

Evolving *Sui Generis* Options for the Hindu-Kush Himalayas

Edited by:
Ratnakar Adhikari
Kamalesh Adhikari

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Acronyms

ABRATK	Access to Biological Resources and Associated Traditional Knowledge
ABS	Access and Benefit Sharing
ADOs	Agriculture Development Officers
AoA	Agreement on Agriculture
APP	Agricultural Perspective Plan
BELA	Bangladesh Environmental Lawyers Association
BRCC	Biodiversity Registration Coordination Committee
CAP	Common Agricultural Policy
CBD	Convention on Biological Diversity
CBRs	Community Biodiversity Registers
CDO	Chief District Officer
CEAD	Centre for Environment and Agricultural Development
CGIAR	Consultative Group of International Agricultural Research
CGRFA	Genetic Resources for Food and Agriculture
CIDA	Canadian International Development Agency
CMS	Cytoplasmic Male Sterile
CoFaB	Convention of Farmers and Breeders
CPRs	Common Property Resources
CSOs	Civil Society Organisations
CUTS	Consumer Unity & Trust Society
DANIDA	Danish International Development Agency
DDCs	District Development Committees
DFID	Department for International Development
DFOs	District Forest Officers
ECU	European Currency Unit

EDVs	Essentially Derived Varieties
EIA	Environmental Impact Assessment
EPC	European Patent Commission
EU	European Union
FAO	Food and Agriculture Organisation
FINNIDA	Finland International Development Agency
FRs	Farmers' Rights
GATT	General Agreement on Tariffs and Trade
GPA	Global Plan of Action
GTZ	German Technical Cooperation
GURTs	Genetic Use Restriction Technologies
HHI	Herfindahl-Hirschman Index
HKH	Hindu-Kush Himalaya
HMG/N	His Majesty's Government of Nepal
HYV	High Yield Variety
ICIMOD	International Centre for Integrated Mountain Development
IDRC	International Development Research Center
IKST	Indigenous Knowledge, Skill and Technology
IMF	International Monetary Fund
INGOs	International Non-governmental Organisations
IPGRI	International Plant Genetic Resource Institute
IPP	Intellectual Property Protection
IPRs	Intellectual Property Rights
IRRI	International Rice Research Institute
ITPGRFA	International Treaty on Plant Genetic Resources for Food and Agriculture
IU	International Undertaking on Plant Genetic Resources
IUCN	The World Conservation Union

IUPGR	International Undertaking on Plant Genetic Resources
JT	Junior Technician
LDC	Least Developed Country
LST	Law & Society Trust
MFN	Most Favoured Nation
MNCs	Multinational Companies
MoA	Ministry of Agriculture
MoAC	Ministry of Agriculture and Cooperatives
MoWR	Ministry of Water Resources
MoFSC	Ministry of Forests and Soil Conservation
MoLRM	Ministry of Land Reform and Management
MoPE	Ministry of Population and Environment
MTA	Material Transfer Agreement
NACC	National Agro-biodiversity Conservation Committee
NAFOS	National Alliance for Food Security – Nepal
NARC	Nepal Agricultural Research Council
NBA	National Biodiversity Authority
NBSC	National Biodiversity Steering Committee
NCCBC	National Coordination Committee for Biodiversity Conservation
NPC	National Planning Commission
NPVDF	National Plant Variety Development Fund
NSB	National Seed Board
NSC	National Seed Company
NTFP	Non-timber Forest Product
OAU	Organisation for African Unity
OECD	Organisation for Economic Cooperation and Development
OGL	Open General License
PBRs	Plant Breeders' Rights

PDS	Public Distribution System
PGRFA	Plant Genetic Resources for Food and Agriculture
PIC	Prior Informed Consent
PPVFR	Protection of Plant Varieties and Farmers' Rights
ProPublic	Forum for Protection of Public Interest
PTO	Patent and Trademark Office
PVFRA	Plant Varieties and Farmers' Rights Authority
PVPA	Plant Variety Protection Authority
QRs	Quantitative Restrictions
R&D	Research and Development
SAWTEE	South Asia Watch on Trade Economics & Environment
SDPI	Sustainable Development Policy Institute
SEAN	Seed Entrepreneurs' Association of Nepal
SPS	Sanitary and Phytosanitary
SSSC	SEAN Seed Service Center
TK	Traditional Knowledge
TNC	Trade Negotiating Committee
TNCs	Transnational Corporations
TRIPS	Trade Related Aspects of Intellectual Property Rights
UNCED	United Nations Conference on Environment and Development
UNDP	United Nations Development Programme
UPOV	International Union for the Protection of New Varieties of Plants
US	United States
USA	United States of America
WIPO	World Intellectual Property Organisation
WTO	World Trade Organisation
WWF	World Wildlife Fund

Preface

In 2001, South Asia Watch on Trade, Economics & Environment (SAWTEE) and International Centre for Integrated Mountain Development (ICIMOD) initiated a regional programme to protect the mountain farming communities of the Hindu-Kush Himalaya (HKH) region by helping them address the problems unleashed by the complex market forces of liberalisation, globalisation and the World Trade Organisation (WTO). The main target groups of this programme are poor, marginalised and vulnerable mountain farmers. Recognising that these mountain farmers – more than likely mountain women – lack the understanding and capacity to protect their interests, the joint programme is designed to: raise the level of debate on issues relating to protecting and promoting farmers' rights at the level of civil society, national alliance institutions and policy makers; to conduct research on crucial issues; and to generate documents to clarify these issues.

This work is based on the conclusion that the expected opportunities for economic growth and development deriving from open economies and regions are not without accompanying pitfalls. In particular, multilateral agreements on trade liberalisation under the WTO definitely will have impact on the mountain resources upon which mountain farmers depend for their subsistence.

Gaining some understanding of the WTO and its potential implications on the lives and livelihoods of the mountain farmers of the HKH region is an important beginning.

While opponents claim that the WTO allows commercial interests to take priority over development, environment, and health and safety issues; those in favour of the system claim that the WTO is the only forum for countries to work out their differences on trade issues. They argue that the WTO is a member-driven organisation and that it promotes non-discrimination and transparency, which, in turn, will help generate economic growth, especially in developing countries. Although the theory behind the WTO does envision a non-discriminatory multilateral trading system that is freer, more predictable, more competitive and beneficial for the developing world, in practice, the benefits of WTO-led trade liberalisation have, however, tended to accrue to the more developed and richer nations with little apparent relief for less developed countries.

What actually are the farmers' rights that we are seeking to safeguard, and what are the dangers posed by the WTO? The concept of farmers' rights, which emerged in debates at the United Nations Food and

Agricultural Organisation (FAO), acknowledges the contribution of farmers to conservation and development of plant genetic resources. It also foresees protection of farmers from the commercially motivated intellectual property systems.

There is also a need to protect the interests of farmers against the International Union for the Protection of New Varieties of Plants (UPOV) Convention. Signed in 1961, the UPOV Convention has been amended three times since it came into force. The latest amendment, made in 1991, severely constraints the ability of farmers to save, exchange, re-use and sell seeds. This Convention provides strong monopoly rights to breeders of new plant varieties. In protecting the rights of breeders, the Convention provides no recognition to farmers, the original 'donors' of plant genetic resources and the knowledge pool based on which breeders develop new plant varieties.

As farmers are already a largely marginalised community in most developing countries, and especially in mountain areas, WTO provisions that affect their basic rights to choose and to know, and their rights to store, reuse, recycle and share their seed, could put them into even more difficulties. Protecting farmers' rights and developing a mechanism of benefit sharing between donors - generally farmers - and inventors of new plant varieties - generally breeders - are important to provide farmers an incentive to continue their engagement in conservation and sustainable use of genetic resources. It is also important for the sake of fairness and the pursuit of a more ethical world - however distant that sometimes - like now - seems.

The Trade Related Aspects of Intellectual Property Rights (TRIPS) Agreement under the WTO system has provided three options for protecting new varieties of plants: i) protection through patent; ii) protection through an effective *sui generis* (of its own kind) system; or iii) protection through a combination of patent and *sui generis*. While most countries presently lack any such mechanism, all WTO members are required to enact this type of legislation. Least developed countries (LDCs) are required to implement this provision by 31 December 2005. The phrase 'effective *sui generis* system' has not been defined anywhere, and is, therefore, subject to varied, and often conflicting, interpretations.

A related issue concerns assuring farmers the right to recognition and compensation for their role in protecting and improving genetic resources and traditional knowledge. The recent increase in the role of intellectual property rights (IPRs) in agriculture has led to a demand that farmers and rural communities should also be recognised and

compensated for their role as sources of genetic material and indigenous knowledge. This is extremely important in the Himalayas, which are the major sources of both germplasm and indigenous knowledge, and where the farmers have maintained a wide variety through judicious crop composition and rotation. Traditional methods of farming still dominate these hill and mountain economies. There is a genuine fear that the WTO's grand design of global marketisation will: threaten the lives and livelihoods of mountain communities in many aspects of their traditional practices; jeopardise their food security; and hasten the loss of their rich biodiversity.

Although the TRIPS Agreement provides no recognition to farmers for having conserved genetic resources, the United Nations Convention on Biological Diversity (CBD), ratified by 186 countries in 1992, does recognise this right. In order to address the conflict between TRIPS and CBD, the Doha Ministerial Declaration has mandated negotiations on the TRIPS Agreement among WTO members. So far, however, attempts made at the TRIPS Council to introduce the CBD context within TRIPS have largely failed because of protest from the developed countries. All HKH countries are party to the CBD and must implement their commitments under this instrument of international law. A major effort should be made to bridge the gap between TRIPS and CBD.

Rights advocates agree that no patents should be allowed on life forms. The rights of indigenous peoples and other local communities over their knowledge, customs and resources must also be acknowledged and promoted. These measures are essential to the realisation of strong and resilient agricultural economies around the world. Without such changes, the WTO rules will continue to be detrimental to food security and development. Developing countries must demand change to make real the commitments made in the Doha Declaration. The international trade system must improve and support efforts to pursue development goals.

We need to better identify and evolve strategies for putting into place *sui generis* options that will secure the rights and livelihoods of the mountain farmers. This is not an easy task given the pressures from the corporate interests and their agents. However, the beginning has to be made somewhere. Let this be a humble beginning.

J. Gabriel Campbell
Director General
ICIMOD

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Posh Raj Pandey, Ph.D
President, Executive Committee
SAWTEE

Contributors

Biswajit Dhar — Professor and Head, Centre for WTO Studies, Indian Institute of Foreign Trade, New Delhi, India

Devendra Gauchan — Agricultural Economist, Nepal Agricultural Research Council (NARC), Kathmandu, Nepal

Devinder Sharma — Chairman, Forum for Biotechnology & Food Security, New Delhi, India

Eklabya Sharma — Senior Agricultural Specialist, International Centre for Integrated Mountain Development (ICIMOD), Kathmandu, Nepal

Elisabeth E. Kerkhoff — Associate Expert, Agro-forestry and Agro-biodiversity, ICIMOD, Kathmandu, Nepal

Ghayur Alam — Director, Centre for Sustainable Development, Dehradun, India

Gloria O. Pasadilla — Research Fellow, Philippine Institute for Development Studies, Makati City, Philippines

Jagath Gunewardena — Attorney at Law, Law & Society Trust (LST), Colombo, Sri Lanka

K. C. Paudel — Deputy Director General, Department of Forest Research and Survey, Kathmandu, Nepal

Kamalesh Adhikari — Senior Programme Officer, South Asia Watch on Trade, Economics & Environment (SAWTEE), Kathmandu, Nepal

Madhusudan Upadhyay — Senior Scientist, Nepal Agricultural Research Council (NARC), Kathmandu, Nepal

N. S. Jodha — Policy Analyst, MEI Division, ICIMOD, Kathmandu, Nepal

Ratnakar Adhikari — Executive Director, SAWTEE, Kathmandu, Nepal

Rohit Priyadarshi — Research Associate, Gene Campaign, New Delhi, India

Ruchi Tripathi — Food Trade Policy Analyst, ActionAid, UK

S. Rizwana Hasan — Director (Programmes), Bangladesh Environment Lawyers Association (BELA), Dhaka, Bangladesh

Susette Biber-Klemm — Dr. iur, MAE, Senior Research Fellow, World Trade Institute, University of Berne, Switzerland

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Introduction

Ratnakar Adhikari

The Hindu-Kush Himalayan (HKH) region is the largest and most diverse mountain setting in the world, comprising 3500 km long complex landscape of mountains, plateaus, river gorges, and plains. The region includes Afghanistan, Northern Pakistan, China's Xizang Autonomous Region, Western Sichuan, North West Yunnan and Chengdu, the northern hilly region of Burma, Chittagong Hill Tracts of Bangladesh, Indian Himalayas, Bhutan and Nepal. This vast tract of landmass includes such ranges and chains known as the Himalayas, the Karakoram, the Hindu-Kush, the Hengduan Mountains, and the Tibetan Plateau.

The mountains in the region are young and fragile and in terms of land use 39 percent is pasture, 21 percent is forest, 11 percent is covered under protected areas and five percent is used for agriculture. Over 150 million people representing scores of ethnic groups live within this fragile and marginal landscape and another half a billion inhabitants depend on its resources, downstream in the hinterlands. The region is primarily characterised by richness in biodiversity and associated indigenous knowledge, antiquity of agriculture, niche opportunities and human adapted to harsh environments.

The economy of the region's hills and mountains is primarily agriculture-based. Farming systems in the HKH region present a mosaic of distinct agriculture and livestock production systems, representing various agro-ecoregions. Pastoralism and agro-pastoralism cover a vast part of the HKH in the highland areas, notably in Tibet (China) and some northern areas of Pakistan, India and Nepal.

According to *Eklabya Sharma and Elisabeth E. Kerkhoff*, there are five types of farming systems within the HKH region. In the high altitude areas, there are specialised pastoralism and mixed mountain agro-pastoralism, whereas in the mid-hills, there are mixed crop-livestock farming systems, shifting cultivation and a variety of specialised commercial systems. It has to be, however, noted that the last type of farming system is only prevalent in certain pockets of the region.

Until recently, the region was less connected to the plains primarily because of difficult terrain and resultant lack of requisite infrastructure. However, the forces of globalisation have changed or are about to change all this. *Narpat Singh Jodha* argues that the process of globalisation tends to create the circumstances that are beyond the control of communities in mountain areas. This may marginalise the nature-endowed economic niche of mountain areas. It would force them to interact as a weaker

party in the competitive world market. The process is governed by the driving forces, which are not sensitive to the concerns of fragile ecosystems and their residents.

Furthermore, the process is so rapid and overpowering that the affected communities have neither sufficient lead-time nor required capacities to adapt to rapid changes. If the scattered emerging evidence is any indicator, as a final consequence, globalisation may accentuate the process of exclusion of local communities from the specific resources as well as the pace and pattern of rapid economic transformation in mountain areas.

For the mountain farmers of the region eking out their living from subsistence farming, the WTO Agreements are likely to spell disaster, provided corrective measures are not taken well in time to address the problems. For example, the WTO Agreement on Agriculture (AoA) is not likely to provide any sense of respite for the mountain farmers. Argues *Devinder Sharma*: "With the international prices remaining sluggish and the developed countries refusing to reduce subsidies under one pretext or the other, the dice is heavily loaded against millions of farmers in the developing countries."

The only way out for the HKH farmers to survive in this appalling scenario is by reorienting their production strategy. They should move away from the plantation of staple commodities to traditional crops and economically important botanical species. It then becomes the responsibility of the States to shift the focus of their research and development (R&D) efforts to harness the potentials of these agricultural products.

It has been argued that new multilateral agreements under the WTO regime are violating farmers' rights as protected under natural law as well as several United Nations declarations, including the Universal Declaration of Human Rights, 1948, the International Covenant on Economic, Social and Cultural Rights, 1966 and the Convention on Biological Diversity (CBD), 1992. Patents on life forms in particular are serious violations of the rights of farming communities. Traditional farmers' rights include the right to acquire skills in cultivating and reaping crops, the right to store crops and seeds, the right to reuse and share plant varieties, and the right to protect their indigenous knowledge, plant and seed varieties.

Developed countries managed to systematically impose an agreement related to intellectual property rights (IPRs), namely Trade Related Aspects of Intellectual Property Rights (TRIPS) on the ill-prepared developing countries during the Uruguay Round of Multilateral Trade Negotiations of the General Agreement on Tariffs and Trade (GATT). IPR -

despite its contribution to the process of invention and innovation - is about providing monopoly to the right holder, which provides him/her "market power".

Market power is potentially abusive and a tool for attaining market exploitation. Yet TRIPS made it to the WTO because developed countries wanted it and they used all sorts of carrot and stick tactics to ensure that. The reason is simple: transnational corporations (TNCs) housed in those countries wanted globally harmonised standards for the protection of their IPRs.

Within the TRIPS Agreement, the provision on patent protection is the murkiest area. Even trade economists do not see any economic rationale in providing patent protection of 20 years! As if monopoly was not enough, plant variety protection, a provision under Article 27.3 (b) of the Agreement has resulted in spate of mergers and takeovers in the seed sector resulting in massive concentration within the seed industry. *Gloria Pasadilla* argues that aggressive pursuit for obtaining and exploiting market power among the biotechnology firms has led to large scale consolidation among them. Spate of horizontal as well as vertical mergers have taken place in this sector, leading to excessively high concentration in the commercial seed sector.

She explains the following plausible reasons for large scale consolidation among the firms which possess IPRs on seed and agro-chemicals. First, since IPR provides monopoly power to its owner, a firm may want to erect barriers to entry for potential competitors. Secondly, firms may want to accumulate patents by buying companies with IPRs so that they could be able to use them as bargaining chips in negotiations with other firms. Thirdly, it is their desire to attain economies of scope in research or exploit complementarities in the use of specialised assets in biotech R&D; and finally, low appropriability of IPRs in biotechnology and high transaction costs in contractual arrangements lead the firms to merge with each other.

As of now, only three seed companies in the world, namely Du Pont (which acquired Pioneer Hi-bred), Pharmacia (which acquired Monsanto) and Novartis (which spun off Syngenta) hold 63 percent market share in corn seed market and 46 percent of soybean seed market.

These very companies were the chief architects of provisions on "life form" patenting as well as mandatory requirement to protect plant varieties either through patent or an "effective *sui generis*" system, included in the highly convoluted and most contentious Article 27.3 (b) of the TRIPS Agreement. Due to the opposition of the developing countries at the time of giving final shape to the Agreement, the developed countries trade negotiators could not impose "patent only" requirement

for the protection of plant varieties. They had to finally agree to a mechanism whereby plant varieties could be protected through one of the three means: patent; effective *sui generis* system; or any combination of both.

Since developed countries are the chief architects of the global trade regime, they had hoped that they would somehow manage to impose their own requirement for plant variety protection too. As per them the only effective *sui generis* system is their own system, which is known as International Union for the Protection of New Varieties of Plants (UPOV) - the Convention exclusively prepared by the developed countries in 1961 to suit their requirement of commercial farming at the insistence of the commercial plant breeders.

As per the initial text of this Convention, a provision on "Farmers' Privilege" contained therein allowed farmers to save, exchange and reuse seeds. The UPOV Convention has been amended three times since it came into being in 1968. While the first two amendments made in 1972 and 1978 kept the basic structure almost unchanged, the last amendment in 1991 introduced far-reaching changes to the structure of protection considerably downgrading Farmers' Privilege.

Should the developing countries decide to adopt this system, their farmers' rights to save, exchange, reuse and sell seeds will be circumscribed. This would jeopardise the livelihood options of the farming communities in the mountain and hill areas. Presenting a synopsis of a major study on IPRs and access to seed conducted by Consumer Unity & Trust Society (CUTS) in Uttaranchal (Eastern Himalaya), *Ghyur Alam* concludes that almost all the farmers save seed for planting in subsequent years. Also, saved seeds account for a very large proportion of seed planted in the state. The practice of exchanging seed is also common and reliance on purchased seed is comparatively low. He further mentions, "It is clear that any legislation, which imposes restrictions on the farmers' right to save, reuse and exchange seed will be damaging both to individual farmers and farming activity as a whole in the mountain areas."

In their pursuit to colonise the agriculture of the developing countries, the developed countries are exerting considerable degree of pressures to the developing countries to sign on to the UPOV Convention. *Ratnakar Adhikari and Kamallesh Adhikari* document a few examples of select developing countries highlighting the intensity of such pressures.

China, a developing country, where traditional farming practices are still dominant, had to succumb to the pressure of the European Union (EU) to become a member of the UPOV Convention. India, another developing country and a leader of the developing countries in various fora including the WTO, could not resist the bilateral pressures from the

developed countries and the Indian Cabinet has made a decision to join the UPOV Convention, 1978.

The Indian case is different because India has enacted a balanced legislation, i.e., Protection of Plant Variety and Farmers' Rights (PPVFR) Act in 2001. This Act is being hailed as the model legislation since it has balanced breeders' rights as well as farmers' rights. However, even after enacting such a legislation, the Indian government's decision to take a "U-turn" and seek UPOV membership has surprised many. Gene Campaign, a Delhi based organisation, which has also drafted an alternative treaty called "Convention on Farmers and Breeders" (CoFaB), has filed a writ petition in the Delhi High Court on 1 October 2002 against the government's decision to join UPOV. The Court accepted the plea and asked the government to submit written reply.

Bangladesh, a least developed country (LDC), prepared its Plant Variety Protection Bill in 1999. The Act was said to be farmer-friendly. However, now it is learnt that the Bill could not be introduced in the Parliament because the EU threatened to stop aid provided to Bangladesh if the latter enacted a pro-farmer legislation. Now, a new Bill has been prepared by Bangladesh, which is heavily tilted in favour of breeders - quite akin to the UPOV model.

Cambodia, a small LDC, was compelled to obtain UPOV membership at the time of its accession to the WTO due to the pressure from the developed countries led by the United States of America (USA) and the EU. Another small LDC, Nepal, was also asked to join UPOV at the time of its accession to the WTO, but due to the pressures from the civil society organisations (CSOs) in the country, the developed countries finally had to agree to a much weaker formulation regarding Nepal's possible entry into the Convention at a later date.

Though the TRIPS Agreement provides some flexibilities to the developing countries to adopt their own type of system for the protection of plant varieties, the developed countries are making serious attempts, with considerable degree of success to use other platforms to provide backdoor entry to UPOV within the WTO system. It is intrusive to note that the UPOV Secretariat has argued that the "UPOV Convention provides the only internationally recognised *sui generis* system for the protection of plant varieties". In view of this, the Secretariat expected many developing countries to choose UPOV as a model for their effective *sui generis* systems.

