FAO International Treaty on Plant Genetic Resources for Food and Agriculture
Implementation of Farmers' Rights

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Introduction

In response to Resolution 6/2009 of the International Treaty's Governing Body, this paper provides the findings of research on the protection of traditional knowledge and farmers' rights in Peru, China, India, Kenya and Panama. The research was conducted over 5 years (2004-2009), as part of the project "Protecting community rights over traditional knowledge: Implications of customary laws and practices". It entailed 7 studies with over 60 indigenous and local communities in areas of important but threatened bio-cultural diversity:

- Peru: The Andean Potato Park, near Cusco – a centre of potato diversity
- China: Southwest Karst mountains – a centre of maize and rice diversity
- India: Eastern Himalayas – centre of diversity for rice and traditional crops
- India: Chattisgarh – a centre of traditional rice diversity
- Kenya: Southern coast – kaya forest areas with rich traditional crop diversity
- India: Andhra Pradesh – Yanadi traditional knowledge and food systems
- Panama: Kuna and Embera-Wounaan traditional knowledge systems

This paper has 5 sections:

1. Farmers' Rights under the Treaty

Article 9.1 of the Treaty recognises the enormous contribution that indigenous and local communities (ILCs) and farmers have made to the conservation and development of PGRs. Article 9.2 identifies 3 measures to protect and promote farmers' rights:

a) Protection of traditional knowledge relevant to PGRFA
b) The right to equitably participate in sharing benefits from the use of PGRFA
c) The right to participate in national decision-making on conservation and sustainable use of PGRFA

Article 9.3 states that "nothing in this Article shall be interpreted to limit any rights that farmers have to save, use, exchange and sell farm-saved seed".

The implementation of Farmers' Rights should be guided by the overall objectives of the Treaty on the conservation and sustainable use of PGRFA, and related provisions on in situ conservation and sustainable use, in particular:

- Article 5.1 on supporting farmer and community efforts to manage and conserve PGR on farm; and in situ conservation of wild crop relatives and wild plants for food production, including the efforts of ILCs; and

[1] We are grateful to Robert Lettington for his advice and comments on the draft.

- Article 6 on promoting sustainable use of PGRFA through appropriate policy and legal measures, which may include fair agricultural policies that promote the maintenance of diverse farming systems.

Taken together, these provisions call for a broad interpretation of farmers' rights which goes beyond the right to benefit-sharing, to include the right of farmers to continue the practices which contribute to the conservation and sustainable use of PGRFA and to sustain the traditional knowledge and livelihood systems needed for this. The protection of Farmers Rights is essential to enable in situ conservation of PGRFA and sustainable use.

The recently adopted Nagoya Protocol on Access to Genetic Resources and Benefit-Sharing under the Biodiversity Convention also requires countries to take measures to ensure equitable benefit-sharing from the use of traditional knowledge associated with genetic resources (TK), and genetic resources held by communities. It emphasises the need for prior and informed consent of communities for access to TK, and genetic resources where communities have the right to grant access, based on mutually agreed terms. It also emphasises the need for customary laws, community protocols and procedures to be taken into account when implementing its provisions on traditional knowledge; and encourages support for the development of community protocols for access and benefit-sharing relating to TK.

2. Review of Implementation of Farmers' Rights

Protection of traditional knowledge relevant for PGRFA and the right to participate equitably in benefits from PGR use

Summary of key findings: While some progress has been made in protecting farmers' rights at national level, much remains to be done. Peru and Panama have developed laws to protect the collective traditional knowledge of indigenous peoples. However, these do not protect the rights of farmers and communities over the associated genetic resources and hence their right to equitably participate in the benefits from their use. In India, the Plant Variety Protection and Farmers' Rights Act (2001) aims to protect farmers' rights through registration of farmer varieties and benefit-sharing, but this has not been implemented given the unclear system for farmers to apply for registration.

At the same time, other policies and laws have negative impacts on Farmers Rights. In particular:

- The existence of IPR protection for plant breeders' rights, without equivalent protection for Farmers' Rights in many countries (eg. Peru, India, China) has the effect of undermining the rights of farmers. A number of countries are facing pressure to adopt UPOV '91 which is a particular concern since plant breeders' rights can extend to on-farm saved seeds, thereby threatening farmer seed systems.
- Agricultural subsidies flooding markets with subsidised farm goods which reduces market access for smallholder farmers. This was also a common constraint across the studies, reducing the ability of farmers to equitably benefit from the use of their genetic resources.

