis the higher price of seed from the formal sector. This is normally the case in commercial, high-input farming systems.

In order to promote breeding progress for marginal conditions, for particular user groups and in neglected and underutilised crops that may be important for national food and nutrition security, other complementary initiatives are required, that are based on public funding. Not only do the rights of vulnerable groups depend on such complementary initiatives, but also food and nutrition security of all societal groups, now as well as for future generations. Commercial breeding companies cannot be expected to take care of all crops and varieties that are important for human nutrition and health, or resilience of farming systems under changing conditions, e.g. climate change.

Formal breeding programmes of the public sector are one possibility to address breeding needs that may be identified in crops of importance for national food and nutrition security, or for particular groups of users; however, implementing formal breeding programmes for many different crops and conditions may not be the most cost-efficient approach, where different forms of cooperation between scientists, civil society organisations and farmers or communities are also possible.

UPOV 91-based PVP law tends to sideline local and collective initiatives, in spite of their potentially positive contributions to food and nutrition security, by applying a narrow definition of 'breeder' and by using eligibility criteria for PVP (e.g. 'uniformity') that make it difficult for more diverse 'varieties' to comply with them. However, such diversified 'varieties' may be better adapted to particular needs and constraints than highly uniform ones. Hence, UPOV-based PVP law, which is intended to facilitate private breeding initiatives, tends to reward breeding for more favourable conditions and industrial farming systems, rather than breeding for marginal production conditions. It further creates a level of legal uncertainty for farmer-led or community-based breeding initiatives, and leaves their products open for (mis)appropriation.

In UPOV 91-based PVP laws, the scope of protection of plant breeders' rights is extended in such a way that farmers are not allowed to exchange and sell seed of protected varieties, even on a limited scale. An important pathway for poor people to access seed of these varieties is thereby rendered illegal. In order to compensate for this change, based on their human rights obligations to guarantee access to science and its applications to all people without discrimination, governments of developing countries could take measures to balance the restrictions on Farmers' Rights if they adopt an UPOV 91-based PVP law. Such measure could include subsidies or voucher systems to provide poor farmers with access to seed of protected varieties at reduced cost. By doing so, 'lost benefits' of private companies are shifted from the private to the public sector of the developing country, where they occur as additional budgetary commitments in the longer term.

Whether it should be a priority of developing countries to improve the conditions for private companies to increase their profits at the expense of (public) budgetary funds would need to be discussed, also in view of the human rights obligations these countries have. Hence, adopting UPOV 91-based PVP law would need to be weighed against other available options, such as *sui generis* PVP laws that allows for the farmers' customary practices to continue to some extent that could be defined, or for certain groups of farmers.

Furthermore, the 1991 Act of the UPOV Convention does not allow members to exclude certain genera or species from PVP. In countries where indigenous peoples are identified, this provokes problems if consent cannot be reached for species that are used by the indigenous peoples. The 1978 Act of the UPOV Convention as well as alternative *sui generis* approaches allow states more discretion in this regard.

Recommendation 5: Governments of developing countries should try to clarify the objectives of a national PVP law, also in view of their human rights obligations, and carefully consider how different PVP laws could help to address these objectives in an inclusive, human rights-based process[24].

Recommendation 6: Crops and varieties that are important for national food and nutrition security, including resilience of farming systems, need to be identified and appropriate national strategies for their conservation and sustainable use should be developed with participation of farmers and local communities. If necessary, constraints to their sustainable use should be addressed in publicly funded breeding initiatives[25].

Recommendation 7: From a human rights perspective, breeding progress needs to reach the vulnerable groups in practice. In order to achieve this, governments of developing countries should consider how they can facilitate breeding initiatives targeting vulnerable groups and specific environmental conditions, also as part of a national strategy for the sustainable use of plant genetic resources (see Recommendation 6), and provide public funding for these initiatives.

Recommendation 8: Governments of developing countries should consider how access to seed of protected varieties can be ensured for resource-poor farmers, if PVP laws are established that restrict traditional pathways of seed procurement that are important for vulnerable groups of farmers. Such measures that ensure access to seed of protected varieties could form part of a national strategy for reducing hunger and poverty[26].

Recommendation 9: In order to assess whether scientific progress reaches all people equally, and how this relates to the right to food, governments of developing countries should consider assessing their policies relating to PVP for their human rights impact, and take corrective measures if necessary[27].