As per *Bisawjit Dhar*, "one important consideration for the developing countries is that the TRIPS Agreement does not define what constitutes an 'effective' *sui generis* system for protecting plant varieties.

This offers the flexibility to WTO members to devise systems of protection of plant varieties, which suit their interests to the fullest extent."

According to him, the *sui generis* legislation that developing countries must introduce has to take into consideration the interests of both the farming communities as well as the plant breeders involved in the formal sector. Agriculture in most developing countries relies significantly on the traditional farming communities who have made their contribution to the production process through informal innovations as well. Most importantly, the seed supply systems in many of these countries continue to be in the hands of the farming communities, despite plant breeders in the formal sector starting to make in-roads into the seed markets in recent years.

Is it then possible, given the aggressive pursuit of the developed countries to impose their own requirement on the developing countries?

The pressures to join the UPOV platform are supplemented by the efforts of the developed countries to use other fora. They are even using other international platforms such as World Intellectual Property Organisation (WIPO) and Food and Agriculture Organisation (FAO). As *Ruchi Tripathi* aptly puts it, "a looming threat to the current flexibilities in the TRIPS Agreement that are being fought for could be undermined by WIPO patent agenda with its three pillars (patent law treaty, patent cooperation treaty and substantive patent law treaty) that could make it simpler to file worldwide patents, harmonise the domestic laws further as well as possibly remove the exemptions currently allowed under the TRIPS Agreement - in other words a one stop shop for a single global patent."

Not that developing countries are without any alternatives. There are at least three models, which could be used as a reference by the developing countries to enact their *sui generis* legislation. CoFaB tries to provide an alternative to developing nations. As per *Rohit Priyadarshi*, the UNDP Human Development Report, 1999 has described it as a "strong and coordinated international proposal", which "offers developing countries a far better alternative to European Legislation by focusing on the need to protect farmers' interests and food and nutritional security goals." This model does not only try to strike a balance between the rights of farmers and breeders, but has also been adopted by India as a model for enacting its PPVFR Act.

Another model, which is being used by most African countries and in particular by Namibia while designing their legislation is Access to Biological Resources and Associated Traditional Knowledge Act. Based on the African Model Law for the Protection of the Rights of Local Communities, Farmers and Breeders, and for the Regulation of Access to Biological Resources developed by the Organisation for African Unity

(OAU), the Namibian legislation provides for the grant of farmers' rights and plant breeders' rights, while at the same time recognising the rights of local communities over their biological resources and associated knowledge, innovations and practices. The rights that the plant breeders and farmers would enjoy have been clearly spelt out in the legislation.

Another platform, not a model *per se*, which could be used by the developing countries while designing their *sui generis* legislation is the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA). The Treaty was approved by the FAO Conference at its 31st Session Meeting on 3 November 2001. Tracing the historical context of the Treaty, *Devendra Gauchan* remarks, "The Treaty (Article 9) recognises the past, present and future contributions of farming communities in all the regions of the world, particularly those in centres of origin and diversity, in conserving, improving and making available these resources as the basis of farmers' rights. This could be done, for example, through the protection of relevant traditional knowledge and the right to take part equitably in benefit sharing and in decision making process regarding the conservation and sustainable use of plant genetic resources."

Following one or any combination of the above-mentioned platforms, the countries in the HKH/South Asia region are in various stages of enactment of plant variety protection laws based on *sui generis* system. While India is probably among the first developing countries to enact its legislation, Bangladesh has prepared two versions of legislation, but has enacted none. *Rizwana Hassan* provides the salient features of these drafts.

As per the latest draft, the Plant Variety Protection Authority (PVPA) shall not only protect but also promote the rights of the farmers. These rights of the farmers, among others, include: a) right to protect their traditional knowledge relevant to plant genetic resources from being accessed in formal sector without compensation; b) right to claim an equitable share of benefits if their varieties have contributed to the registered variety; c) right to save, use, exchange and sell farm-saved seed/propagating material of registered variety for non-commercial purposes.

Similarly, Nepal, which has recently acceded to the WTO, is also required to prepare its plant variety protection law by December 2005 as per the Working Party Report on the Accession of the Kingdom of Nepal to the WTO. The Report mentions, "The drafting of the Plant Variety Protection Act was not yet initiated, however, it would be intended to protect the rights of related stakeholders in accordance with the needs of the country. This law would be a separate free-standing Act."

The meaning of the last sentence is not clear because it could mean one of the two things. It could either mean that it has to be free-standing plant variety protection law without clubbing it with Farmers' Rights Protection as done in India, or it could mean plant variety protection law should not be included in the Industrial Property Act to be enacted by Nepal within December 2006 for the protection of patent, designs and trademark.

Whatever may be the intention of this sentence, studies are being conducted in Nepal by various sectors (including government and non-government) to decide the contours of such a legislation. Having discussed the pros and cons of various model legislation available, *Madhu Sudan Upadhyay* concludes, "The [Nepal's *sui generis*] system should address food security and livelihood concerns of poor farmers and protect their farming practices. Similarly, Nepal, being a biodiversity rich country, the eventual *sui generis* system should help to promote the conservation and sustainable utilisation of biodiversity and environment. In that sense, the *sui generis* system should be truly of its own kind."

Sri Lanka had prepared their *sui generis* legislation during 2000-2001. However, the legislation was based on the UPOV model. *Jagath Gunewardena* argues that the draft Bill does not meet or fulfil the needs of Sri Lanka, particularly in terms of safeguarding the rights of the poor farmers. He cautions that the draft legislation would rather act against the interests of the farmers if passed in the present form.

Thus, he recommends that it needs to be drastically altered or has to be even set aside and a new law drawn in its place. This is possible under Article 27.3(b) of TRIPS, which does not define what an "effective *sui-generis* law" should have or should not have. As per him Sri Lanka should strive to have a really unique law that will meet the requirements of not only the farmers, but of society.

In recent days, at the international level, it is being explored whether farmers' rights could be implemented through the creation of *sui generis* rights to traditional knowledge. *Susette Biber-Klemm*, therefore, calls for the further exploration of the options of *sui generis* IPRs to protect traditional plant genetic resources for food and agriculture and traditional knowledge as one of various elements for the implementation of farmers' rights. She recommends that this should be done within a clearly defined strategy and taking account of the main objectives of protection; and maintaining/opening up the possibility to integrate the option to protect traditional knowledge by *sui generis* rights at the regional and international levels.

Documentation and registration of genetic resources and traditional knowledge are being viewed by the developing countries as the major means to protect them from the threat of bio-piracy and for creating an orderly mechanism for regulating access and benefit sharing. Indeed, a number of developing countries have initiated the process of registration and documentation.

K.C Paudel states that over 500 Community Biodiversity Registers (CBRs) are reported to have been prepared in India during the last few years. Similar works have been initiated in other countries of the HKH region like Bangladesh and Pakistan but the approaches taken are different. Based on the works undertaken by the Ministry of Forest and Soil Conservation, the focal point for CBD in Nepal for the documentation of genetic resources and traditional knowledge, he shares the experience on how the system could be made effective in order to meet the stated objective of the programme.

In sum, the present volume does not only look at the farming systems and problems encountered by the farmers of the HKH and South Asia region due to globalisation, liberalisation and WTO Agreements, but also proposes various mechanisms to protect farmers' rights. One such mechanism, which clearly appears as a cross-cutting issue in most of these countries, is by evolving *sui generis* system that suits the socio-economic, ecological and cultural requirements of each country concerned.

Given the threat of international pressures, it is necessary to prepare a roadmap for the protection of farmers' rights and utilise the international platforms for their protection. At the local level, it is equally important that HKH countries to start documenting their genetic resources as well as traditional knowledge, skills and practices not only to ensure that they are protected from piracy but also to obtain benefits from them.

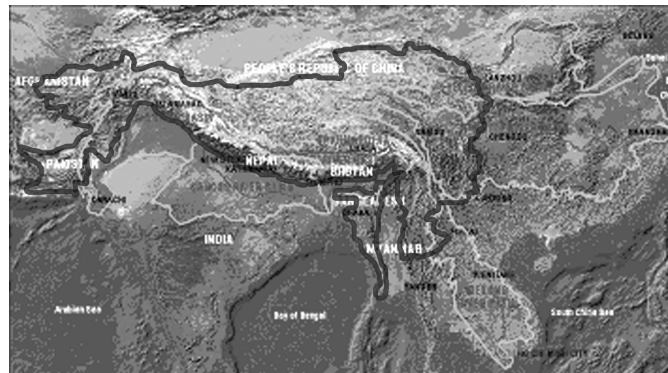
Farming Systems in the HKH Region

Eklabya Sharma and Elisabeth E. Kerkhoff

Introduction

The Hindu-Kush Himalaya (HKH) region has been identified as one mountain eco-region. The Himalayas in the region form a continuous mountain range. Though the range is politically split up in eight different countries, there are similarities in characteristics, opportunities as well as constraints between those countries. Therefore, a regional approach is promoted for the proper management of resources they provide. On the other hand, the region is characterised by rich ecological and biological diversity, caused by the presence of altitudinal and climatological extremes within a relatively small area, and rich cultural diversity as well. The region is demarcated in Figure 2.1 by the bold line. The Himalayas form the upstream part of six major river basins of regional importance, including the Indus, Ganges, Brahmaputra, Mekong, Yangtze and Yellow river, which are demarcated by the thin line. The area extends 3,500 km from east to west. Its area is 4.3 million sq km and it has about 150 million inhabitants. The mountains are young and fragile and in terms of land use 39 percent is pasture, 21 percent is forest, 11 percent is covered under protected areas and five percent is used for agriculture.

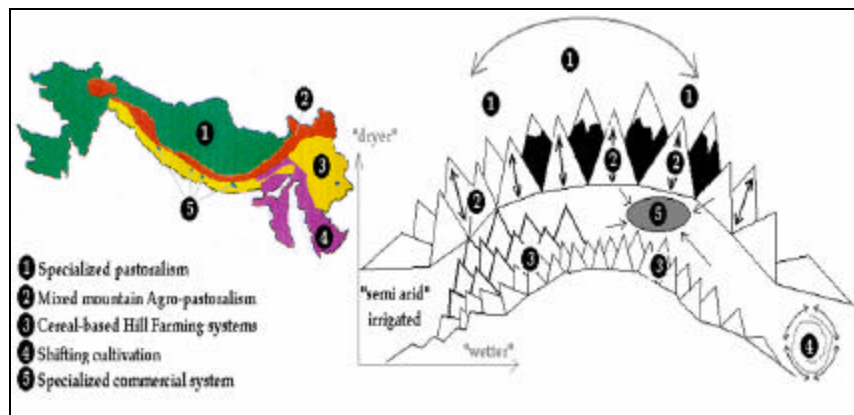
Figure 2.1: Map of the HKH region (Showing countries and river basins)



More relevant for research and development efforts is the identification and description of the farming systems that exist within the region, as they give an idea of the management of natural resources. The International Centre for Integrated Mountain Development (ICIMOD) identifies five farming systems within the HKH region. In the high altitude areas, there are specialised pastoralism and mixed mountain agro-

pastoralism whereas in the mid-hills, there are mixed crop-livestock farming systems, shifting cultivation and a variety of specialised commercial systems. The geographical position and coverage of the farming systems are depicted in Figure 2.2 in the map on the left. On the right they are depicted according to elevation. In the following part a brief description of all five is given.

Figure 2.2: Overview of the farming systems in the HKH region



Specialised pastoralism

Specialised pastoralism exists in the alpine areas of the high Himalayas, at altitudes above about 4,500 m, and is most prominent on the Tibetan plateau and surrounding fringes, as well as in Pakistan and Afghanistan. Conditions are tundra and agricultural crops are non-existent. People are completely dependent on the rangelands in which they graze yaks (*Bos gruniens*), which form the backbone of the farming system. It is a transhumant system, and the yaks are used for subsistence food production, transportation for trade, and in recent times both people and livestock are used in tourism.

The rangelands are under increasing pressure and their carrying capacity for animals has exceeded in some areas. The options to diversify livelihoods are limited.

Mixed mountain agro-pastoralism

The mixed mountain agro-pastoralism is found at slightly lower altitudes, but still lies within the alpine climatic zone at altitudes between around 3,800 and 4,500 m. Livestock production is undertaken in the high altitude areas, whereas large amounts of farmland have been cultivated in the lower valleys of the zone. In river valleys, small scale forestation has been

carried out using willow (*Salix spp.*) and seabuckthorn (*Hippophae spp.*) as well as fruit trees such as apple and peach. Barley is the predominant grain crop (Tashi *et al.*, 2002). While cropping is for subsistence, cash income is mostly derived from livestock. The farming system can be either transhumant or sedentary, and is characterised by strong traditional community institutions (e.g. *Dzumsa* in Sikkim) and rich traditional ecological knowledge.

The major constraints this system is facing are high pressure on rangelands and pastures, small land holdings for cropping, limited access to common property resources (CPRs) and weak market linkages. However, there is a high potential for diversification and niche products.

Cereal-based hill farming system

The cereal-based hill farming system (also called mixed crop-livestock farming system) is the most typical for the mid-hills found across India, Nepal and Bhutan and the Yunan and Sichuan provinces of China. These hills are characterised by steep slopes at altitudes from 200 m up to 3,500 m. In the mixed crop-livestock farming systems, livestock production and food production systems are closely integrated. Crops provide feed and fodder, while in return livestock supply draught power and manure, as well as milk and meat as a source of cash income. A close link also exists between livestock and CPRs. Nutrients from forests, support lands, and crop residues fed to animals are recycled back to the cropland as manure. This complex inter-relationship between forests, grasslands, livestock, and crops in mountain farming systems has contributed to the sustainability of mountain agriculture for generations (Tulachan and Neupane, 1999).

Ruminants include cows, buffalos, goats, and sheep, and the main grain crops are rice, maize, wheat and millet. Production is mostly for subsistence, and farmers opt for spreading of risks by adopting many options rather than specialising. High soil erosion, including landslides, is common in this area, and fertility and production levels are low. However, opportunities for improvement are not yet fully exploited.

Shifting cultivation

Shifting cultivation is also called swidden agriculture, or popularly known in India as '*Jhum*'. Within the HKH region, it is most predominant in the North East of India, in Bhutan, in the Chittagong Hill Tracts of Bangladesh, and in Myanmar. However, it is also practiced in a few places in Nepal and the Central Himalayas. The agro-ecological conditions are similar to that of the mixed crop-livestock system, except for the higher levels of rainfall that occur in the Eastern Himalayas. It is characterised by the sequential rotation of forest vegetation and cultivated food crops, and is closely

linked with socio-cultural values that are central to the lives and livelihood of shifting cultivators and their communities (Garrity and Lai, 2001).

Under the broad term of shifting cultivation, a wide range of practices can be grouped. Their distinction is important, especially for sustainability assessments. According to Brown and Schreckenberg (2001), there is a wide variety of farming systems encompassing stable rotational systems, extensive forest fallow cultivation and forest mining. Researchers at North East Hill University in Meghalaya have distinguished more than 30 different types of shifting cultivation (Tiwari, 2002). The main constraints this system is facing are the shortening of cycles, which in some places has led to unsustainability, and an over-simplified blanket policy against the practice.

Specialised commercial systems

This system exists in pockets mostly in the mid-hills. Some examples are tea (Darjeeling), apples (Himanchal Pradesh), mandarin oranges (Eastern Himalayas), and spices like large cardamom (Sikkim). At the farm level, most of these cash crops are grown as an additional option next to food crops. Although, tea is traditionally grown in large estates, small-scale farmers have started to plant tea at a smaller scale nowadays on their farms. Farmers have to decide whether to produce for cash income, and become dependent on the market, or for food production and spread the risk. The trend is more and more towards more cash crop production, but only some farmers have left food crop farming completely.

The specialised commercial systems have a high potential for poverty alleviation in the mountain areas because of cash income generation. In India, most of the crops are exported and contribute to the gross domestic product of the respective states as well as of the nation .

Most of these are typically niche products, meaning that the places where they are grown have an absolute advantage for their production. This forms protection against market competition, but on the other hand, government attention for agricultural extension and development is sometimes less, and opportunities for up-scaling these production systems in other areas are limited. Furthermore, there are constraints for marketing production in the mountain areas, like accessibility and input availability. As a consequence, less input intensive systems and high value low volume products have an advantage. Products benefit greatly from processing and value addition at the local level and proper marketing development are not only essential for profit, but also to protect systems against the impact of open market economy.

The case of large cardamom cultivation in Sikkim is described in more detail below because it is a good case of a niche product. It is suitable for commercialisation in the mountain areas, and it has potential for up-scaling within the region.

Large cardamom is a perennial cash crop, native of Sikkim, which is grown beneath the forest cover on marginal lands. The cultivated species is *Amomum subulatum* Roxb and belongs to the family of Zingiberaceae. Its capsule contains about three percent of essential oil rich in cineole, and is used as spice and condiment. It is grown in an agro-forestry system because it needs a relatively dense shade tree cover. Its leaves show burn marks in case of excessive direct sun light. In some areas, the shade tree used in new plantations and large patches of existing large cardamom agro-forestry systems is the N₂-fixing Himalayan Alder (*Alnus nepalensis* D. Don), but there are quite a number of other common shade trees, which are grown singly or in combinations. In other areas, it is even grown under natural forest cover. The large cardamom agro-forestry practice thus supports conservation of tree biodiversity in the region, though use of the *Alnus*-cardamom system has proved more profitable (Sharma *et al.*, 2000).

The Himalayan alder is a native and common fast growing species in the Eastern Himalaya, which is nodulated with *Frankia*, and effective in N₂-fixation. Because of that large cardamom can be grown without much labour input, and without the depletion of soil nutrient levels. The alder is a pioneer coloniser on landslide affected sites and an important fallow species in shifting cultivation. It also functions as an associate species in *Cinchona* plantations (Sharma and Ambasht, 1984).

In terms of environmental sustainability, cash crops like ginger and mandarin oranges have caused rapid nutrient depletion of the soil, whereas the permanent tree cover of the large cardamom based system ensures that soil quality is maintained, even on steep slopes. One of the advantages which make it especially suitable for mountain conditions where accessibility and access are restricted is that it is a low volume crop that nevertheless has high economic value. Apart from its high-income value and the fact that it is not labour intensive, large cardamom is a non-perishable crop (Sharma *et al.*, 2000).

The large cardamom agro-forestry system has traditionally been developed by the Lepchas of Sikkim, but in recent times it has spread to other countries as well. The cultivation of large cardamom in the world is presently localised only in the Eastern Himalayas viz. Bhutan, Sikkim and Darjeeling in India and eastern Nepal, where it generates annual revenue of US\$ 21 million from 52,000 ha of agro-forestry system. In all, large cardamom agro-forestry can be considered an example of a mountain niche that is successfully harnessed in an ecologically sustainable manner (Sharma and Sharma, 1997, Sharma *et al.*, 2000).

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Globalisation and Mountain Agriculture: A Process of Integration through Disintegration

N. S. Jodha

Globalisation and fragile mountain areas

Put simply, globalisation process implies adoption of market friendly and market-driven economic policies and programmes specifically directed to liberalisation of trade and exchange policies, reorienting development and investment priorities and restructuring of rules and provisions guiding economic transactions as well as roles of different actors in the process, as dictated by the pressures and incentives generated by global economic forces and their legal and institutional instruments (UNDP, 1999). Its key implication relevant to present discussion is the fact of according primacy to global perspectives and external concerns even while dealing with the local problems, and in the process disregarding the local perceptions and practices. The mechanisms through which global perspectives could be imposed at the micro-level (or in mountains) contexts are commodity trade and associated resource use as well as production patterns, restructuring of property rights and access to resources, dismantling of existing regulatory provisions and their enforcement measures, curtailment of welfare and promotional support for the needy, promotion of preferred technologies as dictated by the market requirements, which, in turn, are insensitive to both social and environmental concerns (Norgaard, 1999). Mountain areas and communities are likely to face a range of problems in the context of above mentioned changes and pressures, which may accentuate the poverty promoting circumstances in mountain areas.

The presumed virtues of globalisation, such as the greater gains of free flow of resources and products ensuring more efficiency as well as greater growth of wealth and welfare at global level; and assigning of the development and distribution business to the forces of market, which through incentive-driven transaction can perform the above business more efficiently etc. (World Bank 1999), have a number of questionable assumptions behind them (South Center, 1996). The latter become more clear when the process of globalisation is viewed in the micro-level context, e.g., with reference to mountain areas and their communities.

Globalisation and mountain areas

To begin with, the process of globalisation tends to create the circumstances that are beyond the control of communities in mountain areas. This may marginalise the nature-endowed economic niche of mountain areas. It would force them to interact as a weaker party in the competitive world market. The process is governed by the driving forces, which are not sensitive to the concerns of fragile ecosystems and their residents. Furthermore, the process is so rapid and overpowering that the affected communities have neither sufficient lead-time nor required capacities to adapt to rapid changes. If the scattered emerging evidence is any indicator, as a final consequence, globalisation may accentuate the process of exclusion of local communities from the specific resources as well as the pace and pattern of rapid economic transformation in mountain areas. It may further accentuate the inequities associated with highland lowland economic links. In particular, the exclusion process may cause loss of local access to resources and promote degradation of resources; marginalisation of well-adapted production options and practices, which in the past helped in environmental sustainability and livelihood security of people in mountain areas (Jodha, 2000a). More specific and interrelated contexts for understanding the potential repercussions of the rapid globalisation process on mountains and their dependent populations are elaborated below.

One can understand the possible consequences of globalisation for mountains by putting its key features in the context of circumstances characterising mountain areas under the following categories: (a) visible incompatibilities between the driving forces of globalisation and imperatives of specific features of mountain areas; (b) possibility of globalisation accentuating the negative impacts of past interventions; (c) erosion of practices and provisions imparting resilience and protection to mountain communities (including welfare programmes); (d) loss of niche and access to opportunities and emerging 'exclusion' process. Based on the above understanding one can also think of (e) indicative approaches or possible ways to influence and adapt to globalisation process in mountain areas. Table 3.1 summarises the details.

Visible incompatibilities between the driving forces of globalisation and imperatives of specific features of mountain areas

According to Table 3.1, section (a), the globalisation process is driven by market forces (guided by short term profitability and external demand) that promote selectivity and narrow specialisation in the choice of production activities, encourage indiscriminate resource use intensification, and over extraction of niche opportunities/resources with

little concern for their environmental and socio-economic consequences. These orientations are directly in conflict with the imperatives of specific conditions of the mountain areas rooted in their high degree of fragility, marginality, diversity, specific niche etc. These specific features create objective circumstances, which favour diversification of resource use and production activities, balancing of intensive and extensive uses of land resources as well as that of production and protection needs facilitating environmental and livelihood security in the fragile ecosystems. Some evidence of the above process at the farm level is already visible through strong focus on selected high value crops, including horticultural crops with intensive use of chemical inputs in hills (Nagpal 1999). The environmental and productivity impacts of monoculture or reduced diversification are also increasingly felt (Jodha 19997a and Kreutzmann, 1995). Over extraction of resources (timber, mineral, hydropower, herbs) with their negative side effects is also well recognised.