Peru and **Panama** were amongst the first countries to introduce national laws for protecting traditional knowledge. Peru introduced a National Regime to protect the Collective Traditional Knowledge of Indigenous People associated with biodiversity, in 2002. Panama introduced a Special Regime governing the collective rights of Indigenous Peoples for Protection and Defence of cultural identity and Traditional Knowledge in 2000, but this does not explicitly cover TK related to bio-genetic resources. Both laws explicitly recognise traditional knowledge as the collective heritage of indigenous communities. This is important given that traditional knowledge and genetic resources are developed, held and conserved

cumulatively and collectively within and between communities. Protecting individual rights as in most western IPRs would undermine the customary practices through which TK and genetic resources are improved and conserved in traditional subsistence economies.

However, these laws still mirror existing IPR standards in other respects. For example, they only protect rights over the intellectual component of knowledge systems, and not over the associated genetic resources. Most policies to protect TK at international and national level emphasise 'state sovereignty' over natural and genetic resources. While this is not incompatible with community ownership, since it applies to all state actors, governments often interpret it as government ownership. Thus, genetic resources, including traditional crop varieties developed by generations of farmers, tend to be seen as state owned. This undermines the rights of farmers to equitable benefit-sharing from the use of PGR, and to customary use of genetic resources which underpins conservation and sustainable use of PGRs, and is important for subsistence. Farmers and communities sustain, use and develop TK and bio-genetic resources together – the two are closely inter-related and inter-dependent.

At the same time, other policies and laws in **Peru** are impacting adversely on farmers' rights and the protection of TK. The IPR commitments in the US-Peru Free Trade Agreement (2006) allow for the patenting of genetic resources and traditional knowledge that have been developed and conserved by indigenous and local communities for thousands of years. With the ratification of the FTA, Peru accepted the US demand to make 'all reasonable efforts' to begin patenting plants and plant material. This goes against Decision 486 of the Andean Community which prohibits the patenting of plants. Furthermore, the FTA does not require patent applicants to disclose the origin of plants or obtain authorisation before using TK. This again contradicts Andean Community patent regulations, which require the biological and genetic heritage and TK of ILCs to be safeguarded, and patent applicants to provide a license to use the TK of indigenous and local communities. In addition, the FTA led to the approval of a new 'Law to Promote the use of Modern Biotechnology in Peru' which allows GMOs to enter Peruvian territory, in place of existing legislation which stressed the risks of GMOs and how to prevent them. Furthermore, markets have been flooded with subsidised farm goods based on modern varieties, which has significantly impeded market access and returns for the agricultural products of smallholder and indigenous communities and their diverse traditional varieties.

In light of these national policy changes, the Cusco government introduced two regional laws. The first, passed in 2007, aims to protect native potatoes from transgenic contamination, in order to safeguard the rich PGRs and related TK in this centre of potato diversity. The second (2008) aims to combat bio-piracy. These were developed with support from the NGO Asociacion ANDES and input from indigenous farming communities in the area.

Asociacion ANDES has been working for the last 15 years to protect native potato varieties and farmers' rights in situ in the Cusco region of the Peruvian Andes. It has helped six Quechua farming communities to establish a Potato Park. The Park is an Indigenous Bio-Cultural Territory managed collectively by the six communities, with about 1300 potato varieties and the greatest wild potato diversity in the world. It uses a number of tools to protect farmers' rights, agrobiodiversity and livelihoods:

- The Park itself enables farmers to assert their rights over the varieties and knowledge in the collective land title area, and provides the basis for a landscape based *sui generis* system for protecting TK and PGRs *in situ*.
- The Park signed a collaborative agreement with the International Potato Centre in Lima in 2004, for a reciprocal exchange of potato varieties and benefit-sharing, and in situ conservation and monitoring of potato GRs. This resulted in the return of 400 varieties to the park. The CIP also agreed not to allow any patents on varieties from the Park, thereby recognising and protecting the rights of the communities over them.

- An inter-community agreement for equitable benefit-sharing amongst the six communities provides the basis for protecting farmers' rights at community level, and for promoting collective TK and PGR management and conservation in situ.
- The Park's register database of potato varieties serves as a tool for the protection of farmers' rights over these varieties and for strengthening related access protocols based on customary laws, as well as for monitoring and in situ conservation of PGRs.

India's experience in the protection of TK and farmers' rights is spread over a number of national laws: the Protection of Plant Varieties and Farmers' Rights Act, 2001, the Biological Diversity Act, 2002, the Patent (Amendment) Act, 2005 and a proposed Seed Bill of 2004.

In the past, India had kept agriculture and plants out of the patent regime to ensure that the first link in the food chain, the seed, is held as a common property resource in the public domain. The recent amendment to the Patents Act has increased the possibility for international and national agri-businesses to patent plants and seeds, which could lead to monopolies and increase farmers' vulnerability and dependence on monopolies of modern varieties (Shiva, 2005). However, the Patent (Amendment) Act provides defensive protection to the farmers in the form of a disclosure provision. According to the amendment, a patent application not disclosing the source of geographical origin of the biological material used in the invention or incomplete specification of claims in the application thought to be from the knowledge of indigenous and local communities, forms a ground for raising objections to the patent applications filed.