Recommendation 10: Prior to adopting any new PVP laws, governments of developing countries should assess whether indigenous peoples exist in the country whose rights are to be protected. In this case, a consultation process based on FPIC should be implemented *prior* to adopting any PVP law that concerns the rights of the indigenous peoples.

Recommendation 11: The German government, as a state party to ICESCR and United Nations member state, could consider actively supporting the governments of developing countries in harmonising PVP laws with their human rights obligations under ICESCR and UNDRIP, and obligations of states that have adopted the ILO Indigenous and Tribal Peoples Convention (ILO Convention No. 169).

7.3 UPOV-based PVP law and Farmers' Rights

The legal analysis of the Farmers' Rights recognised by ITPGRFA resulted in the identification of seven elements of Farmers' Rights (see Section 5.2.1). These elements include a right to protection of relevant traditional knowledge, a right to equitably participate in sharing benefits, a right to participate in deci-

[24] See Voluntary Guidelines: Guideline 3.2 (FAO, 2005).

[25] See Voluntary Guidelines: Guideline 8.12 (FAO, 2005).

[26] See Voluntary Guidelines: Guideline 2.2 and 2.4 (FAO, 2005).

[27] See Voluntary Guidelines: Guidelines 17.2-17.4 (FAO, 2005).

sion-making, and rights to save, use, exchange and sell farm-saved seeds or propagating materials.

The 1991 Act of the UPOV Convention does not *promote* any of the identified elements of Farmers' Rights. Rather, these rights become *restricted* once a country adopts UPOV 91-based PVP law in its national legislation, as was discussed in detail in Sections 5.3. and 5.4. However, ITPGRFA leaves it to the discretion of state parties to take measures that protect and promote Farmers' Rights 'as appropriate' under national legislation, and in harmony with other existing treaty obligations of the members.

Therefore, state parties to ITPGRFA have an obligation to address the issue of Farmers' Rights, to take measures to protect and promote these rights, and in this context to define what should be regarded as an 'appropriate' level of protection of Farmers' Rights in the country. ITPGRFA further refers to policies and legal measures. Maintaining or developing policies that support the sustainable use of plant genetic resources, and reviewing existing policies are options mentioned. This could also include clarifying the legal status of customary norms within the legal system of a country.

National PVP laws are important to Farmers' Rights as they define under what conditions a variety can be protected and what makes it eligible. Here, a national PVP law can set different priorities regarding the protection of new varieties, or also include protection of extant varieties, e.g. landraces or farmer varieties. It can set the same or different procedures and criteria for applications that relate to different types of varieties. It can also define who could apply for a PVP right. By becoming a member of UPOV, a developing country undertakes legally binding obligations limiting these flexibilities.

Another important issue that can be addressed in a PVP law is the scope of the protection, which sets some sort of balance between the rights of the holder of the PVP right, and the rights of others, e.g. other plant breeders or farmers. This balance can be set differently, so that rights of holders of PVP rights can be very strong compared with the rights of farmers who use the variety, or *vice versa*. It could make the rights of holders of a PVP law strong compared to the rights of others who wish to use this variety for further breeding, or *vice versa*. A PVP law could also strive for balancing the rights of different actors as equitably as possible.

Depending on how these issues are addressed in a PVP law, there will be different impacts on the actors involved; and also broader impacts on farming and food systems, e.g. on the level of agricultural biodiversity found in farmers' fields, level of resilience or innovation capacity. Hence, a government of a country that aims to design or adopt a particular type of PVP law should be aware of the impacts the new law is likely to have at different scales and in complementary contexts.

The 1991 Act of the UPOV convention sets this balance in its own way. It tends to prioritise the rights of plant breeders over the rights of farmers, e.g. by strongly restricting the legal space for farmers to save, use, exchange and sell farm-saved seed of protected varieties. It does not recognise the collective cultural institutions that created the agricultural biodiversity used today in breeding programmes as 'breeders', and sets eligibility criteria in such a way that many of the products of farmer-managed breeding and seed systems cannot comply with these criteria. One result is that most landraces and farmer varieties cannot be protected under UPOV 91-based PVP law and are therefore open for appropriation (e.g. if some minor breeding activity is performed). UPOV 91-based PVP law also does not include a requirement for applicants to disclose the origin of their material and prove that the plant genetic resources used in the breeding process were legally acquired.