Table 3.1: Potential sources of adverse repercussions of globalisation for mountain areas and communities and approaches to adapt to them ^a

Potential sources	Elaborations/examples
a) Visible incompatibilities between: (i) Driving forces of globalisation; and (ii) Imperatives of specific features of mountain areas (fragility, diversity, etc.)	(i) Market-driven selectivity, resource use intensification and over exploitation induced by uncontrolled external demand versus; (ii) fragility-marginality induced balancing of intensive and extensive resource uses; diversification of production systems, niche harnessing in response to diversity of resources Consequences: Environmental resource degradation: loss of local resource centred; diversified livelihood security options; increased external dependence
b) Accentuation of negative side effects of past development interventions under globalisation due to their common elements (approaches, priorities, etc.) with adverse effects on mountain areas	Common elements between the past public interventions and market-driven globalisation: (i) Externally conceived, top-down, generalised initiatives (priorities, programmes, investment norms) with little concern for local circumstances and perspectives, and involvement of local communities; and (ii) indiscriminate intensification at the cost of diversification of resource use, production systems and livelihood patterns causing resource degradation (e.g., deforestation, landslides, decline in soil fertility, biodiversity); general indifference to fragile areas/people excepting the high potential pockets creating a dual economy/society; over-extraction of niche opportunities (timber, mineral, hydropower, tourism) in response to

Evolving *Sui Generis* Options for the Hindu-Kush Himalayas

Potential sources	Elaborations/examples
	<p>external (mainstream economy) needs, with very limited local development</p> <p>Consequences: Environmental degradation and marginalisation of local resource use systems, practices, and knowledge etc., likely to be enhanced due to insensitivity of market to these changes and gradually weakened public sector</p>
<p>c) Globalisation promoting erosion of provisions and practices imparting protection and resilience to marginal areas/people (including disinvestments in welfare activities)</p>	<p>(i) Traditional adaptation strategies based on diversification, local resource regeneration, collective sharing, recycling, etc., likely to be discarded by new market-driven incentives and approaches to production, resource management activities; and</p> <p>(ii) shrinkage of public sector and welfare activities (including subsidies against environmental handicaps, etc.) depriving areas/people from investment and support facilities (except where externally exploitable niche opportunities exist)</p> <p>Consequence: Likely further marginalisation of the bulk of the mountain areas and people</p>
<p>d) Loss of local resource access and niche-opportunities through the emerging 'exclusion process'</p>	<p>Niche resources/products/services with their comparative advantage (e.g., timber, hydropower, herbs, off-season vegetables, horticulture, minerals, tourism etc.) and their likely loss under globalisation through:</p> <p>(i) Market-driven over extraction/depletion due to uncontrolled external demands;</p> <p>(ii) focus on selective niche, discarding diversity of 'niche', their traditional usage systems, regenerative practices, indigenous knowledge;</p> <p>(iii) transfer of 'niche' to mainstream prime areas through market-driven incentives, green house technologies, infrastructure and facilities (e.g., honey, mushrooms, flowers produced cheaper and more in green house complexes in the Punjab plains compared to naturally better suited Himachal Pradesh); and</p> <p>(iv) acquisition and control of access to physical resources: forest, water flows, biodiversity parks, tourist attractions by private firms through sale or auction by government, depriving local's access, destroying customary rights and damaging livelihood security systems</p> <p>Consequence: Loss of comparative advantages to fragile areas or access to such gains for local communities</p>

Potential sources	Elaborations/examples
e) Adapting to globalisation process, possible approaches to loss minimisation	<ul style="list-style-type: none"> (i) Sharing gains of globalisation through partnership in primary and value adding activities promoted through market; building of technical and organisational capacities using NGOs and other agencies including market agencies to promote the above; (ii) Promotion of local ancillary units (run by locals) to feed into final transactions promoted by globalisation. This needs institutional and technical infrastructure and capacity building; (iii) Provision for proper valuation of mountain areas resources and compensation for their protection, management by local people for use by external agencies; (iv) Enhance sensitivity of market-driven initiatives to environment and local concern to be enforced by international community and national governments; (v) All the above steps need local social mobilisation, knowledge generation and advocacy movements, and policy framework as well as support. <p>Consequences: If above steps are followed, there are chances of influencing the globalisation process and reducing its negative repercussions for mountain areas/people</p>

Table adapted from Jodha, 2000a.

Accentuation of extractive patterns of resource use

It may sound strange, but as far as mountains are concerned, most of the past public sector determined development interventions and the new market-driven processes under globalisation share a number of common elements (Table 3.1 part 'b'). They include extension of, externally conceived and designed, very much standardised and highly top-down, interventions to mountain areas with little concern for local biophysical and social circumstances; indiscriminate resource use intensification with little concern for fragility and diversity; over extraction of niche resources to meet external demands; and imposition of external perspectives, institutions and technologies, marginalising the traditional well adapted systems (Jodha, 1998). These elements had been the source of negative side effects of development interventions in the fragile areas (Banskota and Jodha, 1992). The globalisation process, governed by external market forces (and being much less sensitive to local circumstances), is likely to further accentuate the above trends. Gradually weakened state, yielding

to the incentives and pressure from the globalisation process, would find it increasingly difficult to act against the accentuation process.

Globalisation can further strengthen another feature of the past interventions, namely coexistence of policy makers' general indifference towards mountain areas and their strong focus on niche opportunities, which could be exploited for the mainstream economy. The significant niche resources (timber, hydropower, herbs, minerals, etc.) offer attractive opportunities for the market agencies under globalisation in mountain areas, to exploit the resources with limited benefits for the local populations and the bulk of the gains going to the mainstream economy outside these regions. Due to unequal highland-lowland economic links, this may further increase the already high extent of uncompensated flows of resources and products from mountains to lowlands (Jodha, 1997b).

Erosion of practices and provisions imparting resilience, protection and livelihood security

There are two broad categories of provisions and practices that have helped mountain people in the past. First, the people's traditional adaptation strategies to ensure both protection and use of fragile and marginal resources as well as security of their livelihood. These are manifested through diversified and flexible resource use, resource recycling, common property resources and various risk sharing arrangement etc. (Jodha, 1998). Despite their decline in the recent decades, these practices are still important part of their economic and social transaction. To this one may add the gains from local harnessing and exchange of petty niche products with comparative advantage to highlands.

Second, despite their limitations, the public policies, through welfare programmes and subsidised development interventions have been helping the mountain people to compensate for the natural and other handicaps faced by them. Public sector plays a crucial role in these activities.

The above protective provisions and practices are likely to decline due to pressures generated by globalisation (Table 3.1 part 'c'). Accordingly, the traditional practices, despite their continued rationale and utility, are likely to be disregarded and marginalised by market-driven processes under globalisation. We have already alluded to such traditional practices and arrangements, which will have serious backlash from the new short-term profitability centred production and resource management systems driven by external tradability and domination of external perspectives. There is a strong possibility of emergence of a dual

system consisting of rich and resourceful groups/pockets participating in the change process and the bulk of the poor left with limited options. This is already visible through emerging gaps between the progressive and transformed areas participating in market processes and the bulk of mountain areas still remaining out of it (Jodha *et al.*, 1992).

Similarly, with rapid shrinkage of public sector and reduced role of the state, changed efficiency and productivity norms for resource allocation and performance assessment under the strong 'market dominated regimes', both welfare and subsidy supported development programmes are likely to be de-emphasised. The consequent disinvestments in welfare and protective programmes are already emphasised under structural adjustment plan (Roy, 1997), and communities are losing their niche resources and opportunities. This forms a part of 'exclusion process' as elaborated below.

Loss of niche and access to opportunities: an emerging 'exclusion process'

Mountains are endowed with unique environmental and resource characteristics, which have potential for products and services with comparative advantage to these areas. As already mentioned timber, hydropower, off-season vegetables, seed production, valuable herbs, minerals and tourism, etc., constitute niche for mountains. Under the market-driven compulsions and facilities, these areas may face a loss of their niche. The process is likely to include the following (Table 3.1 part 'd').

Production and trade related exclusion

First, the survival and sustainable use of niche resources are closely associated with their protection while using them and interlinking them with diversified resource based activities. Both of these conditions may not be satisfied in the face of external market-driven pressures and incentives for selective over exploitation and indiscriminate resource use intensification, propelled by trade liberalisation.

Second, the globalisation process would bring in new sets of incentives, technologies, infrastructure and support systems, which in response to high demand and profitability would facilitate creation of human made facilities for production of items outside mountain areas, in which the latter hitherto had a comparative advantage. Already, one comes across several developments of this nature. For example, products such as honey, mushroom, flowers, herbs, off-season vegetables and quality crop seed, hitherto produced mainly by mountain areas such as Himachal Pradesh (India) are now produced much cheaper and in a larger quantity under the massive green house facilities in the plains of the

Punjab. There is yet another development encouraged by the trade policies, which may marginalise the 'niche' opportunities of mountain areas by way of substituting their products by cheaper imports. Thus, human-made facilities (circumstances) tend to increase the comparative advantages of the plains over the nature-endowed advantages of mountain areas. Negative impact of (OGL-open general licence for imports in India), on apple from hills is one of the examples (Sharma, 1999).

Resource-related exclusion

The production and trade related 'exclusion process' indicated by the above possibilities is further accentuated by resource based 'exclusion'. This implies alienation of the local communities from their niche resources and associated niche opportunities. Accordingly, in the situations where due to physical or economic inseparability of niche from its spatial location, the marginalisation of niche opportunities of mountains is also possible through production and trade mechanisms. In such a situation, a different pattern of depriving the local communities from their niche opportunities is emerging in the Hindu-Kush Himalaya (HKH) region. This involves external agencies (e.g., private firms, rich individuals, etc.) increasingly acquiring ownership or exclusive access and usage rights to landscapes and specific resources in mountain areas. Disregarding the customary right and local control and access to such resources and products, large scale areas are given by the state to private companies in the name of resource development and product harnessing. Auctioning or leasing of so-called "wastelands", leasing of areas for mining or development of herbal farms, rights to water flows for hydropower, forest for timber, enclosures for parks and biodiversity, prime spots for tourist resorts (and private dwellings for the rich) are some of the examples of changing patterns of ownership and access to resources, seen in different countries of HKH (Jodha 2000b). These developments, which alienate the local communities from their own resources, are complemented by the well known global initiatives manifested by global treaties and conventions, where enlightened national and international policymakers including donors rather than market forces play the key role in alienating people from their own resources (e.g., in conservation areas, sanctuaries and parks, etc.) (Zerner, 1999).

Responding to the changes

Table 3.1 summarises a few possible approaches to respond to the above negative changes and harnessing the potential opportunities associated with globalisation.

Mountain agriculture in the globalisation context

Most of the above discussions about globalisation and mountain areas apply to mountain agriculture defined as diversified and interlinked land based activities including annual crops, horticulture, agro-forestry, pastures and other common property resources. In the following discussion, we address the issues of specific features or rather weaknesses of mountain agriculture in the context of globalisation-induced changes. Before commenting on the above, we may respond to some of the often-repeated questions on the subject.

Some general questions

Based on the postings during an ICIMOD organised E-Conference on Globalisation and Fragile Mountains during 2001 the following questions may be listed.

- (i) How do globalisation induced/driven provisions and practices designed at macro level percolate to micro/community levels where bulk of the agricultural activities take place?
- (ii) How does globalisation process affecting agriculture (and other sectors) differ from the conventional process of commercialisation, marketisation of mountain agriculture specially in the better accessible and progressive areas?
- (iii) How could the impacts of globalisation differ between better and relatively less accessible areas as well as between the areas dominated by different major product groups (e.g., cereals, fruits, annual crops, perennial crops, etc.)?

As a quick response to the above questions we may state the following:

- (i) As stated earlier, put in simple terms, globalisation is a market-driven and market friendly process that at least in theoretical terms is geared to integration of national economies into wider global economic systems through promoting free flow of resources, products and services as determined by market forces and norms. This is encouraged by market friendly state policies such as liberalisation, deregulation, withdrawal of the state from economic activities and new institutional enforcement mechanism such as the norms of the World Trade Organisation (WTO), etc.

Most of the steps (policies, programmes, provisions) manifesting the above features are determined at macro level and rarely directly focused on micro-level situation. But the

changes in the macro level provisions directly or indirectly get translated into changes in support systems, incentives, disincentives, property rights and regulations, new links and facilities, changed approaches toward well established institutions and practices, etc. It happens both formally and informally. In light of the above, the components or features of globalisation with immediate relevance to mountain agriculture would take the form of changes reflecting primacy to market and marginalisation of role of state and communities; enhanced role of external factors (demand process, profitability, trade links, etc.) in the local decisions about resource use, product choices, product disposal patterns and usability and efficacy of local institutional arrangements related to agriculture and natural resource use.

- (ii) Globalisation (i.e., patterns of above changes) differs from the traditional or existing patterns and processes of commercialisation of mountain agriculture in terms of the above aspects as well as in terms of new institutional and incentive-disincentive patterns, speed of change, new market-determined norms of efficiency and goals of agricultural activities. To reiterate, the process of globalisation gets initiated at macro level through country level, market friendly policies/programmes (as pushed by the WTO etc.) and percolates to micro-level through changes in the provisions, support systems, types of incentives, etc., affecting local activities. Mountain agriculture's ability to adapt to these changes determines the degree of losses and gains it has to encounter due to globalisation.
- (iii) The extent of above changes and their impacts would be much higher in the accessible and relatively commercialised areas, especially those producing the products that have market outside their locations and where market-driven processes have greater chances of altering the existing situation positively or negatively. The inaccessible and isolated area, with predominance of subsistence-oriented agriculture may not have immediate effects of globalisation process unless their physical or information accessibility (to link with external areas) is improved. If their accessibility through globalisation induced investments, infrastructure etc. is improved, they may get exposed to impacts of globalisation as visible in already commercialised, accessible areas. If that results in cheap import based increased external dependence, the local livelihood security might get adversely affected.

Mountain agriculture in competitive context

As stated earlier, according to its advocates, globalisation is a market-driven process for enhanced global growth and prosperity. However, as the recent history of this change shows, the gains of globalisation (i.e., through unrestricted trade and resource flows) are closely and directly linked to international competitiveness and profitability of an activity i.e., mountain agriculture. This, in turn, at the resource use and production level is linked to high productivity and efficiency, often associated with specialisation and ability to harness economies of scale of production, ensuring generation of tradable surplus. As indicated by Table 3.2, the mountain conditions such as fragility, marginality, inaccessibility and farmers' 'non-market' oriented traditional measures constrain the fulfilment of the above-mentioned conditions on the part of mountain agriculture.

Besides the above production process-level factors, another category of factors that help ensure competitiveness of agriculture relates to post production (e.g., processing, marketing) processes characterising agriculture. The most important among them is infrastructure and access to relevant market for agricultural products. Quite related factor is the equitable and effective external links, which ensure fair terms of trade and unconstrained flow of products, services and resources. This helps translate the high competitiveness of production systems into producers' incomes. However, in mountain areas, again due to inaccessibility, high cost of infrastructure (due to fragility) and poor mobility, traditional isolation and social marginality etc., the above conditions are very rarely satisfied (See Table 3.1).

In the context of globalisation, due to the lack of human capacities for quick response to the emerging changes and generally non-commercial orientation of economic activities in most areas, altering the above negative factors in the short run is quite difficult. Besides, the lack of requisite human skills, capacities, resources and other physical and market constraints adversely affect the potential gains associated with mountain niche and diversities, which if properly harnessed, can boost the standing of mountain agriculture in the global market. Poor external links and associated low bargaining capacities make the terms of trade in niche products highly inequitable and exploitative. The above picture (indicated in Table 3.2) presents a general picture. In some accessible areas situation could be better and brighter.

Table 3.2: The indicative factors/conditions potentially ensuring gains from globalisation and their status in mountain areas

Mountain features constraining or favouring conditions required for gains from globalisation	Indicative conditions/processes promoted by and conducive to gains from globalisation					
	Relating to production process			Relating to post production processes etc.		
	High productivity involving resource use intensification, high input availability and absorption capacity	Specialisation and economies of scale	Tradable surplus generation	Infrastructure facilities, access to markets	Equitable effective external links	Human capacities , quick response to changes
Limited Accessibility: distance, semi-closeness, high cost of mobility and operational logistics, low dependability of external support, or supplies	(-) ^a	(-)	(-)	(-)	(-)	(-)
Fragility: vulnerable to degradation with intensity of use, limited low productivity/pay-off options	(-)	(-)	(-)	(-)	(-)	(-)
Marginality: limited, low pay-off options; resource scarcities and uncertainties, cut off from the 'mainstream', social vulnerability	(-)	(-)	(-)	(-)	(-)	(-)
Diversity: high location specificity, potential for temporally and spatially inter-linked diversified products/activities	(+) ^a	(-)	(+)	(-)	(-)	(-)
Niche: potential for numerous, unique products/activities requiring capacities to harness them	(+)	(+)	(+)	(-)	(-)	(-)
Human adaptation mechanisms: traditional resource management practices-folk agronomy, diversification, recycling, demand rationing, etc.	(-)	(-)		(-)	(-)	(-)

Source: Table adapted from *Jodha, 1997a* applicable to different development contexts in mountain areas

(-) and (+) respectively indicate "extremely limited" and "relatively higher degree" of convergence between imperatives of mountain features and the conditions associated with potential gains from globalisation. The situation may differ between more accessible (commercialised) and poorly accessible areas.

Some fundamental risks

Both the proponents and opponents of globalisation agree (though in different measures) that globalisation process carries both risks and opportunities for the participants in the process. But the participants, which are ill-equipped to participate in the change process, are exposed to greater risks and limited opportunities. Mountain areas (or mountain agriculture) fall under this category. The major risks faced by mountain agricultural system are discussed below.

i) Systematic disintegration: A genuine and effective participation of mountain economy, its sectors etc., in the globalisation process implies their integration into market-based wider economy. However, this integration would also involve some disintegration of existing systems (Table 3.3).

To illustrate the situation, one can look at mountain agriculture as seasonally, spatially interlinked, diversified land based activities, where output of one activity serves as input for another. Farming-forestry-livestock link is a case in point. However, in the globalisation context, the agricultural systems as a whole may not have a place in the wider market economy. Instead, the individual products e.g., hill apple or Yak cheese or buckwheat, specific flowers etc. may become important items in external market. Their local demand and use as main or by products and as input for other agricultural activities may cease to exist. To enhance their productivity and profitability, their inputs needs (types) may also get out-sourced (e.g., imported feed for dairying). On their own such products may become important, integral parts of wider economy, but as a side effect the same would contribute to the disintegration of existing interlinked production and resource use systems.

Furthermore, the contribution of diversified and interlinked land based activities to local environmental sustainability, resource regeneration and stability would cease to exist. The above mentioned disintegration phenomenon may have far-reaching negative implications for indigenous knowledge systems; and people's livelihood/food security measures, collective risk sharing and traditional institutional arrangements for resource conservation. All these provisions and practices would be adversely affected by the changes in "trading or transaction" partners and disappearance of local inter-activity and functional links. The final consequence of such change would be disintegration of community's collective stake in local natural resources and breakdown of social systems-ecosystem links. In the long run, dominance of negative or positive consequences of this "disintegration-reintegration (in to wider economy) process" would depend on how effectively and wisely mountain areas (communities) are able to adjust to the change. However, unlike in

the past, the lead-time offered by rapid globalisation for adaptation is too short.

ii) Increased sources and exposure to vulnerabilities: With the globalisation promoted processes the past sources of resilience and defences against vulnerabilities are likely to decline. Diversification of agriculture as an age-old measure to reduce risk, and collective institutional arrangements to share risks are two examples of provisions likely to be adversely affected by globalisation. To this, one can add the (already alluded) fact of reduced state support to mountain agriculture through research and development (R&D), infrastructure, welfare and a number of subsidies because of marginalisation of public sector under globalisation process (Jodha 2000a, 2000b).

iii) Erosion of comparative advantage: As already discussed in the beginning, mountain areas and agriculture are losing their niche opportunities due to specific trade policies and the production processes supported by investment and technologies (under global arrangements including contract farming) in plains to produce products hitherto confined to mountain areas. Off-season vegetable is a case in point.

Adaptation strategies

The mountain agriculture's chances of having negative impacts of globalisation are directly linked to its degree of unpreparedness to minimise the risks and harness new opportunities. To enhance the capacity to adjust to the new challenges and opportunities, a few tentative steps are indicated under Table 3.4. Accordingly, clearer understanding of sources and processes of risks and opportunities (differentiated for diversified situations of better and poor accessibility of areas) is the first step. The subsequent steps could be broadly focused on key constraints indicated by Table 3.3. Hence, focus on enhancing productivity and competitiveness of mountain agriculture; enhancing human-made support systems to complement nature-endowed unique niche opportunities; and building local capacities to respond to new changes are some of the important steps. Besides, there has to be some arrangements to secure proper pricing and compensation for environmental services (international public goods e.g., biodiversity, fresh water, usable herbs, etc.) provided by mountain regions, which have roots in natural resources usage/management systems followed by the communities. A systematic research effort can help identify operational steps in these areas (Jodha, 2000b).

Table 3.3: Globalisation and mountain agriculture possible negative repercussions

Risks	Explanations
Inherent limitations of mountain agriculture to effectively compete in the globalised market	Primacy of biophysical conditions (constraints), limited human made support systems to make mountain agriculture acquire high productivity, market determined efficiency, profitability and competitiveness; market does not recognise holistic, diversified, sustainability promoting contributions of mountain agriculture
Breakdown of systematic integrity of mountain agriculture; decline of social system-ecosystem links	Based on profitability, external demand/utility, etc., globalisation tends to favour individual components of agricultural system (in terms of their external "input-sourcing" and output disposal systems) and in the process eliminate their internal links in the context of mountain agriculture as an integrated and diversified resource use and production system with well recognised social and ecological functions (e.g., decline of farming-forestry-livestock linkages with shifts in their input sourcing/output disposal channel/destinations)
Increased sources and exposure to vulnerabilities with rising primacy of market-driven processes/practices	(i) Decline of agricultural diversification, collective risk sharing arrangements, customary rights and resource access; (ii) withdrawal of public sector support for welfare and development; (iii) increasing role and domination of external perspectives in local situation (investment/ technologies etc.); and (iv) lack of skills, capabilities, resources of mountain communities to quickly adapt to the change, enhancing their risks and vulnerabilities
Erosion of mountain agriculture's, niche products/ services/opportunities with comparative advantage	Through (i) liberalised trade policies; (ii) declining public sector support; (iii) increasing possibilities of mountain products being available from plains (due to new technologies and investments)

The following actual/potential changes will differ between accessible/progressive areas and less accessible ones. Some of these changes have been observed in HKH during the exploratory work on the subject supported by MacArthur Foundation.