It was only in 2005 that the PPVFR Act, 2001, became operational. The Act simultaneously grants IP rights to both plant breeders and farmers. The Indian government considers it to be the national response to the sui generis provision of the WTO/TRIPs to protect plant varieties. However, the PVP Act is not acceptable to many farmers associations and civil society organisations working towards protection of TK and farmers' rights. The Act recognizes the farmer as a cultivator, a conserver of the agricultural gene pool and a breeder who has bred successful varieties. Although it provides protection to farmers' seeds, this will only be possible when farmers' varieties are registered with the help of NGOs. The Act does not specify the system and criteria to be adopted for registering farmers' varieties and thus does not adequately protect farmers' rights (Sahai, 2003). The yardstick of DUS (Distinctness, Uniformity and Stability) used for other varieties does not suit farmers' varieties and even the government has recognised the need to find a more pragmatic procedure to register Farmers' Varieties (Nagarjuna et al, 2008).

The PVPFR Act has adopted the provisions of the CBD relating to benefit sharing but these provisions are vague and are left to be determined by the PVP authority in India (Sahai, 2001). There is no representation of farmers in the authority.

The Act provides IPRs over plant varieties through a system of registration. But given the vague system for registration and benefit sharing in the law and the inability of farmers to apply for registration, it seems extremely far-fetched that farmers' rights are going to be protected through the law. Farmers' varieties are developed as a collective and spread over large geographical regions and often the same variety is found in several villages and sometimes, even across national borders in villages of neighbouring countries especially if the same ethnic communities reside in the same agro-ecological region. In such a situation, the process of registration would also need to address these issues. (Pant 2008)

In India, the farming community is the largest seed producer, fulfilling about 87% of the country's annual requirement of over 6 million tons. Although this is largely done through a process of seed-exchange, sometimes money also changes hands when farmers do not have anything to barter. Control over seed production is vital to food security. However, weak

Farmers' Rights in the legislation will allow seed corporations and modern varieties to dominate the seed market.

The PVP law is based on the view that plant variety protection accorded to commercial plant breeders leads to increased food production, greater food security and the development of new varieties by spurring investments in this sector. But the reality is that the commercial seed sector is essentially engaged in research on hybrid technology in a few commercial crops such as the maize, canola, sunflower, etc. Food production in India is still largely in the hands of the small farmers who use farm saved seeds (Shiva and Jafri, 2003).

The Seed Bill proposed in 2004 is likely to further curtail the rights granted to farmers in the PVPFR Act. This is due to a provision requiring compulsory registration of all farmers' varieties. This bill proposes prohibition of exchange of unregistered seeds, a traditional practice still being followed in large parts of the country.

Agrarian communities are not able to come to grips with the new policy situation. They find it difficult to believe that laws could be enacted which will take away their right to save, sow, exchange and sell their seed. The introduction of IPRs prevents farmers from exchanging unregistered seeds and engaging in their own seed production which eventually leads to extinction of the farmers' varieties thus leading to a loss of agro-biodiversity. It also hampers their right to determine what they would like to grow, what inputs they would like to use, and their right to follow their own practices which are closely linked to their socio-cultural ethos.

The government also promotes seed distribution through the extension services of the departments of agriculture and horticulture and other development programmes. These seeds are mostly modern varieties, and this undermines markets for local varieties.

The National Biodiversity Act recognises the rights of communities over traditional knowledge, but its implementing Rules only provide communities with the authority to develop community registers, and there is hardly any community participation in the biodiversity institutions established to implement it at national, state and sub-state levels. There are also concerns about the TK Digital Library and pressure to add community TK registers to this, in the absence of effective policies and institutions for ensuring farmers' and community rights are protected.

A number of NGOs in India have been working with communities for the last decade or more, to protect local varieties and farmers' rights, through community TK registers, seed banks etc. Ecoserve along with a local NGO, Centre for Mountain Dynamics, initiated a capacity development programme for small farmers in district Darjeeling in the Eastern Himalayan region. This programme entailed a legal literacy component, where farmers, especially women, were appraised about the provisions of the new laws and the implications such laws have had in other countries where they have been in force for a while now. Modules were developed and farmers were taken on exposure and learning visits to interact with farmers in other parts of the country. Farmers decided to document their knowledge pertaining to traditional rice varieties in the form of a computerised database to be available with the local NGO. And from time to time, these farmers with the help of the local NGO, update this database when they are able to find seeds of a traditional variety with some farmer in a remote village. These farmers have also created a small seed bank with the local NGO. The NGO has created a small rice park in their premises as an in situ conservation initiative, to grow these seeds on a periodic basis by rotation to keep the seeds alive. Farmers are welcome to take these seeds from the NGO when these varieties are not available any more.