The general aim of adopting PVP laws is to improve the conditions for private sector plant breeders to invest in plant breeding and to contribute to the development of a country's agricultural and food sector. As they lack other sources of funding, private plant breeding companies rely on exclusive rights

for seed marketing to get a return on their investment, as was described in Section 3.2. This can be considered a legitimate interest. If farmers save, use, exchange and sell seed of protected varieties, the benefits for plant breeders from seed marketing tend to be reduced. Here, governments could set some sort of balance between the needs of (poor) farmers, and the interests of the breeding companies, based on informed decisions. A decision that prioritises the interests of one group of actors should be grounded in clear evidence of benefits to societal goals, such as food and nutrition security, agricultural biodiversity conservation, or resilience of food and farming systems.

Alternative *sui generis* systems (see Chapter 6) provide more flexibility to states to strike balances between plant breeders' and Farmers' Rights as they are found 'appropriate' for a country. These *sui generis* approaches can be quite similar to the UPOV system but allow for broader exceptions, or they can take a completely different approach, putting a stronger focus, for example, on the protection of extant varieties. Elements of *sui generis* approaches that comply with the TRIPS agreement have been summarised and described, *inter alia*, by Leskien and Flitner (1997), Helfer (2004) and UNDP (2008). For LDCs, there is no urgent need to adopt any PVP law in the near future, unless they find it in their own interest.

Using the flexibility provided by alternative *sui generis* PVP laws does not exclude the possibility to develop common standards for harmonising PVP laws at a regional level, should this be found to be of shared interest among members of regional organisations.

Recommendation 12: Governments of developing countries should carefully assess the effects of PVP laws on different actors and the broader implications for their national agricultural and food sectors, prior to taking decisions on the approach to be taken.

Recommendation 13: Alternative *sui generis* systems for PVP allow for more flexibility for setting balances between the interests of diverse actors and for harmonizing PVP laws with customary norms compared with the UPOV system. Therefore, governments of developing countries should not opt for joining UPOV unless clear benefits can be identified for their national farming and food systems[28].

Recommendation 14: Developing countries might like to consider developing common standards for regional harmonisation of national PVP laws based on a *sui generis* approach, should this be of shared interest.

7.4 UPOV-BASED PVP LAW AND DEVELOPING COUNTRIES

Developing countries differ in many aspects so that any general statements concerning their needs with regard to PVP laws appear inadequate. This is why we highlight in this study the need to leave the decision on which PVP law is appropriate for developing countries to the discretion of these countries, and not to promote any particular approach.

Developing countries differ, for example, in the importance of the agricultural sector for national economies, in climatic and agro-ecological conditions in general, in the proportion of favourable and less favourable agricultural production conditions, the distribution of farm sizes, the level of farmers' access to agricultural input and product markets, the level of agricultural biodiversity that is present in the country, and the importance of farmer-managed breeding and seed systems, besides many other aspects. Also, ethnic and cultural diversity is an

[28] Such benefits should be assessed also from a human rights perspective.

important factor shaping agricultural conditions in some countries.

The 'one size fits all' approach of the UPOV appears as such problematic if the highly diverse conditions and needs of developing countries are to be addressed. The 1991 Act of the UPOV Convention restricts the options for UPOV members to adapt national PVP laws to the conditions and needs of their farming sector, such as regarding the number and kind of species qualifying for PVP, or the eligibility criteria.

UPOV has its origin in more industrialised countries where the agricultural conditions are more or less shaped by commercial farming. Buying seed as an 'input' on a regular basis is the rule for most farmers working under such conditions, particularly where hybrid seed is used, or when certain commercial varieties are demanded by food processing industries. By extending its membership towards developing countries with more diverse agricultural conditions, the notion of agriculture and relations between plant breeders and farmers that may be implicit in certain rules and definitions of the UPOV Convention could be challenged.

Furthermore, the political and legal developments in the fields of plant genetic resources and human rights tend to make it more difficult for new members to reconcile the obligations of different treaties with the requirements of the 1991 Act of the UPOV Convention while implementing their national PVP laws.

Recommendation 15: UPOV members might consider addressing the diversity of conditions in their present and potential new members' agricultural conditions in the further development of rules and their interpretations, and consider allowing for more flexibility in designing national PVP laws, e.g. with regard to exceptions for small-scale farmers and indigenous peoples.