Table 3.4: Globalisation and mountain agriculture potential opportunities and strategies

Potential opportunities/ strategies	Explanations
Basic strategy: understand challenges and opportunities and identify/promote response options	(i) Focus on: differential impacts of globalisation due to mountain diversities (e.g., accessibility wise different area); information and understanding of processes of impacts (see Table 3.3) to help design differentiated responses; (iii) combination of general and specific responses
<p>Focus on enhanced productivity, efficiency and competitiveness of mountain agriculture/products</p> <p>Human-made support systems, and infrastructure to reduce the biophysical constraints due to fragility, inaccessibility, marginality, etc. and enhance equitable external links of mountain areas.</p>	<p>(i) Explore, promote market opportunities for exclusive mountain products such as herbs, flowers, fruits, etc.; (ii) focus on human-made support systems to complement (now eroding) nature-endowed niche opportunities in mountains</p> <p>Increased investment and relevant technologies for mountain agriculture and areas, which help ensure high productivity without resource degradation; use of information technologies as a measure to reduce impacts of inaccessibility; productive use of fragile and marginal land resources; and value adding activities as part of rural enterprises</p>
Local capacity building to equip mountain communities to effectively adapt to changes	Lack of skills, resources, awareness, etc. being major factors constraining communities to effectively respond to new challenges should get high priority. Promotion of high value adding off-farm activities etc. are other priority areas to be focussed
Pricing and compensation for environmental services offered/managed by mountain areas/ communities	Mountain areas produce several international public goods (e.g., rich biodiversity, unique usable herbs, fresh water, nutrition flows and products for downstream through conservation sensitive resource use systems of communities. They should be recognised and compensated for to enhance resource flows to mountain areas.
Global advocacy of mountain issues	Promotion of mountain concerns and action at different levels based on knowledge and understanding of ground realities

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WTO and Mountain Agriculture: Preparing for a Sustainable Future

Devinder Sharma

There seems to be no respite on the agriculture front. With the international prices remaining sluggish and the developed countries refusing to reduce subsidies under one pretext or the other, the dice is heavily loaded against millions of farmers in the developing countries. With the World Trade Organisation (WTO) mired in the debate on the utility and futility of launching a new round, many agricultural issues have been pushed to the background. Outside the WTO Secretariat, however, agricultural trade is being aggressively pursued. And post Doha, agricultural trade norms are being further distorted and abused in what appears to be a desperate effort to attain and retain global supremacy.

The United States (US), for instance, is in a neck-to-neck race with the European Union (EU) on retaining the supremacy over agricultural trade. While steadily expanding foreign demand — brought on by income gains, trade liberalisation, and changes in global market structures — has helped the US exports double over the past 15 years to an estimated US\$ 53.5 billion, its market share has dropped from 24 percent of global agricultural trade in 1981 to 18 percent in 2001. The EU, on the other hand, has increased its performance from 13.5 percent to 17 percent.

"Losing six points over 20 years may not sound like much but every percentage point loss of market share amounts to US\$ 3 billion in lost export sales and a reduction of US\$ 750 million in agricultural income. But the good news is that every percentage point we can recover will add US\$ 3 billion in export sales and US\$ 750 million to agricultural income each year," Mattie Sharpless, Acting Administrator, Foreign Agriculture Service of the US Department of Agriculture had told the Senate Agriculture Committee some time back.

The US, therefore, has adopted an aggressive posture. After ensuring that the developing countries are made to conform to the WTO obligations of phasing out or lifting of quantitative restrictions (QRs) that allow easy penetration of the US farm commodities and the processed products, it is now preparing for the final assault. The new policy is directed at the 600 million "new consumers" in Asia and Southeast Asia and another 400 million in Latin America and Central America. It also meets "an eye for the eye" with the EU's Common Agricultural Policy (CAP). And in this 'clash of civilisations' the battle is primarily between the developed and the developing countries, between industrial

agriculture and food security, and between value-added functional foods and growing hunger.

The destructive fallout from the emerging global trade paradigm is being felt all over the region, though not in the same magnitude. But before we talk of the bitter political harvests and the growing disenchantment with the WTO, it is important to understand why and how the market rules play against the Hindu-Kush Himalayan (HKH) farmers.

It is now been acknowledged officially. Seven years after the WTO came into existence, on 1 January 1995, the anticipated gains for South Asia from the trade liberalisation process in agriculture were practically zero. In India, the Ministry of Agriculture have officially admitted that the hopes from an international regime that talked of establishing a fair and market-oriented agricultural trading system have been belied. In Pakistan too, the impact has been negative so far.

The WTO's Agreement on Agriculture (AoA) has incorporated three broad areas of commitments from member states, namely market access, domestic support and export subsidies. The underlying objective is to correct and prevent restrictions and distortions in the world agricultural markets. On the other hand, the trading regime has ensured that developing countries take time-bound initiatives to open up their domestic markets for cheap and highly subsidised imports of agricultural commodities in the name of encouraging competition.

Market access: Increased market access was the hallmark of the free trade agenda. It was aimed at force opening of new markets for agriculture exporters. The WTO required all members to allow a certain minimum market access for every agricultural product at five percent for developed countries and four percent for developing countries.

There has, however, been hardly any change in the volume of exports. Tariff peaks or in other words high import duties continue to block exports from the developing countries. Tariffs still remain very high, especially in case of cereals, sugar and dairy products. Sanitary and Phytosanitary (SPS) measures, which were enforced to ensure quality of the imported products, actually continue to be a major barrier in diversifying exports in horticulture and meat products. Selective reduction in tariffs by the developed countries has also blocked the exports from the developing countries. And on top of it, only 36 countries (all developed) have the right to impose special safeguard duty if agricultural imports distort their domestic market!

Developing countries like India were forced to either phase out or eliminate the QRs on agricultural commodities and products latest by 1 April 2001. India has, therefore, opened its market and in turn made the

farming community vulnerable to the imports of highly subsidised products. Already, cheaper imports of skimmed milk powder, edible oils, sugar, tea, arecanut, apples, coconut etc. have flooded the market.

Domestic support: Clever manipulation of their subsidy reduction commitments has in reality increased the support to farmers in the developed countries. In the US, subsidy to a mere 900,000 farming families has increased by 700 times since 1996. Two years before President Bill Clinton left the office, the US had provided an additional US\$ 24 billion to its farmers. In absolute terms, the farm support in the 30 richest trading countries (called the Organisation for Economic Cooperation and Development, OECD) increased by eight percent to reach the staggering figure of US\$ 360 billion in 1998.

Box: 4.1

EU's 'pick-pocketing' strategy

In the EU, to compensate for the reduction or abolition of institutional prices, crop specific per hectare payments, based on historic yields, were established in favour of cereal, oilseeds and crop producers. The compensation payments were introduced in step with the price cuts and by 1995/96 for all cereals these amounted to 54.34 European Currency Unit (ECU) per ton. Cereal farmers also received a payment per ton for the land set aside (based on historic yields). From 1995/96 this was set at 68.83 ECU per ton. Supply management was based on the definition of land eligible for compensatory payments. These "bæ areas" could not be exceeded and producers were obliged to "set aside" from production, a portion of this eligible land. Adjustments to the "set aside" rate have become the principal instrument to manage the supply of cereals to the EU market, with the set aside rate being adjusted annually in light of production, demand, stock and export situation.

To compensate for this price reduction, overall arable sector expenditures rose from 10,610.7 million ECU in 1993, to 12,643.7 million ECU in 1994 and 15,010.3 million ECU in 1995. By 1996, direct aid payments in the arable sector totalled some 15,838 million ECU, some 97 percent of total arable sector expenditures. The introduction of set aside linked to increased direct aid payments to farmers saw the area devoted to cereals production fall from 38.1 million hectare to 34.7 million hectare in 1994.

In the recent past, EU exports of cereal products have been restricted by WTO ceilings on the value and volume of cereals, which can be exported with the benefit of export refunds. In future, if EU projections prove correct, these WTO ceilings will cease to apply to wheat, maize and barley exports, since world market prices will be above the EU intervention price.

Against this background, it will be important to bear in mind the less transparent nature of EU support to cereal exports under a reformed CAP regime. The first point to note in this regard is the declining significance of export refunds in the promotion of EU exports. The objective of supporting EU production and exports of cereals and cereals based products is now primarily achieved through the deployment of direct aid to EU cereal producers.

The second point to note is the blurring of distinctions between assistance to cereal production and assistance to the production of other arable crops. This will make it more difficult to identify the distortions generated by EU public aid programme for individual products. This problem will be compounded by the introduction of more general rural development programmes, which will directly serve to defray certain costs incurred by processing companies that expand market opportunities for agricultural producers in specified areas of the EU.

The basic point to note is that before the CAP reform, the distortions generated by EU aid programmes were relatively clear-cut. In the coming years, however, the situation will be very different since no export refunds will be required on exports of wheat, barley and maize. This will not mean that distortions arising from the provision of EU public aid to the cereals sector have been removed. Overall levels of public assistance to cereal producers during the period of reform have actually increased substantially. However, in future, distortions will be far less transparent. Not surprisingly, in the WTO, the EU is quite willing to reduce export refunds but simply because they will no longer be needed.

In the coming years, the increased price competitiveness of European wheat, barley and maize will enable EU suppliers to win contracts and supply markets, which the developing country producers and processors previously served without any need for export refund assistance. The fact that the new EU system of direct aid payments is judged, at the macro-economic level, to be less trade-distorting than other forms of public aid, will provide little consolation to developing country producers who find their markets undercut by more "competitive" EU exports. The distinction is in many respects like the difference between being "mugged" and being "pick-pocketed". If one is "mugged" it is blatant and one is clearly aware of it, however, if one is pick-pocketed, one may not be aware of it at the time, but the net result is the same; one is poorer as a consequence.

Source: Implications of the reform of the EU cereal regime for Southern African countries, European Research Office and Oxfam, August 2001 .

In India, we are being told that our subsidies that are provided to agriculture, being negative (against the upper limit of 10 percent) we can still raise these. In reality, India is committed to do away with agricultural subsidies under the Structural Adjustment Programme (SAP) of the World Bank and the International Monetary Fund. In any case, India provides only one billion dollar worth of indirect subsidies to 110 million farming families!

It was anticipated that due to reduction in domestic support in developed countries, cereal production would shift from developed countries to developing countries. Empirical evidence, however, shows that such a trend is not at all visible. In other words, while the developing countries shift from cereals to cash crops like flowers and vegetables, they are left with no option but to import staple foods.

Export subsidies: The WTO enables only 25 countries to provide export subsidies for their agricultural products and commodities. Other countries, which do not have agricultural export subsidies, like HKH countries, cannot make any new provisions for it.

The Indian Ministry of Agriculture acknowledges that despite the rules being defined, the expected gains have eluded the developing countries. It was expected that with the removal of trade distorting measures, agricultural exports from the developing countries would increase. This did not happen. In fact, India has on the other hand seen a massive increase in the imports of agricultural commodities and products - from about Rs 50 billion in 1995 to over Rs 150 billion in 1999-2000 - a three-fold increase. In edible oils alone, the import bill has soared to Rs 120 billion crore. The so-called fair trading system has also not helped efficient producers in realising a higher price for their products. On the contrary, prices of most agricultural commodities are declining in the world markets.

Public stockholding of grains: Unlike the European countries where the public distribution system (PDS) was discontinued after the Second World War, its importance has grown for an overpopulated and poverty-stricken country like India. It was with the basic objective of curbing consumption and ensuring an equitable distribution of available food supplies, especially in the deficit areas and among the poorer strata of society, that the PDS was introduced more than 50 years ago.

The WTO allows developing countries to use public stockholding of foodgrains for food security purposes "provided that the difference between the acquisition price and the external reference price (i.e. the international price) is accounted for in the subsidy support". At the same time, member countries have been asked to identify the beneficiaries on the basis of "clearly-defined criteria related to nutritional objectives".

Box: 4.2

The case of Danish peas

If one is wondering as to why Indian peas producers will be unable to competitively bid for processed foods in the global market, it is important to see how Denmark manipulates the market by truly following the WTO norms.

Danish pea farmers do not benefit from price subsidies. Danish split pea processing companies do not benefit from processing and marketing aids. Danish pre-cooked split pea exporters do not benefit from export refunds. So obviously, one will think that they are very efficient producers and, of course, very competitive. But hold on.

Since pea farmers do not have to recover their full production costs from the sale price of the peas supplied to processing companies, the price at which pea farmers supply processing companies is substantially reduced. As a consequence, the price at which pre-cooked split peas are offered for sale is substantially below the price that Indian pulse growers can offer. The provision of direct aid payments thus enables Danish suppliers of pre-cooked split pea to capture markets, which they would never have been able to supply in the absence of such payments.

In other words, the WTO has circumscribed the capacity of the government to intervene in the market to ensure needs of the food security. After all, if India were to acquire foodgrains for stockholding under PDS at the international prices, the budget allocations will mount beyond manageable limits. Any tinkering with the public stockholding of grains is sure to lead to food insecurity, as has been demonstrated in many countries, which have done away with public stockholding of grains. And yet, the government is making desperate attempts to decentralise the public stockholding of foodgrains in an obvious attempt to dismantle the main plank of what is called the 'famine-avoidance strategy'. Pakistan already has agreed to do away with the procurement system in some of the major farm commodities following pressure from the Asian Development Bank (ADB).

Food security box : Among the numerous measures being suggested in the ongoing review of the AoA, much of the emphasis is on creating yet another box for food security as a mechanism for safeguarding developing country's vulnerability to cheaper imports. The EU has also been supporting some of the developing countries' proposal to protect the food security needs. But what is essentially being overlooked is the way food security is now being defined. As the US earlier declared, and which Britain blindly supports, food security is no longer linked to food self-

sufficiency. Food security now implies that the needs of any developing country can be better met through trade.

What is being forgotten is that a developing economy needs a food security system that looks much beyond management of scarce supplies and critical situations. What is not being accepted is that free trade in food products and agricultural commodities does not help the survival of farming communities in developing and least developed countries, where it forms the backbone of the economy.

Food security, therefore, can only be ensured if the developing countries have provisions and powers to reinforce QRs or trade barriers. No amount of tinkering with suitable clauses on market access, domestic support and export subsidies is going to serve the food security needs of the developing countries. Two measures, which will protect the food security needs of the developing countries while at the same time bringing in equity and justice under the continuing " 'disagreement' on agriculture" as part of the global free trade regime, are:

- Food security can only be ensured if the right to impose QRs is restored for the developing countries. This can only be sanctioned under a multilateral system. The ongoing review of AoA is, therefore, the right forum to accord approval to this most effective provision for ensuring food security.
- The elimination of subsidies, including domestic support, and those for agricultural exports needs to be linked to the removal of QRs. As long as subsidies, both explicit and implicit, are not brought down to zero in the developed world, developing countries should have the provision to continue with the QRs. After all, border protection is the only way to avoid being inundated by cheap and highly subsidised food and agricultural commodity imports.

For mountain agriculture, the research and development (R&D) strategy has to be a little different. Since it cannot meet the challenge thrown by commodity based research and production potentials, the prospects for sustainable economic growth will depend, among other inherent strengths, on the following issues:

- For mountain agriculture to survive the onslaught, raising productivity of staple foods is not going to be of much use. It is not the competitiveness based on efficient production and productivity that ensures economic gains at the way the WTO operates but the subsidies .
- Mountain agriculture, therefore, has to reorient its R&D approach to encashing on its inherent strengths. The HKH region, for

instance, is recognised to be the home to the traditional sub-continental medicine system - *Ayurveda*. It is also endowed with a unique and rich biodiversity, which can be the engine of future growth and socio-economic development.

- The mountains in the HKH region, for instance, have been shored of one of the prized species of tremendous economic value - *Taxus baccata*. While the global industry banking upon *Taxus baccata* barks is worth US\$ one billion a year, subsistence farmers and the rural communities dependent upon the forests have hardly got a finger in the pie. Numerous other species, which could change the economic profile of the mountain regions, have received scant attention.
- R&D effort, therefore, must shift to the traditional crops, and economically important botanical species. The focus should be to further strengthen the location-specific needs based on the uniqueness of the biological wealth. With Austria taking the initiative by adopting *Ayurveda* as its official medicine system, the HKH region can take advantage being its place of origin.

IPRs and Competition Policy: Implications on the Seed Industry

Gloria O. Pasadilla

Introduction

The strengthening of intellectual property rights (IPRs) as a way of providing incentives to innovators has led to some important policy concerns. First, there is the question of how long and how broad IPRs, patents in particular, should be. If it is too short, it gives insufficient incentives for innovation; if too long, it prevents wide adoption of the innovation, provides huge monopoly power to the innovator, thus creating large social welfare loss. Again, if patent scope is too narrow, innovators have little possibilities of recouping investment expenditures because innovations are easily prone to reverse engineering and thus to greater competition. If the scope is too broad, the diffusion of the innovation is hampered, and vital improvements on the initial innovation not undertaken.

There is also the issue of IPRs' impact on market structure. The Schumpeterian view is that IPRs lead to monopoly power and consequent growth in size of the successful innovator. The industry structure thus veer from a competitive one prior to the innovation to a monopolistic or oligopolistic structure *ex post*. To some, this change in structure is important for the continuous growth in research and development (R&D) because big companies will have deeper resources to support such activities. Others disagree contending that many important innovations have come out of small firms rather than from big enterprises.

Besides the IPRs' impact on market structure and the latter's impact on R&D, there is also the question on how the changing market structure affects competitive behaviour of firms in the industry. Not only can increased market power due to control of crucial technological input affect price and output in the industry but it can also influence the behaviour of competitors through contractual arrangements and commercial agreements.

This paper considers the impact of IPRs on competition policy, focusing on the seed industry, in particular. With the growth in biotechnology and strengthened plant patent protection, the seed industry today is so much more concentrated, with 10 seed firms controlling 31 percent of the US\$ 24.7 billion commercial seed market worldwide (RAFI, 2000), than it was in the 1980s. Is this development an

advance or not? What factors contributed to the emergent market structure? What are the benefits or disadvantages of such a concentrated seed sector? What are its likely consequences on the innovation and product markets? What are some of its welfare implications? These are some of the questions this paper will attempt to address.

The next section looks at the changed industrial structure of the seed industry and discusses the factors that contributed to it. In particular, it asks what role did intellectual property protection (IPP) play in helping bring about the new competitive structure. The last section deals with the competition policy and welfare implications of IPRs in the biotechnology and seed sector.

IPRs and concentration in the seed sector

Discussion of developments in the seed sector is hard to divorce from technological advance in the biotechnology industry. Indeed, in the foregoing discussion, when we talk of how innovation influenced market structure, the innovation referred to are the technical changes and R&D process that grew out of biotechnology research. Thus, the section briefly describes the important technological advances to be able to understand the developments that impinge on the seed sector. It also cursorily looks at the legal history of IPP in this area. Then, it discusses the characteristics of the seed industry and the result of the consolidation trend that took place in the mid-1990s. Finally, the section tackles how IPP contributed to the strategy of consolidation in the emergent 'life science' sector.

Biotechnology innovations and IP protection

Biotechnology research was given a significant push by the discoveries of recombinant DNA and genetic engineering in the early 1970s and its agricultural applications sparked a lively research among scores of start-up R&D firms in the US. These firms competed in producing product forms and designs of bioengineered microorganisms with enhanced natural pesticidal action (biopesticides), bioengineered plants augmented with foreign DNA for producing proteins with pesticidal action, and hybrid forms (Kalaitzandonakes and Marks, 2000).

The biotechnology research process requires a number of inputs, key intellectual assets which scientists work on. These include basic biological knowledge, genes, commercial promoters' varieties, transformation technologies, and plant germplasm. IPRs, particularly patents, protect many of these research inputs.

Graff *et al.* (2001) assigns biotechnology R&D input to three distinct technological categories: a) technologies for plant transformation; b) gene sequences and genetically identified traits; and c) elite germplasm. Research discoveries in each of these categories are granted utility patents, whose breadth and height, i.e., scope, are open to legal challenges (Barton 1998). The category of transformation technologies is diverse and includes all technologies that are involved in producing a genetically transformed plant. They can be techniques for transferring DNA into plant cells and for regenerating from these cells mature plants that express a new genetic trait. DuPont's particle gun, Monsanto's 35S promoter, Mogen's *Agrobacterium* transformation vector are some examples.

Gene sequences, the next category, are the so-called "software" that code for specific physical or behavioural traits of an organism. Examples are different strains of *Bacillus Thuringiensis (Bt)*, a type of soil bacterium, which was found to have pesticidal action against various types of pests. Patents have also been issued for different genes that improve crop yield, resist disease or pests, allow host plants to tolerate applied herbicides or environmental stress, improve nutrient content, etc. Lastly, elite germplasm category represents the plant varieties that are genetically transformed. These patents have been issued for hybrid crops like maize, major crop varieties that produce sexually like soybeans, and other plants like tomatoes, cotton, etc (Graff *et al.* 2001).

One of the fundamental problems in these agricultural biotechnology patents that affected strategic acquisition directions in the late 1990s is disagreement over the limit of the patent breadth. Barton (1998) gave three examples, which are summarised in Table 5.1, describing some litigations involving patent scope that have occurred since the 1980s.