In **China**, the protection of traditional knowledge and farmers' rights is included in China's NBSAP and these issues are increasingly being discussed. The Chinese government has set up 62 protected areas for in situ conservation of wild PGRs and invested in integrating in situ

and ex situ conservation. There is no specific legislation to protect TK or farmers' rights in China. However, the rights of farmers to their TK and plant genetic resources and benefit-sharing are under discussion for the development and implementation of concrete elements.

In general, farmer TK and seed systems are still not fully recognised by the formal agricultural system, and the public sector is mainly engaged in hybrid breeding. In the absence of legislation to protect the rights of farmers, current legislation on Plant Variety Protection (1997) and the Seed Law (2000) tend to favour the rights of plant breeders.

Scientists in China largely assume that gene banks are enough to conserve PGRFA. A recent scientific study found that landraces in the field are far more genetically diverse than the same varieties collected from the same area 20-30 years ago (CCAP forthcoming paper on the results of laboratory analysis of 170 landraces in SW China). This shows that farmers and ecological factors play a critical role in conserving and enhancing PGRFA.

Some explorations and practices have been conducted to address these issues and protect PGRFA and TK in field over the last decade. The Chinese Centre for Agricultural Policy, under Chinese Academy of Science, has been working with poor farmers in the genetically and culturally rich provinces of South West China since 2000 to protect farmer knowledge and local genetic resources and promote benefit-sharing. The main focus has been on Participatory Plant Breeding with maize, the staple food crop for the poor, in SW China. Since 2008, PPB has spread to Yunan and Guizhou, and to rice, casava and beans.

PPB contributes to in situ conservation because local landraces and knowledge are used and valued rather than replaced with modern varieties. It has enhanced both the farmer seed system and the formal seed system. For the farmer seed system it has broadened seed access and exchange networks. For the formal seed system, it has provided genetically diverse landraces which can promote future breeding. The collaboration established through PPB provides the basis for negotiating equitable benefit-sharing. Two types of benefit-sharing agreement have been established between farmers and communities and formal breeding institutions. The first is for conservation and management of local landraces for future breeding, recognising that landraces are the product of farmer knowledge; and the second for farmer collaboration in the PPB process, recognising their contribution of GRs and knowledge. PPB, where farmers needs and interests are addressed, is now being supported by provincial governments in some areas.

The basic tools used in conducting participatory plant breeding (PPB) and related protection, value addition and capacity building for TK and PGRFA are as follows:

Around PPB –

- Community-based seed registration and conservation – through which farmers get to know more information about varieties, including landraces, farmers' traditional varieties and modern hybrids. Based on such information and its annual change, farmers can plan for both landrace conservation and quality hybrid adoption.
- On-farm experiments and varietal selection – through which farmers and local communities recognize the values of their genetic resources and their TK and share them, in an appropriate way, with other communities and scientists through PPB and PVS. This helps farmers find/breed better adapted varieties.
- Community-based seed production – through which farmers can get monetary benefit from their seeds; and the farmer seed system can be enhanced, since it has been challenged by the industrialized and profit-driven hybrid seed systems for a long time.
- ABS discussion and contracting with public breeding institutes – which can be seen as the implementation of PIC and MAT at the project level. Both farmers and institutes

have reached an ABS agreement at the project level, which regulate benefit sharing principles and working mechanisms in written form. These should be signed before accessing the crop germplasm.

Around traditional organic products –

- Niche market development together with local NGO and/or public institute – through which value can be added to PGR & TK with specific recognition of their biological and cultural values.
- Interaction with urban consumers – through which the value of PGR & TK can be introduced to consumers and integrated into diverse food systems. The linkages between traditional farming and organic farming have been defined by consumers and intermediaries, which will provide more opportunities for PGR & TK products in light of concerns on national food safety.
- Farmers' organization and network building – can support mutual learning among farmers and communities. Farmers can thus get back their varieties and knowledge as well as their confidence through learning from each other.

The right to participate in national decision-making on conservation and sustainable use of PGRFA.

National efforts on the conservation and sustainable use of PGRFA still focus largely on supporting the role of plant breeders, scientist and gene banks, rather than the role of farmers, in situ conservation and farmers' rights. Despite progress in introducing new laws to protect TK, PBR and seed laws increasingly threaten the rights of farmers and in situ conservation. This suggests that there is limited participation of farmers and communities in national decisions relating to PGR conservation/sustainable use.