Recommendation 16: UPOV members might consider changes in the process of granting membership so that it better complies with obligations of potential new members with regard to the participation of farmers and other rights holders in the process of decision-making.

7.5 Research priorities and needs

Farmer-managed breeding and seed systems play an important role in farming system of most developing countries, and are of particular relevance for resource-poor farmers working under marginal (low-input) conditions. As discussed in Section 3.4, such conditions are not affecting just a 'marginally' small number of farmers, but can in fact be the conditions faced by the majority of farmers in some developing countries. In order to establish PVP laws that address the needs of such countries, baseline studies are required on farmers' use of varieties and the importance of different breeding and seed systems.

The Seed System Security Assessment (SSSA)[29] framework could serve as a guide for such baseline studies, and for identifying strengths and weaknesses of the existing breeding and seed systems. Because ways of seed provisioning may differ for women and men as well as among different groups of farmers, such baseline assessments should include disaggregated data in such a way that socio-economic or socio-cultural differences are addressed (including gender and ethnicity, for example). The SSSA framework could then be further used to monitor changes, e.g. before and after adopting a new PVP law, and relate these to seed system security and food security.

[29] The Seed System Security Assessment (SSSA) is a methodological tool based on the concept of food security frameworks. The objective is to describe in detail the functioning of seed systems in relation to seed availability, seed access and seed quality. It helps improve seed system resilience by addressing weaknesses and better targeting seed aid in disaster situations (Sperling, 2008).

Moreover, there is little information available as to how different PVP laws affect agricultural biodiversity, Farmers' Rights and human rights in practice. This is why research is needed that could guide informed decisions for designing PVP laws in the future. For those countries that are in the process of adopting new PVP laws, these processes could be accompanied by research aiming at monitoring the effects of PVP laws with regard to agrobiodiversity, food security and human rights, so that it will be possible to assess the effects of the PVP law on these issues over time. Human Rights Impact Assessment (HRIA) studies need to be conducted, covering the conditions of various groups of farmers and focusing on human rights; at the same time they need to be based on sound economic assessments and include non-monetary benefits and costs, e.g. relating to nutrition and sustainability.

Moreover, even though alternative *sui generis* approaches to PVP are in place in several countries, many questions remain open. For example, there is little evidence with regard to their ability to stimulate innovation of different kinds, economic implications for various actors, degree of conflicts that may arise due to less strict variety descriptions, etc., and also in comparison with UPOV 91-based PVP laws. This is why more research is also needed with regard to the coherence, impact and legal content of *sui generis* PVP laws, and appropriate processes for the development and implementation of such laws, including at a supra-national level.

Recommendation 17: Baseline studies should be conducted in developing countries in order to assess the importance of farmer-managed and formal breeding and seed systems for different crops, regions and groups of farmers, so that PVP laws can be based on the priorities and needs of diverse actors. The SSSA framework could serve as a model for such baseline studies, as well as for monitoring changes over time.

Recommendation 18: Research that allows for assessing and monitoring the effects of PVP laws over time on human rights, Farmers' rights and agricultural biodiversity is required to better understand these effects and take informed decisions in the future. Such research could be based on HRIA approaches, underpinned by economic assessments that include sustainability considerations.

Recommendation 19: Research into legal aspects of alternative *sui generis* PVP laws, their effects and possibilities for their further development should be conducted in countries that have such legislation in place, also in comparison with UPOV 91-based PVP laws in other countries.

Recommendation 20: The German government could consider supporting opportunities for research such as in Recommendation 19, through its own initiatives or as a partner in European and international funding initiatives.

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A woman winnowing rice in Tanguiéta. After harvesting, the rice needs to be washed several times, sieved, boiled, dried and finally peeled in the rice mill. The rice is then sold on local markets. *© GIZ/Ursula Meissner.*

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Photo: Neglected and Underutilized species - Finger Millet. For 15 years Bioversity has been working in Bolivia, Peru, India, Nepal, Yemen and the Mediterranean Basin to empower the rural poor by strengthening their identity, income opportunities and nutritional security through the improved use and marketing of Neglected and Underutilized Species. African Finger millet is one of the neglected minor millets that thrive in harsh conditions. Finger millet is especially valuable as it contains the amino acid methionine, which is lacking in the diets of hundreds of millions of the poor who live on starchy staples such as cassava, plantain, polished rice, or maize meal. *© Bioversity International\Y. Wachira.*
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