Table 5.1: Agricultural innovations and legal conflicts

Company	Declared innovation	Comments
A. Use of Bt in crop plants		
1. Mycogen (1983)	Use of Bt in plants; recoding; provides details of cloning Bt but not actual insertion on plants	Issue is on how broad the patents should be.
2. PGS (now part of Egro) (1985)	Transformation vectors that enable expression of Bt toxins; insertion of Bt into tobacco plants	Another issue: in cumulative research, how

Company	Declared innovation	Comments
3. Novartis (1987)	Use of Bt in corn; describes several techniques of inserting a Bt gene into corn	much IP right to give 'basic' research findings (i.e. relatively abstract idea), and to detailed implementation of the finding.
4. DeKalb (1990)	Insertion of Bt gene into corn using microprojectile methods	
B. Recoding of Bt gene for better expression in plants		
1. Mycogen (1983)	Compared codon usage frequencies in plants and in Bt; described ways to modify Bt gene to use the preferred codons	Issue is again appropriability between early abstract ideas and later filing with relevant experimental data
2. Monsanto (1989)	Described apparently different modifications of Bt gene to achieve the same goal; presented experiments demonstrating expressions in tobacco, tomato, cotton, and corn.	
C. Anti-sense technology		
1. Enzo (1983)	Use of inverted sequences to modify gene expression; describe experiments with E.coli; claim all artificial genes and applications that include an inverted sequence	
2. Calgene	Use of antisense in plants	
Source: Barton (1998)		

The major point of dispute in many of these suits and countersuits is the breadth of the patent of any given discovery or invention. For example, Mycogen's patent for its insertion of a particular Bt gene sequence in a particular plant is claimed (by them) to have been infringed by Novartis, which inserted a Bt gene on corn, albeit through a different method. Table 5.1 gives a sampling of how complex the potential patent infringement minefield can be, considering that only one type of microorganism, the Bt, is involved in these cases. The court system is actually saddled with many more similar issues yet unresolved. As discussed below, the litigation problem arising from the patent infringement and the complex pedigree of patented genes, genetic traits, and enabling technologies that legally restrict access to new biotechnology are among the reasons why firms decided to acquire other firms, or else implicitly participate in cross-licensing (Barton 1998).

Brief survey of legal history in agricultural biotechnology

While the idea of an IPR system goes back to early 19th century, patents for plants and biotechnology took some time to evolve and be defined (Dudfield, 2001). Perhaps, one of the earliest related legislation is the US Plant Patent Act of 1930 that allowed patenting of only asexually reproduced plants, not for just any plant variety. In a few European countries in the early 20th century, there was also trademark type of protection for newly introduced seeds. Eventually, in the 1960s, the *Union International pour la Protection des Obtentions Vegetales*, i.e., International Union for the Protection of New Varieties of Plants (UPOV) established, for the first time, internationally recognised rights in registered plant varieties (plant breeders' rights).

But the landmark decision that turned the tide in favour of patenting of plant varieties is the 1980 *Diamond vs. Chakrabarty* in the US Supreme Court case. Before this Supreme Court decision, the US granted patents to process technologies such as recombinant DNA but not "organisms or substances produced naturally" - the so-called *product of nature doctrine* - because these cannot be considered as inventions. Essentially, pre-*Diamond vs. Chakrabarty*, the IPR system precluded patenting on life.

In the *Diamond vs. Chakrabarty* case, the Supreme Court decided to allow the patenting of a new human-made oil-eating bacterium (discovered by Chakrabarty of *General Electric*). It reasoned that the *fact that microorganisms, as distinguished from chemical compounds, are alive is a distinction without legal significance*. With microorganisms being patented, plant variety protection soon followed.

Thus, five years after the *Diamond vs. Chakrabarty* case, the Patent and Trademark Office (PTO) in the US approved the first patent for genetically engineered corn seed, thereby opening the way for more plant patents. By 1988, 42 patents on crop plants had been issued. In Europe, up until 1999, plant varieties and transgenic plants were not patentable, but since 1999, patenting of transgenic plants has been allowed.

But the difficulty in the biotechnology patenting, which continues to date, is determining the appropriate patent scope. Would inserting a piece of DNA into an organism, for instance, entitle one to property rights over the whole organism and all of its progeny? Example of too broad patents include the Cohen and Boyer's recombinant DNA patent, which described a method of inserting genes into E.coli, yet the patent covered applications of the technology for a much wider range of microorganisms. Another example is Agracetus patent on all transgenic cotton. The patent claims covered any variety of cotton produced by means of any gene

transfer technology. The US PTO, however, later cancelled this in 1994 because of complaints over excessive breadth.

The fear in too broad a biotech patent is the tragedy of the anti-commons, where excessive privatisation can inhibit innovation and research. Broad patent scope increases the likelihood of infringement, thus increasing the cost for other innovators working on a similar technology.

The concern over too broad scope is partly reflected in more current patent approval. In the landmark *University of California vs. Eli Lilly and Co.* case in 1997, the United States Court of Appeals for Federal Circuit ruled "that disclosure of a single species of genetic material does not provide an adequate written description necessary to support patent claims to a broad genus of written material". Likewise, Calgene's attempt to acquire a genus patent on transgenic Brassica failed; instead the US PTO awarded the company rights only to Brassica cells transformed using Calgene's method.

The seed industry market structure

Commercial seed accounts for about a third of the total value of the seed industry. The other two-thirds are equally shared between farm-saved seed and seed from public institutions. There are about 60,000 seed varieties sold all over the world. There are varying estimates of the commercial seed market, ranging from US\$ 24 to US\$ 30 billion (RAFI and Rabobank estimates). More than a third of the value of world seed market is earned from Organisation for Economic Cooperation and Development (OECD) sales, but African and Asian demand for seed have also been rising.

There are about 1,500 seed companies (Rabobank, 2001), but power is concentrated in a few: the top 10 seed firms account for more than 30 percent of the commercial seed market. These seed companies specialise in the breeding and production of hybrid and improved crop seeds. They have mostly been 'stand-alone' or independent firms, but with the advent of biotechnology, seed sales became a crucial direct link for biotech firms as they embody the input of genetic material into the agricultural production process. This is a fundamental reason for biotech firms' vertical integration with the seed industry, as discussed below. In addition, with intense competition among R&D firms, the seed market is characterised by a shorter product cycle and rising R&D costs.

Prior to the merger frenzy in the mid-1990s, there was a wave of acquisitions about a decade earlier. The 1978-80 period of mergers coincided with the strengthening amendments to the US Plant Variety Protection Act (PVPA). At that time, a number of observers identified a

direct causal relationship between the strengthening of IPRs and merger activity as the IPRs created expectations of increased earnings in the seed sector. But, whereas many of the acquiring firms in the 1980s merger round were new entrants to the sector, the 1990s round involves existing participants and high-profile multinational firms (Lesser, 1998).

This wave of consolidation has been thoroughly discussed elsewhere (Fullton and Giannakas, 2001; Hayenga and Kalaitzandonakes, 1999; Barton, 1998), but what we provide here is a summary of the result of those series of acquisitions to paint the market structure that emerged (See Appendix). It should be noted, however, that some of those acquisitions have been spun off a few years afterwards for several reasons: a) anticipated synergies might have failed to materialise; b) concern over consumer acceptance of genetically modified organisms and thus the underperformance of the agro-biotech firms relative to pharmaceuticals leading to increased shareholders' pressure; and c) antitrust scrutiny of mergers.

Some of the basic features of the 1990s merger round can, however, be highlighted. First, several large chemical and pharmaceutical firms moved into plant biotechnology, making huge investments in the life sciences, and acquired all of large national seed firms (e.g. Pioneer, DeKalb, Agracetus, Mycogen, etc.). Some chemical and pharmaceutical firms merged horizontally (e.g. Rhou-Poulenc and Hoechst to form Aventis), then integrated vertically all the way to seed breeding and marketing. The result on the seed industry is that a large set of small-start up firms which appeared in the 1980s had, by the end of 1990s, either folded up or been acquired by the new agronomic systems giants (Graff, *et al.*, 2001).

Thus, in contrast to the diffuse structure in the 1980s, the emergent industry structure is now a relatively small number of tightly woven alliances among pharmaceutical firms, biotech research firms, and seed industry. The life science industry has solidified to 5-7 major firms that are to a great extent vertically integrated and organised around a major life science firm. These five major gene giants that dominate the life science industry are: Du Pont, Pharmacia (Monsanto), Syngenta, Aventis, and Dow. Together, they account for 60 percent of global pesticide market, 23 percent of commercial seed market, and virtually 100 percent of the transgenic seed market (RAFI, September 1999).

Table 5.2: Key global players and their positioning in the seed market

Big league	Minor league	Niche players
DuPont (Pioneer)	Limagrain	Cebeco, Pau Euralis Ball, Pennington DLF, Svalof Weibul Saaten Union, Sigma, Ragt, DSV, Maisadour, Barenbrug
Pharmacia (Monsanto)	Grupo Pulsar	
Novartis (Syngenta)	Sakata	
	Advanta (AstraZeneca)	
	KWS	
	Delta & Pine Land	
	Dow Agro	
	Aventis	

Source: Rabobank (2001)

The product market

With regard the seed industry itself, three companies dominate, namely Du Pont, which bought Pioneer, a major seed company; Pharmacia, which bought Monsanto and which, in turn acquired many dominant seed companies prior to its acquisition by Pharmacia Upjohn; and Novartis, which spun off Syngenta, its agro-business arm (see Table 5.2) (See Appendix). Together, the three dominant firms accounted for 19 percent of total seed sales in 2000 (Table 5.3).

Table 5.3: Top 10 global seed companies, 2000

Company	Country	Seed sales (million US\$)	
		1999	2000
1. Du Pont (Pioneer)	US	1,850	1,938
2. Pharmacia (Monsanto)	US	1,700	1,600
3. Syngenta (Novartis/AstraZeneca)	Switzerland	947	958
4. Groupe Limagrain	France	700	622
5. Grupo Pulsar (Semini)	Mexico	531	474
6. Advanta (AstraZeneca and Cosun)	UK and Netherlands	416	373
7. KWS AG	Germany	355	332
8. Dow (+ Cargill North America)	US	350	350
9. Delta and Pine Land	US	301	301
10. Aventis	France		267

Source: ETC (Formerly, Rural Advancement Foundation International (RAFI))

In terms of market share of the major seed traded in the commercial market, these three likewise dominate the corn and soybeans seeds, with a combined share of 63 percent and 46 percent in the respective seed market (Table 5.4). Delta and Pine Land, whose acquisition by Monsanto for US\$ 1.9 billion was disapproved, dominate the cotton seed market with 71 percent share, and is one of the minor league players in the seed market.

Table 5.4: Firm market share by crops (in percent)

Company	Corn	Soybeans	Cotton
Du Pont	39	17	
Monsanto	15	24	16*
Novartis (Syngenta)	9	5	
Dow	4	3	
AstraZeneca (Advanta)	3		
Delta and Pine Land			71
Others	30	51	13

Source: Hayenga and Kalaitzandonakes (1999)

Note: Data is as of 1998; Public varieties of soybeans constitute 10 percent of market share.

* Share of Stoneville which was later spun off.

The “Innovation Market”

The second point that can be highlighted is the increasing concentration in the share of biotechnology patents on the few major companies. As a result of the wave of buyouts, the purchased firms’ IPRs came to be held by its ‘mother firm’. Graff, *et al.* (2001) find that the top seven seed firms own more than 80 percent of total patents in agricultural biotechnology (Table 5.5), while the three major ones have 55 percent of total patents. Du Pont and Pharmacia own a majority of all the major types of patents: 38 percent of transformation technology patents; 31 percent of gene patents; and 81 percent of germplasms, the latter merely reflecting the aggressive buyout strategies of these two firms in the seed industry. This pattern raises concern regarding potential entry difficulties for new firms in the agricultural biotechnology industry, as anyone trying to get in runs the risk of being blocked or infringing on any of the biotech patents held by the major firms.

Table 5.5: Share of agricultural biotechnology patents (as of January 1999)

Firms	Transformation technology patents	Gene patents	Germplasm	Total	Firm share (percent)
Pharmacia (Monsanto)	64	100	130	294	25
Du Pont	22	80	177	279	23
AstraZeneca	10	49	22	81	7
Novartis	18	47	21	86	7
Dow	26	88	3	117	10
Grupo Pulsar (Savia/ELM)	20	14	4	38	3
Aventis	11	67	1	79	7
Total (Top 7)	171	445	358	974	
Total Industry Patents	229	582	377	1188	
Top 7 share of total industry patents (percent)	74.7	76.5	95.0	82.0	

The same concern over concentration may be gleaned from the increasing concentration of innovations after the mergers. Brennan *et al.* (2000) computed the concentration index in the innovation market for agricultural biotech using data on applications for field trials. These field trials are research outputs of firms, but since agricultural biotech outputs use a vast array of specialised assets, field trials can also be used as proxies for these specialised assets. The result shown in Table 5.6 points once again towards a highly concentrated structure in the innovation market. For instance, using standard analysis of the Herfindahl-Hirschman Index (HHI), the post merger HHI went beyond the threshold level of 1,800 in 1997 and 1998, suggesting high concentration. All the mergers since 1995 collectively raised the HHI by more than 100 points, which, from standard merger analysis, normally raise alarm and have the presumption of an anti-competitive effect (US Horizontal Merger Guidelines, 1992).

Thus, in both the product and innovation market, the major firms have cornered majority.

Table 5.6: Analysis of innovation concentration*

Year	4-Firm concentration ratio (C4) (in percent)	Herfindahl-Hirschman Index	Herfindahl-Hirschman Index	Number of mergers
	Post Merger	Pre Merger	Post Merger	
1994	67	1517	1521	2
1995	63	1143	1310	3
1996	69	894	1290	7
1997	71	1327	1862	5
1998	79	1608	2182	4

Source: Brennan et al. (2000), quoted source: APHIS

*Computation is based on field trial data

Reasons for industry restructuring and the role of IPRs

Noting that the industry consolidation led not only to concentration in the product market share (i.e., seeds) but also to concentration in the patents and specialised assets used for R&D in biotech, what was the motivation of giant firms in moving into the seed business? What role did IPRs play in the seed industry transformation?

There are different competing reasons that can explain the restructuring of the industry. Some are unrelated (or marginally related) to IPRs, while others are centred on the intellectual property issue.

Non-IPR reasons

Strong demand complementarity between chemical and biotechnology products is one reason that might have motivated the amalgamation of seed and chemical companies. Consider a single firm producing both insecticides and pesticides as well as transgenic crops. The firm will be more profitable because it can price the products so that the use of the complementary product is encouraged. For instance, Monsanto tried a product tying strategy in selling Roundup, a dominant herbicide with glyphosate as active ingredient, with Roundup Ready crops, which are glyphosate tolerant crops to maintain considerable market power in the glyphosate market (Hennessy and Hayes, 2000).

Innovation life cycle is another possible explanation for the agricultural biotechnology industry consolidation (Kalaitzandonakes and Hayenga, 2000). The idea is that it is typical that at the early phase of

innovation – the fluid phase – new entrants gain access, the number of firms increase and all of them engage in innovation and experiment with product designs and operational characteristics. Over time, a specific product becomes the standard, and product innovation subsides, while process innovation may continue on to lower cost. Finally, the rate of both product and process innovation dwindles. At each phase of the innovation life cycle, there is a corresponding market structure change. The number of firms peak during the fluid phase and then eventually drops off to a few central players as the dominant design gets established. The remaining firms emulate the features of the dominant product concept and compete on efficiency.

Applied to agricultural biotechnology industry, Kalaitzandonakes and Hayenga (2000) note that the number of firms peaked in the early 1980s as these competed in product innovation and various product forms, including transgenic plants and genetically engineered microorganisms. The dominant design emerged in the early 1990s – transgenic plants with pesticidal action – and consolidation began shortly thereafter.

Yet while the innovation life cycle appears to explain horizontal integration among firms engaged in biotechnology R&D, it does not sufficiently explain vertical integration of pharmaceutical/ chemical firms with seed companies.

Another reason put forward for the biotech consolidation is that it was an effect of the equity price bubble in the 1990s. The wave of buyouts was an opportunistic response to the transient shift in share prices. However, one may ask why firms would buy highly priced seed companies, some several times more than the amount of reported amount of profits?

IPR-related reasons

While non-IPR related reasons may partly explain the restructuring in the agricultural biotechnology industry, they raise other valid questions that prompt search for answers elsewhere. For instance, even as the innovation life cycle can explain horizontal mergers of R&D firms, it falls short in explaining vertical integration in the life science industry. Similarly, the high prices paid by the acquiring firms for tiny seed companies lead one to wonder how rational the financial market really is? Thus, others put forward other explanations for the emergent market structure that are directly related to IPRs.

First, since IPRs provides monopoly power to its owner, a firm may want to erect barriers to entry for potential competitors. This can be done by leveraging control over key intellectual properties to block potential imitation or minor innovation improvements (Lesser, 1998). By

accumulating blocking patents, the patent owners maintain their monopoly rents in a specific market for a specific period of time. Industry concentration can be motivated by the desire to control IPRs and maintain a firm's monopoly power, thus explaining the industry consolidation.

Another reason why firms may want to accumulate patents by buying companies with IPRs is to be able to use them as bargaining chips in negotiations with other firms. That is, knowing the high propensity of patent infringement in the biotechnology industry, having a number of patents give firms the necessary leverage or threat to sue back if they are, in turn, sued for infringement. Patent ownership then protects firms from rival patents or enables them to negotiate for the utilisation of certain key technologies on an equitable basis (Joly and Looze, 1996). Thus, what happens in a concentrated market structure where few firms own most of the patents is an implicit cross-licensing among the firms (Barton, 1998). Without a sufficient number of potentially infringeable patents, the firm is more vulnerable to being sued for infringement by other companies.

A third IPR-related explanation for industry consolidation is the economies of scope in research or the desire to exploit complementarities in the use of specialised assets in biotech R&D. Graff *et al.* (2001) argue that the mere desire to accumulate patents to block entry would have led to increase in sheer number of owned patents, but not in increased diversity of patents. Since the increased industry concentration shows that major firms have accumulated not only a greater number of patents but also a more diverse one, the explanation can be found in the mutual complementarity of these assets. For example, the isolation of a gene leading to a gene patent will have greater value if there are enabling technologies to use these genes; or if the firm owns a large array of elite germplasms where those genes can be inserted. This explains the vertical integration of many biotechnology firms into the seed sector, as superior germplasms are essential complementary assets for agro-biotechnology. The question is: why were many mergers necessary to exploit complementarity when there exist other possible contractual arrangements such as licensing or joint ventures with the seed companies?

The fourth IPR-related explanation relies on low appropriability of IPRs in biotechnology and high transaction costs in contractual arrangements to explain industry consolidation in the agro-biotechnology industry. High transaction cost in licensing arrangements is due to the value allocation problem from these arrangements. Since firms do not know completely the full potential utilisation of the resulting innovation, it is difficult to establish the correct cost and benefit sharing arrangement. Because of the difficulty of arriving at optimal licensing contracts, an acquisition alternative is, thus, often preferred.

Low appropriability of IPRs and significant patent overlap come about when firms have similar technology profiles. The weak differentiation of profiles is, in turn, due to the large size of a common knowledge base from academic research and publicly funded research programmes. Thus, it happens many times that different patents are merely based on different procedures that are aimed at the same applications, e.g., gene insertion on different crops using gene gun technology or micro-projectile methods. Consequently, in the face of similar patents, the probability of litigation is strong, and so is the incentive to merge or enter into cross-licensing agreements.

But why vertically integrate to the seed sector? Since crop biotechnologies demonstrate significant degree of technical imitation, high quality proprietary germplasm, a key complementary asset for commercialisation, is in a stronger position than biotechnology know-how and IPR on specific genes. This strategy of vertical integration into the seed business and ownership of germplasm became an almost necessary strategy of technology firms in the face of contested IPRs (Hayenga and Kalaitzandonakes, 2000; Joly and deLooze, 1996).

Conclusion

To summarise, demand complementarities between chemical and seed as well as the innovation life cycle offer possible explanations for the consolidation trend in the agro-chemical/agro-biotech industry. But existence of IPRs appears to have had much to do with the vertical integration. In particular, firms had incentive to buy firms with IPRs: a) to block entry of potential competitors; b) as bargaining chip for an equitable use of rival technologies; c) because of complementarities of key intellectual assets like transformation technologies, genes and germplasms; or d) because of high transaction costs in licensing agreements along with low level of technology differentiation and IP appropriability.

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Appendix 1: Roadmap to the emergent market structure, 2000

Surviving company	From horizontal mergers of:	Vertical mergers (Important seed companies acquired)	Comments
Aventis	- Hoechst(Germany)+ Schering (Germany) - Hoechst+Rhone-Poulenc (France)	- AgrEvo - PGS (Belgium) - Cargill (US Seed Operations) - Nunhems	Nunhems is 4 th vegetable seed company; Will divest its agribusiness division
Dow Elanco (US)	Eli Lilly (US)+Dow (US)	Mycogen (US) and its subsidiaries; Cargill Hybrid Seeds (US and Canada)	
Du Pont (US)		Pioneer (US)	Largest seed company
Pharmacia (US) (2000)	Monsanto+Pharmacia& Upjohn	- Agracetus (US) - Asgrow (US) - Calgene (US) - Cargill (Intl Seed) - De Kalb (US) - Holdens Fndn (US) - Plant Genetics Inc - Plant Breeding Intl (UK) - First Line Seeds (Canada)	Second in seed
Novartis (1996)	Sandoz (Switzerland)+Ciba Geigy (Switzerland)	Syngenta	
Syngenta (1999)	AgChem Business of Novartis and AstraZeneca		First in agrochemicals; third in seed
AstraZeneca (1999) (Sweden and UK)	Zeneca (Sweden)+Astra (UK)	Advanta	Advanta is 6 th largest seed company; it is not part of Syngenta.
Limagrain (France) Grupo Pulsar (Mexico) (1999)	 Empresas La Moderna + Seguros Commercial America = Savia (Mexico).	 Seminis	Fourth largest in seed; First in vegetable seed Seminis is 5 th in seed; Largest producer of fruit and vegetable seed (20percent of world market)
Delta & Pine Land (US)		Monsanto tried to acquire Delta but was disapproved by DOJ	Largest cotton seed company
BASF (Germany)		40percent of Svalof Weibull (Sweden)	

IPRs, Access to Seed and Related Issues: A Study of the Central Himalayan Region

Ghayur Alam

Introduction

Seed is central to agriculture. Farmers' access to seed of their choice is vital for their ability to carry out agricultural activities. Farmers can access seed in a number of ways. They can save a part of the crop and plant them next year; they can exchange seeds with other farmers; and they can purchase seed from other farmers or from the market.

Farmers' access to seed has been a subject of intense debate in recent years. The debate has been triggered by the increased use of intellectual property rights (IPRs) in agriculture. As members of the World Trade Organisation (WTO), developing countries are required to provide protection to plant varieties through IPRs. The protection of new varieties and their seeds through IPRs has the potential to limit farmers' freedom to choose the source. This can have serious implications for the farmers' ability to practice farming, which is their main source of livelihood.

Consumer Unity & Trust Society (CUTS), Calcutta, under the three-year Regional Programme to Secure Farmers' Rights in the Hindu-Kush Himalaya (HKH) Region, completed a study focusing on a number of issues related to farmers' access to seed in the Central and North-eastern Himalayas. Based on this study, this paper describes the situation in Central Himalayas. It examines the following issues: How do farmers in the region obtain seed? What is the relative importance of different modes of access to seed, such as saving, exchanging and purchasing seed? What factors determine the farmers' choice of the source of seed? Are the farmers aware of India's legislation on farmers' and plant breeders' rights, and its implications?