In India for example, farmer participation in agriculture policy and decision-making is limited. Rich industrial farmers have an influence (eg. on the Public Distribution System for seeds) but not poor traditional farmers. In the environment and biodiversity sector, government institutions have tended to be more open to farmer and community involvement. However, the government has become quite closed to NGOs in recent years (Swiderska et al 2008). Community participation in biodiversity institutions dealing with TK protection is still very limited, and there is no farmer participation in the authority that decides over implementation of the PVPFR Act.

In Peru, there has been some farmer and community involvement in national environment policy-making, but this has generally been consultation rather than active participation in decision-making, and there has been far less involvement in the agriculture sector. The process to develop Peru's Free Trade Agreement with the US in 2006 was largely conducted behind closed doors, without involvement of civil society or the Environment Ministry - but with some industry involvement (Siegele, Swiderska and Argumedo, 2006).

Industry and scientists tend to be by far the most influential in national decision-making, and increasingly foreign industry through Free Trade Agreements and other trade deals. The seed industry is pushing for the adoption of UPOV 91 in all countries, as evident from the World Seed Conference in September 2009, organised with the FAO, where there was very limited participation of farmer organisations. Most FTAs include an obligation to accede to the 1991 UPOV regime, which supports the rights of industrial breeders over those of farmers and communities and threatens farmer seed systems (ie. seed saving and seed exchange). Many FTAs require protection of IPRs beyond existing international agreements (eg. WTO/TRIPS), including on the patenting of plants. Where developers of GMOs are able to patent GM seed, they generally charge a royalty to cover research and development costs and require farmers to agree not to save, replant or sell the seeds from crops grown with the patented seed.

Generally, regional and bilateral trade agreements have been negotiated behind closed doors without taking account of civil society concerns, and have excluded the local stakeholders – ie. small farmers and local communities – who are most likely to be affected by their outcome (Siegele, Swiderska and Argumedo 2006).

3. Research Findings on how to effectively implement Farmers' Rights

The protection of Traditional Knowledge and Equitable Benefit-sharing from PGR use

Recognising collective rights: Our research into community perceptions and patterns of knowledge 'ownership'[2] stressed the importance of recognising collective rights. Knowledge is believed to come from God and so is always considered to be collectively held, even if it can be attributed to a particular inventor or provider in the community, in which case both collective and individual rights should be recognised. Knowledge and related bio-genetic resources are widely shared within and between communities and this sharing is important to sustain traditional subsistence economies in often difficult environments– no individual can survive based on their knowledge and resources alone. Sharing allows farmers to innovate further and add to the stock of knowledge and genetic resources. In this context, recognising individual or exclusive rights would not only threaten livelihoods but also the innovation systems which sustain and enrich genetic resources and traditional knowledge.

This means that measures to protect TK, such as the Prior Informed Consent of communities and equitable benefit-sharing, must also be collective. Obtaining PIC and sharing benefits with a single individual or family would promote individual rights and undermine sharing values. As our research found, indigenous communities make decisions collectively. Even where traditional authorities have been weakened, many decisions are still made collectively, particularly in relation to farming and natural resources. Collective PIC and benefit-sharing reinforces collective resource rights and responsibilities, which underpins community-based action to conserve PGRFA. Furthermore, when access is negotiated by an individual, there is a risk that the full value of TK will not be taken into account.

The Kuna of Panama have developed a protocol for research on biodiversity on their territories, which sets out the process and requirements for PIC. Consent is required from the Kuna Congress level (representing 49 communities), the source community authority and the individual knowledge provider, and can be granted or denied at any stage.

Communities can also use 'soft' IPRs, such as collective trademarks or Geographical Indications, to protect their rights over particular products based on TK and genetic resources (defensive protection). These are termed 'soft' because they protect collective rights, rather than exclusive rights, and can link a product to a particular territory and culture. For example, the six Potato Park communities have registered a collective trademark, and a percentage of the sale of trademarked products goes into a communal trust fund to support the park's activities for PGR conservation.

Ensuring equitable benefit-sharing amongst communities. Equitable benefit-sharing at community level is very important to ensure that conflicts over benefits are minimised amongst communities, and that benefits and conservation incentives are widely distributed, rather than captured by local elites. However, this requires strong, locally accountable institutions. The six Quechua communities of the Potato Park, Peru have developed an Inter-community agreement for equitable sharing of the benefits that they are deriving from a collaborative research agreement with the International Potato Centre in Lima. The agreement is based on a long process of participation and deliberation within and amongst the six

[2] Knowledge is not owned outright as in the western concept of property – it is held by custodians as heritage to be passed on to future generations.

communities. It is a community protocol which establishes the rules for how the monetary benefits and potato varieties acquired are shared amongst them. The rules are based on customary laws which promote conservation and equity. Those most involved in the park activities – ie. in sustaining PGRFA – get the most benefits.