In addition to the issues related to access to seed, the paper also examines erosion of agro-biodiversity; and commercialisation of agriculture in the Central Himalayan region.

Before describing the results of the study, these issues are discussed in the following section.

IPR and access to seed

Let us now briefly discuss IPRs and access to seed. IPRs are legal instruments, which provide protection to inventions. Examples of

inventions, which are commonly protected through IPR, are manufacturing processes, product designs, plant varieties, computer programmes, publications, music etc.

There are many types of IPRs. These include patents, PBRs, copyrights and trademarks. Of these, only plant breeders' rights and patents are used to protect inventions pertaining to agriculture. Our main concern here is with PBRs, which are specifically designed to protect new plant varieties. These are widely used by plant breeders.

Until recently, most developing countries did not recognise IPRs in agriculture. However, the situation changed when pressure from multinational seed companies and their governments resulted in the inclusion of Trade Related Aspects of Intellectual Property Rights (TRIPS) in the WTO proscenium. As members of the WTO, developing countries are required to provide protection to plant varieties, microorganisms, non-biological processes and microbiological processes for the production of plants and animals.

We will focus here on PBRs. It is generally agreed that developing countries should not introduce PBR legislation, which is based on existing laws of the developed countries. In developed countries, plant breeding is carried out primarily by commercial breeders. Therefore, the main objective of the PBR laws in these countries is to provide incentives to commercial breeders by protecting their rights over varieties. The conditions prevailing in developing countries are different, as local communities and farmers play an important role in the improvement of germplasm and breeding of new varieties. It is felt that developing countries need legislation which takes into account their situation, and protects farmers' rights (Sahai, 2001).

TRIPS gives developing countries freedom to adopt laws to protect PBRs, which are suitable to their conditions. This is what is often referred to as a *sui generis* system. The main objective of a *sui generis* system in developing countries should be to protect the interests of farmers. Their PBR system should explicitly recognise the role of farmers as an important source of the genetic material used in modern breeding. It should also recognise the farmers' rights to save and exchange seeds.

The majority of farmers in developing countries have limited financial means and so their ability to purchase seed is limited. It is, therefore, important that the farmers in these countries have the freedom to save and exchange seeds. The exchange of seeds between farmers is also important for the development of new and improved varieties (Cromwell, 1999). This issue is crucial in mountainous regions. As farm incomes in these areas are especially low, farmers have little ability to purchase seed from the market. Also, mountain areas are rich in agro-

biodiversity and farmers play a crucial role in the development of improved varieties and landraces. Any restrictions on the use of saved/exchanged seed will restrict the farmers' ability to carry out these activities.

Many developing countries have introduced legislation to PBRs. In many instances, their legislation recognises farmers' rights and provides farmers with the freedom to save, reuse and exchange seed. For example, according to the legislation introduced in India, farmers have the right to save, use, sow, exchange, share or sell seeds of a protected variety (Cromwell, 1999). However, farmers are not permitted to sell branded seeds of a protected variety.

How relevant are the provisions of TRIPS for farmers in mountain areas? In the past, most of the debate on this subject has focused on farmers in the plains. This is largely because data on mountain farming, which can help to answer this and related questions, is not available. For example, there is little empirical information on how mountain farmers obtain seed. How important are the various sources of seed? If mountain farmers purchase seed, how much of it is branded? Do the farmers sell seed? It is important that this data is collected and used to improve our understanding of the implications of TRIPS for mountain farmers.

Agricultural biodiversity

Let us now discuss agricultural biodiversity. This is defined as the variety and variability of plants, animals and microorganisms, which are necessary to sustain the agro-ecosystem (Cromwell, 1999). Agricultural biodiversity is essential for the sustainable production of food and other agricultural products, and the provision of the genetic material essential for the evolution or breeding of new crop varieties (Cromwell, 1999). This diversity is managed by farmers and would not survive without their active participation. Indigenous knowledge and culture are integral parts of agricultural biodiversity management (Cromwell, 1999).

Mountain areas contain great richness and diversity of biological resources. For this reason, mountain farmers play a particularly important role in the conservation of agricultural biodiversity. A number of important crops such as potatoes, tomatoes, and beans have originated in the mountain areas.

Recent years have seen substantial erosion in agricultural biodiversity in many mountain areas. The reasons for this include: a degradation of natural forests, which help to sustain traditional agriculture; an increasing preference for fine grains over coarse grains;

the promotion of modern agriculture, which is based on High Yielding Variety (HYV) seeds and other inputs; and greater links with markets, which demand cash crops (Kothari, nd.).

The adoption of new varieties has resulted in the replacement of a large number of local varieties by a small number of homogeneous modern varieties. This has increased the vulnerability of crops to diseases and pests (Nagpal, nd.). The number of varieties of important crops has also declined.

Commercialisation of agriculture

In the past, most mountain farmers practiced subsistence agriculture. This is now changing. An increasing number of farmers are engaged in production for markets. There is a risk that large-scale adoption of high value crops for niche markets could lead to the further loss of traditional cropping practices. It can also contribute to a long term decline in soil productivity and sustainability (Nagpal, nd.). In fact, in areas where farmers are becoming linked to the market, resources are already being depleted at a dangerous rate (Nagpal, nd.). For example, a study of Garampani village in the Nainital district of Uttaranchal shows a large shift from subsistence to high value crops for niche markets (Nagpal, nd.). While the income of many villagers has increased, the large scale shift to cash crops has also had harmful effects. For example, it has led to a serious deterioration of the environment. There has been a decline in the availability of fodder. This has also increased pressure on forests.

Let us now briefly examine the main characteristics of agriculture in the Himalayan region in general and the Central Himalayas in particular.

Agriculture in the Himalayan region

The Himalayan region covers about 18 percent of India's geographical area and accounts for six percent of its population. Most people living in the region depend on farming for their livelihood. A large majority of them are small farmers, whose main objective is to produce to meet their own needs (Saxena, Maikhuri and Rao, nd.).

Agriculture in the region is faced with a number of problems. Many of these are more acute than the problems faced by farmers in the plains. This is largely because of the difficult climatic conditions, fragile ecosystem, inaccessibility, poor soil quality, lack of irrigation facilities and low use of inputs (Dobhal, nd.). As the population in the region has increased, the per capita availability of resources and food has declined. This has put increased pressure on natural resources and the ecosystem.

There is also a trend of decreasing returns from traditional crops, and self-sufficiency in food has declined. A large number of farmers are able to survive for only 8-9 months in a year on farm production. For the rest of the year they have to depend on non-farming income.

Agriculture in Central Himalayas

The study focuses on the Indian state of Uttarakhand, which is located in the Central Himalayas. The state, which was created in 2000, consists of the Garhwal and Kumaon regions of the Himalayas. It has an area of about 51,000 square kilometers, which amounts to less than two percent of India's total area. The population of the state was about 8.5 million in 2001. The population density is lower than most Indian states compared to an all Indian average of 324 people per square kilometer, the population density of Uttarakhand is only 159 people per square kilometer.

A very large proportion of the population depends on agriculture as the main source of livelihood. The average productivity in the region is low and most farmers practice subsistence farming.

As in other parts of Himalayas, the proportion of area under cultivation is very low in Uttarakhand. While in the plains about 70 percent of the total area is under cultivation, only about 12 percent of the area is under cultivation in Uttarakhand. In some districts, this proportion is particularly low. For example, it is only four percent and five percent in Uttarakashi and Chamoli respectively (Rawat and Kumar, nd.). This is for two main reasons: a large proportion of the area in Uttarakhand (about 70 percent) is under forest cover and is not available for farming; and a large proportion of the area is unsuitable for economically viable farming. This may be due to inaccessibility, poor soil quality or both. The scarcity of land is also reflected in the small size of average landholdings in Uttarakhand (Negi, 1994).

As only about 15 percent of the cultivated area in Uttarakhand is irrigated, agriculture is largely rainfed. In some parts of the state the extension of irrigation is particularly low. For example, only about five percent of the cultivated area in the Pauri district is under irrigation (Teli, nd.).

Most farmers in Uttarakhand practice traditional farming methods, and the adoption of HYVs and use of chemical fertilisers is reported to be small. According to some estimates, less than 10 percent of the cultivated area is under improved seed and fertiliser respectively (Dobhal, nd.). Even in areas with higher incidence of fertiliser use, the quantity of fertiliser used is very low.

However, there are indications that in some areas of Uttaranchal the use of these inputs is significant. For example, in some blocks of Dehradun and Uttarakashi districts, up to 20 percent of the land under cultivation is reported to be under HYVs. However, this trend is limited to the irrigated areas. (Teli, nd. and Dutt, nd.).

Wheat and paddy are the two most important crops in the area. They are planted in 39 percent and 18 percent of the cultivated area respectively. The other important crop is *jhungra*, which account for 16 percent of the total area. In many of the higher altitude areas, *jhungra* is more important than paddy. For example, in Pauri, Tehri, Chamoli and Almora, it accounts for 26.5, 19.3, 25.52 and 23.35 percent of the total cultivable area respectively (Rawat and Kumar, nd.).

Results of the study

Introduction

The research is based on a study of about 500 farmers in the states of Uttaranchal, Arunachal Pradesh and Meghalaya. The data pertaining to Uttaranchal was collected from three districts, covering 55 villages and 210 farmers. The distribution of farmers in each district is shown in Table 6.1. The information was collected through personal discussions with farmers.

Table 6.1: Distribution of farmers according to districts and villages

District	Dehradun	Chamoli	Tehri	Total
Blocks	1	3	5	9
Villages	14	22	19	55
Number of farmers	60	75	75	210

Source of seed

Almost all the farmers in the state reported that they save seed for use in subsequent years (See Table 6.2a). In term of volume, more than 80 percent of the seed used in Uttaranchal is the farmers' own seed (See Table 6.2b). More than 65 percent of the farmers met three fourth of their seed requirement from their own seed.

Table 6.2a: Importance of various sources of seed

Source	Percentage of farmers	
	Paddy	Wheat
Saved	94.29	96.67
Exchanged	64.76	64.29
Branded	15.24	15.71

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Non-branded	23.81	27.62
Total purchased	39.05	43.33

The practice of exchanging seeds with other farmers is also found to be common. About 65 percent of the farmers are reported to obtain part of their seed through exchange with other farmers (See Table 6.2d).

Table 6.2b: Farmers using a high proportion of saved seed

Percentage of farmers using more than 75 percent saved seed	
Paddy	Wheat
67.62	65.24

The number of farmers using purchased seed is also high in Uttaranchal. About one third of farmers were found to use purchased seed. Also, a number of farmers reported that they relied on purchased seed for a significant proportion of their seed requirement. It varies between 6.67 percent for paddy and 13.81 percent for wheat. In terms of volume, seven percent and 11 percent of the paddy and the wheat seed used in Uttaranchal are reported to be purchased from the market (See Table 6.2d). More than half of the purchased seed was reported to be branded seed.

Table 6.2c: Farmers using a high proportion of purchased seed

Percentage of farmers using more than 25 percent purchased seed	
Paddy	Wheat
6.67	13.81

Table 6.2d: Percentage of seed according to sources (volume)

Source	Proportion of seed (percent)	
	Paddy	Wheat
Saved	80.27	81.78
Exchanged	8.25	7.22
Purchased	7.15	11.00
Branded	4.23	7.95
Non-branded	2.92	3.05

Factors preventing farmers from replacing seed at desired interval

Many farmers reported that they would like to change seed more often than they do at present. What are the reasons for this? Three reasons are reported to be the most important: the high cost of seed, unreliable quality and unavailability of seed suitable for local conditions. The high cost of seed was reported to be the most important factor. About 66 percent farmers reported this to be important. About 33 percent farmers reported the other two factors to be important (See Table 6.3).

Table 6.3: Factors which prevent farmers from replacing seed at desired interval

Percentage of farmers reporting following factors as important		
High cost	Do-not-trust quality	Seeds suitable to local conditions not available
66.19	32.86	33.33

Sources of information on new seed

The farmers' access to new seed also depends on information. We find that most farmers rely on other farmers for information on new seeds. Government departments are also reported to play an important role in this. Non-governmental organisations (NGOs), seed companies and traders play comparatively minor roles. The role of universities and research institutes is particularly small (See Table 6.4).

Table 6.4: Sources of information on new seed

Percentage of farmers reporting the source as important					
Government department	Universities and research institutions	NGOs	Seed Companies	Traders in agricultural goods	Farmers
59.05	3.81	46.19	37.62	37.14	100

Awareness of the Plant Varieties Act

Are the farmers aware of India's legislation, Protection of Plant Varieties and Farmers' Rights Act? We find that they are not. Out of 210, only two farmers reported of having heard about the legislation. They were not aware of the details of the legislation (See Table 6.5).

Table 6.5: Awareness of the PPVFR Act

Percentage of farmers aware of the Act		
Yes	No	Total
1.00	99.00	100.00

Agricultural biodiversity

Almost all the farmers in Uttaranchal were found to grow paddy, wheat and a mix of traditional and cash crops (barley, pulses, mandua, potato, and green vegetables). However, data show that there has been a decline of agricultural biodiversity in recent years. More than half of the farmers plant fewer varieties now than they did in the past (See Table 6.6). This suggests that a small number of new (most probably HYVs) have replaced a large number of traditional varieties in Uttaranchal.

Table 6.6: Changes in the number of varieties planted

Percentage of farmers planting more varieties than in the past	Percentage of farmers planting less varieties than in the past
42.05	57.95

Commercialisation of agriculture

A significant number of farmers (48 percent) reported that they were engaged in the production of cash crops. However, there are significant district-wise variations. The incidence of farmers growing cash crops was highest in Dehradun where all the farmers grow cash crops. It was lowest in Tehri, where only 16 percent of farmers grow cash crops (See Table 6.7). The most commonly grown crops included potatoes and a number of green vegetables.

Table 6.7: Number of farmers growing cash crops

Farmers who grow cash crops (percent)		
Yes	No	Total
48.57	51.43	100

Agriculture and livelihood

How important is farming as a source of income for farmers in these states? Almost all the farmers reported agriculture to be an important source of income (See Table 6.8a). However, agriculture is not their only source of income. In fact, only 27 percent of farmers reported that it accounted for more than 50 percent of their income (See Table 6.8b).

Table 6.8a: Relative importance of various sources of income

Important sources of income (percent)				
Farming	Livestock	Labour	Business	Remittance from cities
100.00	56.67	38.10	7.62	53.81

Table 6.8b: Importance of various sources of income

Percentage of farmers with more than 50 percent income from the following				
Farming	Livestock	Labour	Business	Remittance from relatives
27.62	0.95	13.81	0.48	33.33

As agriculture does not provide enough income, many farmers depend on other sources. All the farmers in Uttaranchal were reported to depend on more than one source of income. The most important of these sources was found to be work as wage labourer and remittances from the towns and cities. In about one third of the cases, remittances account for more than 50 percent of the income. Very few farmers are engaged in business (See Table 6.8c).

Table 6.8c: Farmers with more than one income

Number of income sources	Percentage of farmers
Two	100
More than two	56.19

Many farmers reported that they were not self sufficient in food. Almost 95 percent farmers are found to be dependent on purchased food. The income from non-farming sources is largely used for the purchase of food.

Conclusion

The study finds that almost all the farmers in Uttaranchal save seed for planting in subsequent years. Also, saved seeds account for a very large

proportion of seed planted in the state. The practice of exchanging seed is also common. Reliance on purchased seed is comparatively low.

It is clear that any legislation which imposes restrictions on farmers' right to save, reuse and exchange seed will be damaging both to individual farmers and farming activity as a whole in the mountain areas.

India's PPVFR Act gives the farmers the freedom to save, exchange and sell non-branded seeds. These provisions will ensure that the traditional source of seed for mountain farmers (to use their own seed) will not be affected by TRIPS and other WTO induced laws.

However, the use of branded seed in parts of Uttaranchal is found to be significant, and the restrictions on the farmers' freedom to sell branded seeds may affect the farmers in these areas. The impact will largely depend on how important selling of seed is to these farmers.

Although the PPVFR Act has aroused intense debate among researchers, NGOs and policy makers, farmers are completely unaware of its existence. How can the concerns of farmers be reflected in the policies and legislation, if they are not even aware of the issues? Clearly, this situation must change. In the past, NGOs have attempted to familiarise farmers with the WTO, the General Agreement on Tariffs and Trade (GATT), Dunkel Draft and TRIPS. But obviously, their efforts have not been effective. Greater efforts are needed to make the farmers aware of various national and international laws, which have the potential of affecting their livelihood.

The study finds that farmers in Uttaranchal plant fewer varieties now than they did in the past. This suggests a loss of traditional varieties and decline of agricultural biodiversity in this state. This trend appears to be the result of a high degree of commercialisation of agriculture and the official policy of promoting HYVs; both promote the cultivation of only a handful of varieties. The promotion of monoculture in mountain areas should be stopped. Instead the cultivation of traditional crops and local varieties should be encouraged.

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UPOV: Faulty Agreement and Coercive Practices

Ratnakar Adhikari and Kamalesh Adhikari

Introduction

No agreement of the World Trade Organisation (WTO) allows its members to impose any conditions, which transcend WTO obligations, on the acceding countries. However, the developed member countries often clamp down such conditions. In trade jargon, such conditions are referred to as 'WTO-plus' conditions. Such practices are not only seen during the pre or post accession negotiations but are also observed during other bilateral negotiations.

One such coercive practice is evident in the area of plant variety protection (PVP). In order to protect new plant varieties, the developed member countries have been forcing the developing countries to become a member of the International Union for the Protection of New Varieties of Plants (UPOV) Convention, which only promotes the interests of their own commercial plant breeders and multinational companies (MNCs). Surprisingly, no WTO agreement, including the Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS), has indicated that the adoption of UPOV is compulsory.

The TRIPS Agreement requires member countries to protect their new plant varieties by one of the three means: patent; or an effective *sui generis* system; or any combination thereof. The developing countries have preferred the second option. The word '*sui generis*' means 'of its own kind'. Therefore, countries can design and implement their PVP laws by themselves according to their national interests and local realities. Unfortunately, they are not being able to follow this option. Since the definition of 'effective' word is ambiguous, the developed countries have taken full advantage of it. They refer to the UPOV Convention as the only effective *sui generis* model for PVP.

Some developing countries have already enacted PVP laws based on UPOV. While China and South Korea have adopted the UPOV model to prepare their PVP laws, India and Thailand have enacted their own *sui generis* laws, recognising both the breeders' and the farmers' rights. In many other Asian countries, draft laws on PVP are in various stages of discussion. The countries reported to be consulting UPOV are Indonesia, Malaysia, Pakistan, Philippines and Sri Lanka. They are reported to be under varied degree of pressure to join UPOV. ¹

Against this backdrop, the objective of this paper is to sensitise the policymakers of the developing countries to remain alert of the coercive practices followed by the developed countries and make use of alternative mechanisms for the protection of plant varieties.

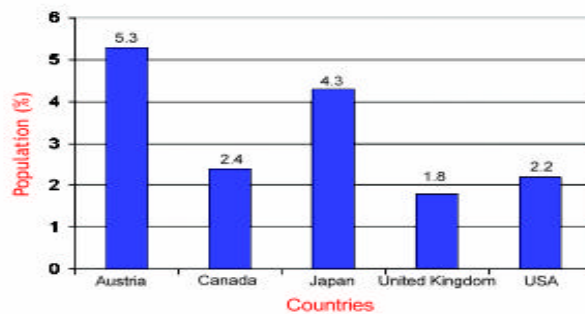
UPOV: A wrong model

The developing countries have criticised the UPOV model on several grounds, not least because becoming a member of UPOV or enacting the legislation in tune with this model is not a requirement of TRIPS.

The developed countries must understand that *sui generis* means of its own kind of system that suits countries' own agro-biodiversity and farming systems and practices. How can one *sui generis* system be the model for all countries? Does *sui generis* imply that? Do all countries have same nature of agricultural systems and practices and share same plant varieties?

The developed countries have chosen UPOV because it suits the requirement of their industrial farming - where farmers' constitute merely one to five percent of their total population (See Diagram 7.1). Agriculture for them is, therefore, a matter of trade and business but for the developing countries, it is a matter of 'life and death'. Most of their population comprises farmers, whose main livelihood is farming, and their economies are heavily dependent on agriculture.

Diagram 7.1: Farming population in select industrial countries



Adapted from: Dhar, 2002.

Farmers in the developing countries practice subsistence farming and have been saving and reusing seeds for time immemorial. They have been exchanging their seeds with their neighbours. Some farmers, who do not have enough land to engage in full-fledged agricultural productions, are engaged in production of seeds, though in a very limited quantity, and

do sell them at the local market to eke out their living. Thus, saving, exchanging, reusing and selling seeds are the means of their livelihood. The UPOV Convention, however, restricts the ability of farmers to exercise these livelihood options.

The UPOV Convention has undergone three revisions since it was signed in 1961. The 1972, 1978 and 1991 amendments to UPOV progressively strengthened the protection afforded to plant breeders. Compared to the earlier versions, UPOV 1991 provides the highest possible level of protection to the breeders, severely diluting Farmers' Privilege and restricting farmers' rights to save, reuse, exchange and sell seeds. For example, Article 15.2 of the latest UPOV Convention is in sharp contrast to the earlier system, which had allowed farmers to reuse protected materials without paying any royalty to commercial breeders. But the new provisions allow farmers to reuse protected material only if the 'legitimate interests of the breeders' are taken care of - the legitimate interests being nothing but the royalty that the breeders should be paid. The United Nations Food and Agriculture Organisation (FAO) views it as "downgrading of the Farmers' Privilege" (Dhar, 2002).

Under UPOV 1978, though farmers were not allowed to sell seeds obtained from the protected varieties, there was no bar on them to store these seeds for cultivation, replant them and develop new plants from them, which was considered Farmers' Privilege. UPOV 1991 gives wider protection to plant breeders. Farmers are permitted use of the protected varieties only with respect to acts done: privately and for non-commercial purposes; for experimental purposes; and for the purpose of breeding varieties other than those which are 'essentially derived varieties' (Kanniah, 2003).

In the developing countries, almost all agricultural researches and plant breeding activities are financed by taxpayers' money. Public institutions in these countries play a vital role in this regard. Such research works in these countries, therefore, belong to the public. However, the laws under UPOV are formulated by societies where research on seed is conducted more in private domains than in public institutions, and where private capital finances plant breeding. Because they invest in expensive breeding methods and need to secure returns on their investments, seed companies in Europe and North America seek market control through strong intellectual property rights. But these conditions do not apply to the developing countries (Sahai, 2003). The developing countries do not have big seed companies. Their major seed producers are farmers and farmers' cooperatives. Logically, their laws will have to concentrate on protecting the interests of the farmer in his/her role as producer as well as consumer of seed.

Moreover, obtaining an UPOV authorised Breeders' Right Certificate could cost several thousand or even hundreds of thousand dollars. Such rates will effectively preclude the participation of developing countries' small companies, farmers' cooperatives and farmers/breeders.

In the developing countries, farmers play a significant role as breeders of new varieties of plants. They often release very successful varieties by crossing and selection from their fields. These varieties are released for use as such. In addition, in almost all cases, these varieties are taken up by agriculture research stations as breeding materials for producing other varieties. Such farmers/breeders would not be able to participate in an expensive system like UPOV. Their material along with their labour and innovation would be misappropriated by those with the money to translate such valuable germplasm into money-spinning varieties registered under the UPOV system. Poor farmers unable to pay the costs for an UPOV Certificate would tend to sell their varieties to larger seed companies, just for small sums. This will be the ultimate irony, creating an institution that will snatch away from a farmer, his/her material and opportunities (Sahai, 2003).

Tactics used to trap developing countries in the UPOV cobweb

During WTO accession negotiations

A majority of developing countries, which have acceded to the WTO, have been forced to join UPOV as a part of their accession deal. China and Kyrgyzstan are the living examples. So much so that Cambodia, the first least developed country to become a WTO member through accession, too was not spared. It agreed to apply its PVP law complying with the UPOV provisions by 2004. Nepal is also not an exception in this case (*See the case study below*).

During bilateral deals

In 1999, the EU pressurised Bangladesh to become a member of UPOV as a precondition to sign a Trade and Aid Agreement with it (Kanaga, 2002). Similarly, Vietnam was compelled to become its member as a precondition to signing the USA-Vietnam Bilateral Trade Agreement. The promulgation of Decree 13 and Circular 119 would bring the Vietnamese intellectual property law into closer conformity with TRIPS. The conditions outlined in the Decree conform to the standard criteria for the granting of protection under the UPOV Convention.²

A detailed account of the Asia Pacific countries, which are either facing bilateral pressures from the two major economic giants (the USA and the EU) or have already succumbed to such pressures, is provided on Table 7.1.

Table 7.1: PVP laws and the Asia Pacific developing countries

Country	National PVP adopted	Member of UPOV	In process of joining UPOV	Consulting UPOV	US Trade Agreements for TRIPS Plus Standards	EU Trade Agreements for TRIPS Plus Standards	WTO Member
Afghanistan							
Bahrain							
Bangladesh							
Cambodia							Accession approved
China							
Fiji							
Hong Kong							
India							
Indonesia							
Jordan							
Korea N.							
Korea S.							
Kuwait							
Laos							Observer
Lebanon							Observer
Malaysia							
Mongolia							
Myanmar							
Nepal							
Oman							
Pakistan							
PNG							
Philippines							
Qatar							
Saudi Arabia							Observer
Singapore							
Sri Lanka							
Syria							
Taiwan							
Thailand							
UAE							
Vietnam							Observer

Adapted from: Kanniah, 2003.

After WTO membership

The pressure on India to become a UPOV member came after its membership.³ Despite the fact that India has already enacted a progressive legislation on farmers' rights in 2001, the Indian government's decision to join UPOV has stunned the international community at large. The government points out that India has applied to join the 1978 UPOV Convention, not the far more draconian 1991 version. In this context, it needs to be understood that a soft landing into UPOV via the 1978 Convention is only temporary in nature. Article 37(3) of the UPOV 1991 Convention clearly states that after 31 December 1995 all countries, who wish to join UPOV, must accede to the 1991 Convention. Yet, India has been allowed to join the 1978 Convention (Sahai, 2003).

The obvious benefit to UPOV in bending their own regulations [Article 37(3) UPOV 1991] is that in encouraging India, a large developing country with major public and private plant breeding sectors, to join, other Asian countries will follow suit rather than try and introduce their own *sui generis* legislation. Non-governmental organisations (NGOs) are highly critical of the government's decision to join UPOV (Kanaga, 2002).

To overturn the government's decision, Gene Campaign, New Delhi based NGO, filed a public interest litigation in Delhi High Court on 1 October 2002. However, the case is still sub-judice (Sahai, 2003). Consumer Unity & Trust Society (CUTS), a network institution of SAWTEE, and several other civil society organisations (CSOs) in India are also remonstrating against such move. CUTS, in its recently published research report on *Intellectual Property Rights and Access to Seed: A Case Study of Himalayan Region in India* has come out strongly against the Indian government's decision to join UPOV 1978 (CUTS, 2003).

Similarly, the pressures to join UPOV are also mounting on Bangladesh, Pakistan and Sri Lanka. But, along with other like-minded CSOs, SAWTEE's network institutions, namely Bangladesh Environmental Lawyers Association (BELA) in Bangladesh, Sustainable Development Policy Institute (SDPI) in Pakistan and Law & Society Trust (LST) in Sri Lanka are strongly advocating for the enactment of their own *sui generis* PVP laws.

Developing countries' initiatives against UPOV

Based on the justifications mentioned above, it is imperative for developing countries to resist the UPOV model and devise an alternate *sui generis* PVP legislation. India's initiative in this regard can be illustrated as an effective example.

India enacted Protection of Plant Varieties and Farmers' Rights (PPVFR) Act in 2001. The Act has taken a balanced approach in ensuring the rights of both - the farmers and the breeders. It aims to establish "an effective system for the protection of plant varieties, the rights of farmers and plant breeders to encourage the development of new varieties of plants" in line with Article 27.3 (b) of TRIPS. The Act has ensured the mechanisms for: a) allowing the farmers to save, use, sow, resow, exchange, share or sell his/her farm produce including seed of a variety protected under this Act (Atul, 2002); b) protection of the rights of farmers for their contribution made at any time in conserving, improving and making available plant genetic resources for the development of new plant varieties; c) protection of plant breeders' rights to stimulate investment for research and development, both in the public and private sector, for the development of new plant varieties; and d) giving effect to Article 27.3 (b) of TRIPS on PVP (Kumar, 2001).

The *sui generis* legislation introduced by the Namibian government is also an important initiative. Developed by the Organisation for African Unity (OAU), it is based on the African Model Law for the Protection of the Rights of Local Communities, Farmers and Breeders, and for the Regulation of Access to Biological Resources. The Access to Biological Resources and Associated Traditional Knowledge (ABRATK) Act provides for the grant of farmers' rights and plant breeders' rights, while recognising the rights of local communities over their biological resources and associated knowledge, innovations and practices (Dhar, 2002).

Similarly, there has been another major initiative by Gene Campaign in drafting an alternate mechanism for the protection of farmers' rights, i.e., Convention of Farmers and Breeders (CoFaB). The United Nations Development Programme (UNDP) has recognised CoFaB as a strong and coordinated international proposal in response to UPOV (See Box: 7.1).

Box: 7.1

COFAB: A non-UPOV platform

Unlike the provisions of UPOV, the CoFaB treaty seeks to fulfill the following goals:

- Provide reliable, good quality seeds to the small and large farmers;
- Maintain genetic diversity in the field;
- Provide for breeders of new varieties to have protection for their varieties in the market, without prejudice to public interest;
- Acknowledge the enormous contribution of farmers to the identification, maintenance and refinement of germplasm;
- Acknowledge the role of farmers as creators of land races and traditional varieties which form the foundation of agriculture and modern plant breeding;
- Emphasise that the countries of the tropics are germplasm owning countries and the primary source of agricultural varieties; and
- Develop a system wherein farmers and breeders have recognition and rights accruing from their respective contribution to the creation of new varieties.

Adapted from: Sahai, 2003.

The International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA), approved by the FAO Conference on 3 November 2001, also seeks to secure farmers' rights in different ways (See Box: 7.2).

Box: 7.2

ITPGRFA and farmers' rights

Article 9 of the ITPGRFA states:

9.1 The Contracting Parties recognise 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 realising 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 utilisation 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.

Source: Correa, Carlos M. 2002. Traditional Knowledge and Intellectual Property A Discussion Paper, Quaker United Nations Office, April 2002, Geneva.

Fending off the UPOV pressure: A case study of Nepal

At its final stage of accession negotiations, Nepal was under pressure by the USA to become a member of UPOV. The pressure came to the notice of the government on 9 August 2003. Surprisingly, the next day, the Nepalese delegation had to leave for Geneva to finalise its accession to the WTO. This was a tactical move by the US as it would give little time to the government to take any unpopular decision.

On the same day, the government authorities invited a member of SAWTEE to prepare a brief on Why Nepal cannot and should not join UPOV? The brief prepared by SAWTEE clearly cited various reasons suggesting the government authorities not to agree for UPOV, even if such a refusal could hamper the prospect of Nepal's membership to the WTO.

The government officials had made public announcement that they would not compromise with the interests of the Nepalese farmers while obtaining WTO membership. Prior to their departure for Geneva, they promised that they would bilaterally deal with it and close the chapter once and for all.

Based on the assurance from the government [which was shared with the core members of National Alliance for Food Security - Nepal (NAFOS)]⁴ on 11 August, the CSOs did not feel it wise to launch any agitation at that moment. However, members of SAWTEE remained in constant touch with the government delegates through telephonic conversation. Meanwhile, a meeting of core NAFOS members was organised on 11 August to discuss the possible future strategy. One of the

major decisions of the meeting was to publish articles in the daily newspapers against the pressure to join UPOV. Two members of SAWTEE published three articles within four days in two of the leading national dailies. Similarly, two posters, one in Nepali and other in English, were also published and distributed to a large number of concerned stakeholder groups. These posters had a clear message: "Say NO to UPOV".

The CSOs were hopeful that the government delegates would be able to maintain their promises. However, to their utter dismay, while talking to one of the delegates in Geneva on 13 August, it came to be known that the government officials had almost lost hope for any major breakthrough by then.

Without wasting a moment, the CSOs then organised a press conference in Kathmandu on the same day under the banner of NAFOS. Journalists from all the leading media organisations, farmers' groups, lawyers and other stakeholder groups participated in the conference.

The press coverage of the event was one of the best among the CSOs' advocacy campaign. The next day almost all the media provided prominent coverage to the news. The news also came to the notice of the United States Trade Representative Office in Geneva.

On the final day of the accession negotiation, i.e., on 15 August, the CSOs' pressure ultimately became a boon for the entire Nepalese farming community. The USA agreed to include only minimalist text in the final Working Party Report, which states:

"...Nepal would also look at other WIPO and IP related Conventions, e.g., Geneva Phonograms Convention, UPOV 91, WIPO Copyright Treaty and WIPO Performances and Phonograms Treaty, *in terms of national interest* and explore the possibility of joining them in the future, as appropriate."⁵ (emphasis added)

On one hand, the CSOs felt that the Nepalese delegation should not even have agreed to include the above text, howsoever minimalist it might be, because this opens the door for another round of pressure at a future date. On the other hand, they took pride in the fact that they were able to block the possibility of Nepal falling into 'UPOV trap' like other countries acceding to the WTO.

Considering the fact that the same pressure could be exerted at a future date, and that the officials who supported the position of the CSOs might be transferred to some other ministries or departments and there being no institutional memory within the government, the CSOs are planning the following strategy:

Evolving *Sui Generis* Options for the Hindu-Kush Himalayas

- To continue sensitising the government officials as well as other stakeholders on the imperatives of staying out of the UPOV system;
- To remain vigilant so as to ward off any future attempt to pressurise Nepal to join UPOV; and
- Even if the government decides to join UPOV at a future date under pressure, in order to block this decision, file a writ petition at the Supreme Court of Nepal by interpreting the 'national interest' as farmers' interest because more than 80 percent of the Nepalese population constitutes farmers.

Conclusion and recommendations

As if the TRIPS Agreement was not enough to harass the developing countries, TRIPS-plus conditions are being imposed on them. UPOV is not the requirement of WTO/TRIPS. It is seeking a backdoor entry to the WTO. Since this model only suits the interests of the developed countries' commercial plant breeders and MNCs, its membership could have severe repercussions for the rights of the farmers in the developing countries. Therefore, these countries should unitedly protest against this model. In order to save the 14 billion farming population of the world, which are depending on farm saved seed for their livelihood, the following recommendations are worth taking note of by the developing countries:

- To remain vigilant and resist the pressure to join UPOV (not even the UPOV 1978 version) at any cost and create a critical mass of like-minded countries to fight such menace at the international level including making use of the TRIPS Council (which is engaged in the review process of TRIPS) and World Intellectual Property Organisation (WIPO) platforms.
- To ratify ITPGRFA and seek ways to capitalise on the flexibilities that the TRIPS Agreement has provided.
- To design a *sui generis* legislation that suits their socio-economic, cultural and political realities.
- To make use of alternative international instruments such as ITPGRFA, OAU Model Legislation and CoFaB while designing *sui generis* legislation and also take note of the Indian PVPFR Act and the Namibian ABRATK Act as the models.
- To consult the farmers' groups and CSOs while designing *sui generis* legislation and preparing negotiating positions for the international negotiations.

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Endnotes

- 1 In the case of Malaysia, a draft PVP legislation was recently presented in the Parliament. See also ActionAid, Consumers International and Gene Campaign. 2002. *Why we oppose UPOV and why it is urgent that developing countries enact their own plant variety protection laws*, Media Briefing, 17 October 2002, Geneva.
- 2 <http://www.asialaw.com/directories/ipprofiles2002/vietnam/> Default.htm
- 3 India was a founding member of the General Agreement on Tariffs and Trade (GATT). After the GATT was transformed into the WTO in 1995, it automatically became a WTO member.
- 4 NAFOS is a network of more than 20 NGOs and INGOs working in Nepal for the cause of protecting and promoting food security and farmers' rights. SAWTEE is currently the Secretariat of this network.
- 5 WTO. 2003. *Working Party Report on the Accession of the Kingdom of Nepal to the World Trade Organisation*, WT/ACC/NPL/16, WTO, Geneva.

Introducing Plant Varieties Protection: Possible Options for Developing Countries

Biswajit Dhar

Introduction

One of the most formidable challenges before developing country members of the World Trade Organisation (WTO) presents itself in the form of commitment they have taken under the Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS) to introduce a system of plant varieties protection. Till date they had undertaken this commitment, most developing countries had kept their agricultural sector outside the ambit of intellectual property protection (IPP). The major beneficiaries of excluding agriculture from IPP were the farming communities who could use new varieties of plants. The plant breeders, on the other hand, did not have any control over the market for the varieties that they had developed in the absence of IPP.

This paper explores the options that developing countries have while fulfilling their commitment to introduce plant varieties protection (PVP). A range of choices before the developing countries in terms of possible frameworks for PVP have been discussed at some length in the paper. These alternatives, it may be argued, would help in developing the framework that is most appropriate given the objective conditions that they are faced with in their respective countries.

Plant varieties protection in TRIPS

The norms for the protection of plant varieties are specified in the TRIPS Agreement in Article 27.3(b). Although at first sight the scope of the relevant provision appears open to interpretation, in reality, however, it is quite well defined. Article 27.3(b) provides that "...Members shall provide for the protection of plant varieties either by patents or effective sui generis system or by any combination thereof" (emphasis added). The qualification made of the *sui generis* system that is to be introduced as per the requirements of this Article holds the key to the adoption of the framework for the system.

Possible interpretations of an "effective" *sui generis* system

Three interpretations of what can be considered as an "effective" *sui generis* system of PVP are given below.

Effective enforcement

Under this interpretation, the TRIPS Agreement provides an indication of a possible meaning of the term "effective". TRIPS employs the term "effective" in particular in the context of the national enforcement of rights and procedures for the multilateral prevention and settlement of disputes, in which the rights to be conferred on the holder of intellectual property that is protected are either defined in detail, or as "equitable remuneration". This formulation underpins the argument that a *sui generis* system needs to allow effective action against any act of infringement, as required by the relevant articles of the TRIPS Agreement. The major limitation of this approach is that the effectiveness of a *sui generis* system thus assessed does not depend on the requirements for, or on the level of, protection¹.

UPOV as the "effective" *sui generis* system

Both the WTO and International Union for the Protection of New Varieties of Plants (UPOV) Secretariats have given clear indications that they would consider the framework provided by UPOV as an "effective" *sui generis* system. In fact, even before the language of the TRIPS Agreement was finalised, a member of the then General Agreement on Tariffs and Trade (GATT) Secretariat indicated that the TRIPS Agreement would oblige parties to the Agreement to, "provide for the protection of plant varieties, but would leave them free to decide whether to grant such protection through patents, through an effective *sui generis* system such as the UPOV system, or through any combination of the two".² This statement made by Gueze is significant for it identifies the UPOV system with an effective *sui generis* system, which WTO members are committed to introduce, in keeping with the provisions of Article 27.3(b).

The UPOV Secretariat has argued that the "UPOV Convention provides the only internationally recognised *sui generis* system for the protection of plant varieties"³. In view of this, the UPOV Secretariat expected many developing countries to choose the UPOV system as their model for an effective *sui generis* system of protection.

Major associations of plant breeders, like ASSINSEL, have also argued in favour of the UPOV framework being accepted as the "effective" *sui generis* system. ASSINSEL has argued that a *sui generis* system for protecting plant varieties can operate only if varieties are defined in terms of uniformity, stability and distinctness. Without these qualities, any variety is "vague and evanescent, quite unsuitable for being the subject matter of a legal right". The adoption of these three criteria for granting protection to plant varieties by the UPOV Convention makes it the effective system according to ASSINSEL.⁴

Protection available to new plant varieties as indicator of “effectiveness”

Under this interpretation, the availability of protection for new plant varieties is the sole determinant of effectiveness for the *sui generis* system that countries must adopt to fulfil their commitments under Article 27.3(b) of the TRIPS Agreement. Accordingly, the legal framework that can provide protection to the largest range of new varieties developed can alone be considered as indicative of an "effective" system. This criterion can only be met if protection is extended to include all the stakeholders involved in the act of plant breeding in various countries. This would include formal plant breeders, who are the focus of the UPOV framework, and traditional farmers, who continue to play a significant role in the development of agriculture across countries.

India has followed this interpretation in its approach while fulfilling its commitments under the TRIPS Agreement. The Protection of Plant Varieties and Farmers' Rights (PPVFR) Act was approved by the Indian Parliament in August 2001 and is arguably the only *sui generis* system for PVP other than the UPOV Convention currently enacted in law. The Indian legislation provides protection to varieties developed by plant breeders in the formal sector as well as farmers, besides safeguarding the traditional rights of the latter to save seeds from one year's harvest to be used in the next. The details of the Indian legislation would be discussed in a later section.

Features of UPOV systems of protection

There are three alternative systems of protection of plant varieties under the UPOV Convention. These are provided by the 1961 Act (with the 1972 amendments), the 1978 Act and the 1991 Act. Over the past decade, the UPOV membership has changed character - from a club of 18 developed countries in 1991; to one of 52 countries at different stages of development in 2003.

UPOV 1961

The UPOV Convention as adopted in 1961 ((henceforth UPOV 1961) by five countries had several key provisions. These are enumerated below.

Forms of protection

Each member state could recognise the right of the breeder provided for in the Convention by the grant of a special title or of a patent. But countries, whose national law allowed protection under both these forms, were allowed to use only one of them for the same botanical genera or species. This provision followed the recommendations made by a Group of Legal Experts on the relationship between the Paris Convention for the Protection of Industrial Property and the proposed UPOV in 1960. The

experts said that “while each country should remain entirely free to choose the system of protection that it adopted for domestic legislation, it is desirable that in each of them, for one and the same species or group of species, there should be just one category of protection”.⁵ This provision became a major impediment to the United States of America (USA) joining UPOV since after 1970, plant varieties could be protected both by the Plant Patents Act of 1930 and the Plant Varieties Protection Act of 1970.

Coverage of varieties

UPOV 1961 applied to all genera and species mentioned in the Annex to the Convention⁶ but in a phased manner. Each member was expected to apply the provisions of the Convention to at least five of the genera mentioned in the Annex of the 1961 Act upon joining, then to the other genera in the list in three phases, viz., (a) within three years to at least two further genera; (b) within six years, to at least four further genera and (c) within eight years to all the genera included in the Annex. Importantly, the genera and species listed were significant in Europe and in countries of the temperate climatic zone⁷.

Scope of protection

Prior authorisation from breeders had to be sought for production and commercial marketing of the reproductive or vegetative material, as such, of the new variety, and for the offering for sale or marketing of such material.

The breeders' rights extended to ornamental plants or parts of plants marketed for purposes other than propagation when they were used as propagating material in the production of ornamental plants or cut flowers. Breeders' authorisation was required only if the new varieties were used as an initial source of variation in creating new varieties or for marketing such varieties. In other words, the use of the varieties for research purposes was allowed.

The framework developed in UPOV provided the minimum standards of protection, and any member state could provide a higher level of protection to the new varieties, even extending the breeders' rights to the marketed products.

Duration of protection

A minimum of 18 years protection for vines, fruit trees and their root-stocks, and 15 years for all other plants was provided. Member states could adopt longer periods of protection if they wished and could fix different periods for the some classes of plants to take into account the requirements of regulations concerning the production and marketing of seeds and propagating materials.

Conditions to be fulfilled for protecting plant varieties

The UPOV 1961 allowed protection of varieties that were: new; distinct; homogenous; and stable. These attributes of plant varieties that could be granted protection were elaborated in the Model Law that the UPOV Secretariat developed after the 1978 Act was finalised (see below).

UPOV 1978

Moves to revise UPOV began in 1974 ostensibly to make the convention more attractive to non-members. The needs of two countries in particular, the USA and Canada, were addressed as the work on the revision of the Convention. Two sets of conditions for plant varieties protection had to be met under UPOV 1978. The first was the minimum number of genera or species to which any UPOV member states had to extend protection in their national legislation. The second related to the characteristics of the plant varieties that could qualify for protection.

Number of genera/species to be protected

Any country, on becoming a party to the 1978 Convention, had to apply the provisions of UPOV to at least five genera or species. Within three years, this number had to increase to 10 and after a further three years to 18⁸. Within eight years, at least 24 genera or species had to be covered. The number of genera or species to be included could be reduced, or the period allowed for meeting the requirements of coverage increased, if particular members of UPOV were unable to comply with the stipulations due to "special economic and ecological conditions"⁹. These provisions, included in Article 4, were a radical departure from the corresponding provisions of the 1961/72 Act, which identified a list of genera or species suited to the needs of European countries. Article 4 was thus provided to remove one of the major obstacles to the adherence of several non-European States to UPOV¹⁰.