Understanding the drivers of traditional innovation. Measures to protect traditional knowledge rights should also provide incentives for innovation. This is the original purpose of IPRs, and is particularly important for protection of TK given its rapid loss. It is estimated that 50-90% of all TK will extinct or threatened by 2100 (UNESCO, 2003). TK relating to PGRFA is a subset of TK and needs to be sustained as part of wider traditional knowledge and livelihood systems.

Western IPRs protect and incentivise innovations through financial benefits - but financial benefits and incentives alone are unlikely to be sufficient to promote traditional innovation – and could undermine the traditional cultural values, collective/sharing practices and dependence on natural resources that sustains TK.

Our research identified the following key drivers of traditional innovation: collective activities, use of diverse GRs, landscapes, cultural and spiritual values and customary laws:

- Collective agriculture and NR use activities at family and community level.
- Use of diverse genetic resources – both wild and domesticated.
- Access to wild gene pools and wide sharing/exchange of genetic resources and TK (within and between communities).
- Cultural values and preferences eg. for traditional varieties/foods.
- Spiritual values and beliefs and customary laws that promote conservation of PGR, sharing and reciprocity.
- Land and landscapes which support all the above.

Land is an essential resource for traditional subsistence economies that depend directly and substantially on natural resources for meeting basic needs (food, agriculture, healthcare, income and cultural/religious needs). Landscapes provide access to wild gene pools and wild plants for food production and healthcare, and to sacred wilderness areas for sustaining spiritual beliefs. Landscapes not only have economic value but are tied to cultural identity and spiritual beliefs (eg. gods associated with mountains and forests). They also provide the physical space for sharing and conservation practices based on customary laws – the wider the area for sharing and exchange between farmers and communities, the richer the genetic and intellectual basis for further innovation.

Protecting 'bundles of rights'. Therefore, policies and laws to protect TK should not only protect TK, but also rights to the associated genetic resources, landscapes, cultural and spiritual values and customary laws that sustain it, in order to protect TK from loss as well as misappropriation. Most policies only protect the intellectual component of knowledge systems, but not the biological, cultural and landscape components that sustain TK and innovation systems. They separate rights over TK which are vested in communities, and rights over genetic resources, which vested in governments ('state sovereignty'). Yet knowledge forms part of genetic resources which have been domesticated, improved and conserved by farmers, and the two are used and transmitted together. In the holistic indigenous worldview, knowledge and bio-genetic resources are inextricably linked and cannot be separated.

Cultural and spiritual values and customary laws also play an important role in sustaining TK and PGRFA, but are being eroded by various processes and policies. Land tenure and access are at threat from development pressures (eg. biofuels, commercial agriculture) as well as conservation schemes in some cases (eg. strict protected areas). While farmers need *access* to land and natural resources to sustain TK and in situ conservation, research has also shown

that secure tenure rights over land and NRs is also important for communities to invest in conservation (eg. research on common property resources by Ostrom in the 1990s). Our comparative research also suggests that rights to land are important to revitalise TK systems and reduce the loss of TK and PGRs. In the Potato Park, Peru, collective land rights have helped to re-establish a sense of collective responsibility for managing traditional potato varieties.

Thus, in order to protect TK and PGRs in situ and prevent their loss, we need to focus on farmers' rights as bundles of rights - rights to traditional knowledge, genetic resources and related landscapes, cultural and spiritual values and customary laws – or to 'collective bio-cultural heritage' as a whole. Such an approach is consistent with the overall objectives of the Treaty of conservation and sustainable use, and implements articles 5 and 6 on in situ conservation and sustainable use. It also implements the UN Declaration on the Rights of Indigenous Peoples, which requires countries to protect the rights of indigenous peoples to their traditional territories, resources, seeds, cultures and customary laws, as well as their knowledge.

Recognising customary laws. Measures to protect TK should be based on the customary laws and practices of indigenous and local communities for protecting and sustaining TK, rather than existing IPR standards. Communal knowledge relating to seeds, farming and everyday healthcare is openly shared, while specialised or sacred knowledge is restricted to elders, family or clan members. The obligation to share is particularly strong in relation to seeds, and the principle of reciprocity means that the more seeds are shared the more seeds are received. Hence reciprocity promotes diversity, and the wider the space for sharing and exchange the greater the diversity. In the Potato Park for example, an additional 100 varieties have been gained from reciprocal exchange of potatoes with communities outside the park.

The Peruvian study identified three key Andean customary principles which guide all aspects of life:
- Reciprocity, meaning equal exchange in society and with nature
- Equilibrium, meaning balance in society and in nature
- Duality, meaning that everything has a complementary opposite

These principles were found to be essentially the same for all the other indigenous and local communities involved in the project. The principle of solidarity was also common, meaning helping those in need (eg. widows, orphans, women headed households etc).

Despite a weakening of customary laws in some cases (eg. SW China), similar values are still evident in more remote areas; and even in less remote areas where it was assumed that no customary laws would be found (eg. 7 hrs drive from Delhi, India). In India, the traditional practice of seed barter in many parts of the country has for various reasons, been partly replaced by sale and purchase either within the community or in *haats* (local village market). However, the traditional practice of seed exchange is still very common among the mountain communities where the community bonding is strong.

In the Potato Park, these customary principles – along with the holistic concept of bio-cultural heritage- have guided the development of all the different tools to protect traditional knowledge and farmers rights, in order to strengthen the customary laws that sustain TK, bio-genetic resources and traditional agricultural landscapes.

Supporting local as well as national measures. National measures alone are unlikely to be enough to effectively protect TK or farmers rights, and need to be complemented by measures at local and community level, particularly if farmers' rights are to be a tool for in situ conservation. The threats to TK and PGRs and drivers of change affect communities at local level, and hence require local as well as national responses to effectively address them.

At the same time, protecting TK in situ may also the best way to protect the rights of communities over their TK, because it enables communities to strengthen control and management of TK and customary laws. The participatory action- research process facilitated by ANDES has strengthened the capacity and motivation of farmers, empowering them to protect their rights, TK and PGRs. A number of different tools are likely to be needed to effectively protect and strengthen TK at community level – including community protocols, registers, territories and collaborative agreements (see the Potato Park example p. 3).

Promoting reciprocal exchange of PGRs As explained above, financial benefits are not the only or even the best type of benefits to contribute to the conservation and sustainable use of PGRFA by subsistence farmers. Communities have shared many genetic resources with outsiders over the years, but received little in return. According to the customary law of reciprocity, they expect genetic resources in return for those shared. Genetic resources have been eroded and are increasingly critical to enable farmers to adapt to climate change. This is why the Potato Park communities insisted on gaining access to potato varieties collected from the Park in the 1960s by the CIP, which have since been lost due to genetic erosion, as well as financial benefits from the past use of their potato varieties.

4. Research Findings on PGR conservation and sustainable use

Rapid genetic erosion over the last 1-2 decades:
Southwest China is a centre of maize diversity, the origin of maize cultivation in China and of waxy maize worldwide. In Guangxi, Yunnan and Guizhou provinces, 90% of survey households were cultivating maize landraces in 1998, but only 56% in 2008, as more and more farmers are turning to hybrids accessed from markets (according to a survey in 2009). In Guangxi, all maize varieties were local before the mid 1980s, from the mid 1980s to the 1990s more and more hybrids were imported, but local varieties were still the majority; and since 2000 the planting area for hybrid maize has enlarged at great speed, with the consequence that the local varieties have decreased rapidly. Maize is the main staple food crop. A key reason for the adoption of hybrids is limited arable, which means that increasing productivity is a priority. Local GRs are lost in the process, and this weakens resilience to climate change. However, older people and women are still growing some traditional varieties such as waxy maize (eg. in their kitchen gardens) due to cultural preference and for use in festivals (eg. to make maize wine for weddings).

There has also been a major loss of genetic varieties across the **Himalayan region** and this is happening very fast. In the Eastern Himalaya study area near Kalimpong, only a few traditional rice varieties are still planted, not because modern varieties are being planted but because they are cheap to buy, since they are often subsidised. Nevertheless, traditional varieties are still grown for use on special occasions, festivals, weddings etc. Different varieties are grown in different seasons, and rice is still widely exchanged between farmers, even between communities and across country borders (this has been witnessed especially where there are marriages across borders).

Similarly, the **Andean region** has experienced significant genetic erosion over the last few decades, due to modern agriculture and development processes, and the disintegration of collective resource management systems under colonial feudal farming systems where farmers became farm labourers. But collective management has been re-established amongst the six communities of the Potato Park thanks to the potato being a symbol of common cultural identity, legal reforms allowing the recognition of collective land rights, and the revival of customary laws in the park.

Key common factors eroding genetic resources and traditional knowledge
Across the different studies, the following common drivers of loss of genetic resources and related traditional knowledge were identified:

- Promotion of modern varieties and technologies by agricultural policies, subsidies and R &D
- Promotion of modern varieties/food products in the media, influencing consumer demand and decreasing markets for traditional foods
- The reduction in size of landholdings and/or take over of community land for other uses
- The existence of plant breeders' rights to protect new varieties without commensurate protection of farmers rights over traditional varieties, which means that farmers have no economic incentive to sustain them
- Erosion of cultural values and customary laws undermining cultural incentives and local rules for PGR conservation and sustainable use. This is due to a number of drivers of change, including the spread of modern/urban values and lifestyles, western education and religion, extension of government authorities and national laws for natural resources, and migration to cities and changes in occupation due to economic pressures.

These factors apply to both genetic resources and traditional knowledge because the two are closely linked – traditional varieties embody the knowledge of farmers that have developed and conserved them. The studies show that erosion of genetic diversity leads to the loss of associated TK, and this can lead to further erosion of genetic resources.

Key common factors sustaining genetic resources and traditional knowledge
Across the different studies, the following factors were identified as playing a key role in sustaining genetic resources and traditional knowledge:

- The use of diverse bio-genetic resources is critical for sustaining traditional knowledge. The return of traditional varieties to ILCs has also revived related traditional knowledge and cultural values and practices (eg. in Peru and China).
- Cultural values and preferences associated with traditional varieties – eg. for use in festivals, ceremonies and because of preferred qualities such as taste.
- Spiritual beliefs and customary laws associated with nature which promote conservation and sustainable use
- Customary laws which promote sharing and reciprocal exchange (eg. evidence in Peru and India studies that reciprocity contributes to conservation).
- Land and landscapes which sustain traditional knowledge and belief systems by providing access to sacred sites and wild gene pools for breeding. Communities need sufficient land to sustain traditional subsistence economies and to exchange and conserve genetic resources over wide areas, based on customary laws.

5. Conclusions and Recommendations on Measures to Implement Farmers' Rights

In order to implement the Treaty's provisions on Farmers' Rights, governments need to take measures at four levels:

1. **Developing effective national legislation for protection of Farmers' Rights** National legislation to protect TK should recognise TK as the collective heritage of indigenous and local communities, be developed with their active participation and leadership, and be fully designed on the basis of customary laws rather than western IPR standards. They should ensure that farmers and communities have the authority to decide over access and use of their knowledge. In order to implement the right of farmers to equitably participate in sharing benefits, laws on TK protection and ABS should recognise the rights of farmers and communities over their varieties in the exercise of national sovereignty. This should include farmers' rights over traditional varieties held in situ, including crop wild relatives, and over traditional varieties which have been collected from their land/communities and are held ex situ. To facilitate this, a list of traditional varieties of communities and farmers could be developed with their participation, including in the development of criteria to be used for identifying these varieties. The PIC of farmers and communities should be required for access

to these varieties, along with equitable benefit-sharing from their use based on mutually agreed terms. In order to protect traditional knowledge from loss as well as misappropriation, and to support in situ conservation, legislation is also needed to protect farmers' and ILC rights to traditional landscapes, cultural values and customary laws associated with TK and genetic resources.

2. Addressing the impacts of other policies and laws on Farmers' Rights. Existing policies and laws tend to favour the interests and rights of plant breeders and agri-business over those of poor farmers. To effective, protection of farmers' rights needs to be commensurate with that provided to plant breeders, and other policy constraints also need to be identified and addressed. For example, Plant Breeders' Rights under UPOV 91 which extends breeders' rights to on farm saved seeds; seed laws which require registration based on uniformity and distinctiveness and prevent exchange of unregistered seeds; and agricultural subsidies which flood the market with cheap modern foods, making it very difficult for small farmers to sell their products/varieties.

3. Supporting farmer and community level initiatives. Protecting farmers' rights requires new practical tools for PIC and equitable benefit-sharing. Supporting policy pilot experiments at farmer and community level provides a way to test out and develop these new approaches, and inform the design of policy and law. At the same time, this will build the capacity of farmers and others to implement farmers' rights, and ensure that new laws are informed by farmers' needs and based on practical experience. Such experiments might include the development of agreements between farmers and plant breeders for access to genetic resources and equitable benefit-sharing. Supporting community initiatives and capacity is also important to enable poor farmers to protect their rights - national laws on farmers' rights alone may not be enough given the many threats that communities face at sub-national and local level.

4. Supporting and institutionalising farmer participation in national decision-making on PGR conservation and sustainable use: Farmer participation in national decision-making is far from being standard practice. Laws to ensure public participation tend to be non-existent or poorly implemented in developing countries. Legal reforms are often needed to ensure that traditional farmers can participate in decisions relating to PGRs. New institutional structures are also needed to enable farmer representatives to participate in national policy and legal processes on genetic resources and agriculture, and ensure that farmers can actually influence the outcome of decisions, and have the same voice and influence as trade and economic actors. This is also likely to require funding for farmer information, capacity building and consultations at local level, to enable farmers to participate effectively.

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