Conditions to be met for protection of new varieties of plants

UPOV '78 allowed protection of plant varieties (Article 6) that were: new; distinct from any other variety that was in common knowledge; sufficiently homogenous; and stable in their essential character. Any plant variety that met the above mentioned criteria could qualify for protection, irrespective of the origin, artificial or natural, of the initial variety from which it had resulted. This implies that unlike patents, which are normally not granted to discoveries, plant varieties could be protected even when they were "discovered".

Novelty - This criterion applied to plant varieties was essentially different from the one applied to industrial patents in two ways. First, with patents, most countries applied the criterion of novelty anywhere in the

world, i.e. absolute novelty, while under UPOV, the novelty criterion may be applied strictly in a national context, i.e. local novelty. Secondly, patent protection could be extended to products and processes that were not marketed as of the day of the application for protection, but a plant variety could be considered as new provided:

- The variety must not have been offered for sale or marketed in the country in which protection was being sought for more than one year.
- The variety must not have been offered for sale or marketed in any other country for more than four years in the case of all plant varieties except for vines, forest trees, fruit trees and ornamental trees when the period was not more than six years.

The first criterion for defining novelty was the result of an amendment made to the 1961/72 Act. The 1961/72 Act allowed protection of only "new" varieties of plant, which is akin to the criterion of novelty applied in case of patentable subject matter.

The Model Law of UPOV 1978 suggests that the criteria of novelty proposed in Article 6(i)(b) does not specify the type of material, the offering or sale of which would be detrimental to the conditions of novelty. The Model Law ("Model Law" in this section refers to the Model Law of UPOV 1978) indicates that the national legislations of UPOV member states could expressly state that it is not only the offering for sale, or the marketing of the propagating material of the variety, but also the offering for sale, or the marketing of other material of the variety (including derived products) that could be considered as offering for sale or marketing of the variety. The latter interpretation of novelty could, in fact, bring UPOV 1978 closer to the industrial patent system.

Distinctness - This criterion was designed to complement that of novelty in that the protectable variety was required to be clearly distinguishable from any other variety whose existence was common knowledge. Common knowledge could be established by reference to factors like cultivation or marketing; inclusion of the variety in an official register of varieties; and description in a publication. The Model Law, however, indicated that these factors were not exhaustive and this left UPOV 1978 open to interpretation in identifying the distinctness of a variety.

Homogeneity - This criterion was applied to the sexual reproduction of the varieties or their vegetative reproduction.

Stability - To be stable, a plant variety had to remain true to its initial description after repeated reproduction or propagation.

Nature of protection

UPOV 1961 allowed countries to protect the interests of plant breeders, either through the grant of a special title or a patent but not both. The USA, however, had extended protection to sexually propagating plants through the Plant Variety Protection Act of 1970 besides providing for plant patents.

An amendment in Article 37 paved the way for the accession of the USA to the treaty by including an exception to Article 2(1), which allowed a state already providing dual protection to continue to do so provided “it notifies the Secretary General (of the UPOV) of that fact”. Furthermore, countries using the patent laws to protect plant varieties were allowed to use the patentability criteria and the period of protection as was provided for under their patent laws.

Thus, this amendment allowed countries to provide more than one form of protection for plant varieties only if the countries were maintaining such a system prior to their entry into UPOV. It is because of this condition that only the USA has been able to provide for multiple forms of protection to plant varieties.

Scope of breeders’ rights

The rights provided to plant breeders under UPOV 1978, as spelt out in Article 5(1), allowed them control over the following activities associated with reproductive or vegetative propagating material: production for the purposes of commercial marketing; offering for sale; and marketing. In addition, the breeders’ authorisation had to be obtained when plants of the protected varieties or their parts, normally marketed for purposes other than propagation, were commercially used as propagating materials in the production of ornamental plants or cut flowers of that variety.

Article 5(4) states that any member of UPOV “may grant to breeders a more extensive right” than set out in Article 5(1), “extending in particular to the marketed product”. Thus, UPOV 1978 sets only the minimum standards for Plant Breeders’ Rights (PBRs) for its members to follow. By so doing, the UPOV Convention provided the benchmark, an approach followed by the TRIPS Agreement¹¹.

Article 5(3), however, provided an important exception to the PBRs. This said authorisation of the breeder was not required “either for the utilisation of the variety as an initial source of variations for the purpose of creating other varieties or for the marketing of such varieties”. However, authorisation of the breeder was required when “repeated use of the variety was necessary for the commercial production of another variety”.

While it defines the scope of the rights of plant breeders, Article 5 also provides the basis for balancing the breeders' rights with the interests of the users of the plant varieties. Farmers and researchers were provided the space to carry on with their activities unhindered by the exercise of the breeders' rights. Farmers were allowed to continue their tradition of using a part of a year's harvest as seeds for the next and also to exchange seeds with their farm neighbours. These activities of farmers, often referred to as the "farmers' privilege", were not considered as a part of "commercial marketing" under Article 5(1).

A research exemption was also clearly spelt out in Article 5(3), since no authorisation of the breeder was required for the use of a protected variety "as an initial source of variation for the creation of other varieties". This provision, it can be argued, also provided space for the farmer innovators who could develop new varieties and also market the varieties they had developed. The Article 5(3) exception in effect meant that the farmers developing new varieties could market their varieties on a limited scale.

Safeguarding public interests through the grant of contractual licenses

Article 9 of UPOV 1978 allows the exclusive rights of breeders to be restricted in the public interest. The Model Law of UPOV 1978 offers three interpretations of Article 9 through the grant of:

- A voluntary license by the right holder for the exploitation of the variety;
- Licenses of right; and
- Compulsory licenses.

Voluntary licenses or contractual licenses, the term that the Model Law uses, can be provided by any breeder for the exploitation of his/her variety on terms agreed between the parties. A similar structure has been suggested in the Model Law of the grant of licenses of right that could be issued by the relevant authority. The licensee has to apply for exploitation of a protected variety and also register his/her intent of paying a royalty to the breeder before the licence can be issued. These licenses do not reflect on the public interest dimension. Also, the structure of licenses of right as suggested in the Model Law essentially differs from those that have been used in the patent laws of several countries. The provisions governing licenses of right in the latter instance left few discretionary powers with the right holder, as they had to allow grant of a licence for the exploitation of a patent once an application proposing exploitation was made to the authority.

The compulsory licensing provisions in the Model Law articulate the public interest dimension referred to in Article 9 of UPOV 1978. The Model Law provides that the 'PBRs Office shall grant the compulsory license if this is necessary to safeguard the public interest in the rapid and wide distribution of new varieties and in their availability to the public at adequate and reasonable prices". Several conditions must be fulfilled for the grant of a compulsory licence:

- The applicant for the grant of a compulsory license must be in a position, both financially and otherwise, to exploit the plant breeders' right in a competent and business-like manner;
- The applicant was refused permission by the right holder to produce or market the propagating material of the protected variety in a manner sufficient for the needs of the general public ;
- The applicant could not procure a license for exploitation of the variety on reasonable terms ;
- Three years have elapsed between the time of the grant of the plant breeders' right and the application for the grant of the compulsory license, and
- The compulsory license shall not, under ordinary circumstances, be granted for less than two or for more than four years.

These provisions for the grant of compulsory licenses differed from those provided for in the patent laws of several countries, in particular over the term allowed for the exploitation of plant varieties. Unlike a compulsory license for the exploitation of a patent, which was usually granted for the entire period for which the patent was valid, compulsory licenses for a plant variety could be granted for a maximum period of four years.

The provisions for the grant of compulsory licenses as suggested by the Model Law thus shifted the balance in favour of the right holder. Therefore, it is no coincidence that several of the conditions for the grant of compulsory license, as indicated above, were adopted when the patent laws were strengthened in the TRIPS Agreement.

UPOV 1991

The decision to revise the provisions of the 1978 Act was taken in 1986. The 17 members of the Union took this decision at a time when biotechnology was increasingly being used for plant breeding activities, which prompted demands for the adoption of the patent system in agriculture. These demands were strengthened after the first industrial patent was granted for an improved crop variety in the USA.

The main goal of the revision was to strengthen the breeders' right. The reason, as argued in the Diplomatic Conference for the Revision of UPOV Convention, was that the "costs of deploying new technologies and the costs of developing and producing new varieties" of plants had "caused the public authorities in the UPOV member states to ask themselves if the PBRs system was adequate and strong enough to secure the maintenance of the enormous, costly breeding work"¹². It was argued that the authorities of the member states of UPOV were convinced of the need to have a strong plant breeding industry, backed by a strong PBRs system, together with strong organisations for the protection of genetic resources.

The members of the Conference accepted UPOV 1991 after the Diplomatic Conference held in Geneva. The Act required a minimum of five ratifications and accessions coming into force as an international legal instrument and this was achieved in April 1998.

There are key differences in three areas - the coverage of varieties qualifying for protection; the nature of rights enjoyed by the breeder; and the rights over "essentially derived varieties" (EDVs) - in UPOV 1991 compared with UPOV 1978.

Coverage of varieties under protection

Until 1991, members had flexibility in the coverage of genera and species subject to PBRs - in part due to concerns about the impact of PBRs on genetic diversity¹³. Till then, UPOV had always maintained that varietal protection should be adopted by the member countries in a phased manner and did not require comprehensive coverage of all varieties.

UPOV 1991 requires a comprehensive coverage of plant varieties by the member states of the Union, but not immediately. States that are members of the UPOV Convention have a five-year transition period to meet this requirement¹⁴. New members to the Union, however, are required to protect 15 genera or species on accession and include all genera and species within 10 years¹⁵.

Nature of rights enjoyed by the breeder

UPOV 1991 marks a major departure from UPOV 1978 in the nature of rights provided to the breeder. Article 14 defines these in four areas: the propagating material; the harvested material; certain other products; and EDVs. The first three situations are discussed below, while EDVs are discussed separately.

Breeders' rights on propagating material include: production or reproduction (multiplication); conditioning for the purposes of propagation; offering for sale; selling or marketing; exporting; importing; and stocking for any of the purposes referred above.

Propagating material, as understood in UPOV 1991, included “parts of the plant intended for the production of new plants, for example seeds”, and certain parts of plants that may be used either for “consumption or sowing”. Of particular importance was “conditioning for the purposes of propagation” covered by Article 14(1)(ii). This was intended to strengthen breeders’ rights by monitoring on-farm production and the use of harvested material. If, for instance, a variety was being cultivated for consumption but during the growing period the farmer decided to use the harvested material, after “conditioning for the purpose of propagation”, the breeder can intervene at the conditioning stage using the rights provided by Article 14 (1)(ii).

This leaves virtually no possibility of farmers re-using seeds without the authorisation of the breeder. Nominal scope for exceptions to breeders’ rights has, however, been provided for under 15.2: “each Contracting Party (to UPOV 1991) may, within reasonable limits and *subject to the safeguarding of the legitimate interests of the breeder*, restrict the breeders’ 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...” (emphasis added).

The rights of the breeder over the propagating material have been extended to all acts involving commercialisation. Besides offering for sale or marketing of the protected propagating material, rights that were provided under UPOV 1978 and UPOV 1991 extend the breeders’ rights to exporting, importing and stocking. Inclusion of exporting as an additional right for breeders makes UPOV in its present form stronger in terms of the rights it affords to the intellectual property holder than the patent system does under the TRIPS Agreement.

The rights of breeders were further strengthened by extending them to harvested material and products of harvested material that use protected varieties of plants. Article 14(2) states that “... in respect of harvested material, including entire plants and parts of plants, obtained through the unauthorised use of propagating material of the protected variety shall require the authorisation of the breeder, unless the breeder has had reasonable opportunity to exercise his/her right in relation to the said propagating material”. This Article, in essence, puts the burden of proof on the users of planting material to prove their innocence that they did not use a protected variety in the event that they are challenged by the owner of the variety in question. The significance of this provision was seen in a dispute involving Monsanto and a Canadian farmer, Percy Schmeiser where the latter had claimed that he did not plant a Monsanto owned plant variety as was claimed by the company. The case was

eventually settled in favour of Monsanto, leaving Schmeiser to compensate the seed company for the losses it had suffered.

Rights over the products of the harvested material were again extended to the breeder through a provision similar to the one in the case of harvested material. The breeder would have rights over the harvested material provided he/she can establish that he/she did not have adequate opportunity to establish his/her rights in relation to the harvested material.

Essentially derived varieties

The inclusion of EDVs in UPOV 1991 is generally regarded as the single most important change to UPOV. Under this provision, the so-called "research exemption" available under UPOV 1978, which allowed breeders to freely use protected varieties for research purposes and for breeding new varieties, was excluded. This has major ramifications for developing countries where farmer-innovators have been an integral part of the innovation systems in the agricultural sector. Article 14(5) of UPOV 1991, which provides for the inclusion of EDVs of protected varieties within the scope of the rights of the breeder, seeks to strengthen the rights of the breeder by bringing within protection "essentially derived and certain other varieties" of the protected varieties. Proponents of the change argued that the benefits that a breeder could secure were limited since the "research exemption" available under UPOV 1978 allowed the creation of a new variety of plant by using protected varieties without the authorisation of the original breeder¹⁶. The association of commercial plant breeders, ASSINSEL, supported the introduction of the EDV concept since "cosmetic modifications", according to them, were enough for protecting a new variety. This was particularly true in the case of the mutation of ornamental or fruit plants and of "conversion" by repeated backcrossing of parental lines of hybrid varieties. It may be argued that Article 14(5) was introduced to limit development of new varieties from the protected varieties by any means.

An EDV is defined in UPOV 1991 as:

- 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;
- It is clearly distinguishable from the initial variety; and
- 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.

Article 14(5) further¹⁷ provides a non-exhaustive list of examples of acts that may result in the essential derivation, including the selection of a natural or induced mutant, or of a somaclonal variant, the selection of a variant individual from plants of an initial variety, backcrossing or transformation by genetic engineering. This indicates that all acts of breeding, from the most conventional to those involving use of modern techniques, would be taken into consideration while determining whether or not a new variety is "essentially derived".

This strengthening of the rights of breeders was quite controversial, with several countries, notably Japan and Canada, raising the issue in the Diplomatic Conference. These countries emphasised that prior to the assigning of rights for an EDV, effective guidelines must be laid down for identifying such varieties¹⁸. UPOV 1991 took note of this observation through a decision to evolve some guidelines. These guidelines have, however, not yet appeared. Introducing the concept of EDVs raises several other contentious issues such as establishing the criteria for identifying the derived varieties. The Canadian delegate pointed out that the provisions on EDVs in Article 14.5 were controversial since varieties that were previously considered new would be treated as essentially derived after these provisions were applied and hence could not be exploited commercially without the consent of the breeder of the initial variety. One of the solutions suggested by ASSINSEL is the establishment of thresholds for characterisation of EDVs by adopting the following principle¹⁹:

A first threshold below which a variety cannot be considered an EDV should be specified for each species and a second threshold of conformity above which the variety should be considered as essentially derived. These thresholds should be used if the breeder cannot prove by clear evidence that he/she has started from an independent germplasm.

Between these two thresholds, the derivation could be disputable and the breeder of the EDV should have to give, in case of amicable negotiation or arbitration, information on the origin of the new variety.²⁰

Others have argued that the determination of derived varieties would not be made by an examining office as a part of the grant of PBRs, but between plant breeders either through a mutually arrived agreement or through litigation²¹. This implies that this critical issue would be settled by the relative strengths of the parties involved. This would not favour developing countries, most of whom have long been involved in major programmes of plant breeding²².

Exceptions to the breeders' rights

Two sets of limited exceptions to the rights granted to plant breeders are included in Article 15 of UPOV 1991. The first (Article 15.1), designated as compulsory exceptions, included the following: acts done privately and for non-commercial purposes; acts done for experimental purposes; and acts done for the purpose of breeding other varieties, provided that such breeding activities did not result in the production of EDVs. Included in this set of exceptions is a more restricted version of "research exemption" available under UPOV 1978.

The second set of optional exceptions (Article 15.2) included those that are related to "farm-saved seed" or the farmers' privilege. This provision states that each "Contracting Party may, within the reasonable limits and subject to the safeguarding of the legitimate interests of the breeder, restrict the breeders' 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..." (emphasis added).

The latter set of exceptions is in sharp contrast to the earlier system under which farmers were allowed to reuse protected material without paying any royalty to commercial breeders. The new provisions allow the farmers to reuse protected material only if the "legitimate interests of the breeder" are taken care of? the "legitimate interests" being the royalty that the breeder should be paid for re-using the seeds and this meant "downgrading of the farmers' privilege" in the view of FAO.²³

The Model Law of UPOV 1991 has suggested further limitations on the exercise of the farmers' privilege. It suggests that Article 15.2 of UPOV 1991 should be used only in relation to varieties of "specified plant genera and species" and not to all genera and species covered by the domestic legislation of UPOV member countries. This, the Model Law states, was inconsistent with a recommendation adopted in the Diplomatic Conference that adopted the 1991 Act, which said that Article 15.2 of UPOV 1991 "should not be read so as to be intended to open the possibility of extending the practice commonly called "farmer's privilege" to sectors of agricultural and horticultural production in which such a privilege is not a common practice on the territory of the Contracting Party concerned".

ASSINSEL interprets this recommendation²⁴ to mean that "farmer's privilege" should not go "beyond the provision of the 1991 Act of the UPOV Convention, i.e., within the reasonable limits in terms of acreage, quantity of seed and species concerned and subject to the safeguarding of the legitimate interests of the breeders in terms of payment of a

remuneration and information". Any national legislation authorising farm saved seed without reasonable limit and without safeguarding the legitimate interests of the breeders, ASSINSEL argue, "would not be an effective *sui generis* system in the meaning of Article 27.3(b) of the TRIPS Agreement".

The restrictions farmers could face in the new system of PBRs are illustrated by the amendment of the PBR system brought about by the US Congress after ratifying UPOV 1991. This new legislation put limits on the scope of the "farmer's exemption" under the US Plant Variety Protection Act (the US equivalent of PBRs) ? farmers are allowed to re-plant the seeds on their own farm but are restricted from selling them for reproductive purposes to their farm neighbours without having to pay royalties or ask permission for the same.

Contractual licenses and the public interest

UPOV 1991 allows restrictions on the exercise of PBRs to safeguard public interest in Article 17. This Article, in essence, is similar to the corresponding provisions in UPOV 1978. The similarities extend to the interpretations of these provisions in the respective Model Laws. In both Model Laws, the suggested remedy for violation of the public interest is the grant of contractual licenses.

However, unlike the interpretation of the Model Law of UPOV 1978, which had provided three options in case of contractual licenses, the Model Law of UPOV 1991 provides only two options ? either voluntary licences or compulsory licences.

The provisions of compulsory licenses as suggested by the Model law of UPOV 1991 have certain nuanced differences from that suggested by the Model Law of UPOV 1978. The most important of these is that while the latter formulation defines the grounds for safeguarding public interest²⁵ the former does not explicitly do so. But although the Model law of UPOV 1991 does not define public interest explicitly, it can be argued that the structure of UPOV 1991 does not limit the grounds for defining public interest and compulsory licenses could be broader in their scope of application than that possible under UPOV 1978.

Other *Sui Generis* options

Many countries, such as India and Namibia have shown their interest in developing alternative *sui generis* systems, not simply adopting UPOV. While India's legislation has entered into the country's statute books, the Namibian legislation is still awaiting the approval of the country's law-makers. These initiatives aside, non-governmental organisations (NGOs) have also tried to develop *sui generis* options for protecting plant varieties. The Convention of Farmers and Breeders (CoFaB), developed by

Gene Campaign, an India-based organisation, represents one such effort. In this section, salient features of these are examined.

The Indian legislation on plant varieties protection

Indian legislation to fulfil its commitments under TRIPS Article 27.3(b) is the Protection of Plant Varieties and Farmers' Rights Act (PPVFR) Act. As its title suggests, the legislation is an attempt by the Indian Government to recognise the contribution of both commercial plant breeders and farmers in plant breeding activity. The PPVFR Act is the outcome of the twin pressures that the government has faced in extending Intellectual Property Rights (IPRs) to agriculture. One set has come from the world system to introduce intellectual property protection (IPP) as a measure to recognise the contribution made by the commercial plant breeders in the development of new varieties of plants. This has been reinforced by the emerging private seed industry in India. The other came from farming communities opposed to the introduction of any form of IPRs in the agricultural sector. The private seed industry in India has argued for the introduction of IPP to cover the agricultural sector ever since its entry on a major scale was facilitated following the amendment of the Seed Act in 1988, which provided greater space to the private sector to operate in the industry. The main argument of the seed companies was that incentives for supply of improved varieties of seeds could only be provided by putting in place an appropriate regime of IPRs.

The farmers, however, had been beneficiaries of the breeding activity undertaken by the publicly funded institutions, which from the mid-1960s had provided the improved varieties of seeds that made the Green Revolution in India a reality. These publicly funded institutions did not depend on IPRs to provide them with the incentives to produce improved varieties of crops; their activities were determined by the structure of government policy making.

The balance, however, shifted in favour of extending IPRs in agriculture after India assumed membership of the WTO and undertook to fulfil commitments under TRIPS.

Objectives of the legislation

The PPVFR Act aims to establish "an effective system for the protection of plant varieties, the rights of farmers and plant breeders, to encourage the development of new varieties of plants", in keeping with Article 27.3 (b) of TRIPS. Three key factors in introducing the legislation are:

- Protection of the rights of farmers for their contribution made at any time in conserving, improving and making available plant genetic resources for the development of new plant varieties,

- Protection of PBRs to stimulate investment for research and development, both in the public and private sector, for the development of new plant varieties, and
- Giving effect to Article 27.3 (b) of the TRIPS Agreement on the protection of plant varieties.

Coverage of varieties

Sections 14, 23 and 29 of the PPVFR Act specify the range of plant varieties that can be protected under the legislation. Section 14 lists three classes of plant varieties that can be protected under the legislation: new varieties; extant varieties; and farmers' varieties. For new varieties, the genera and the species, which can be registered under the PPVFR Act, will be notified subsequently by the Central Government. This implies that the Indian government will restrict the number of genera and species protectable under the Act to an as yet unspecified number. Once notified, no genera or species would be deleted from the notified list except in the public interest. Extant varieties have been defined using four benchmarks: varieties that have been notified under the Seeds Act, 1966; farmer varieties; varieties about which there is common knowledge or any other variety that is in the public domain. Farmers' varieties, however, have been defined as varieties that have been traditionally cultivated and evolved by farmers in their fields; and a wild relative or landrace of a variety about which farmers possess common knowledge. Section 14 thus provides opportunities to all the stakeholders involved in plant breeding, in the main farmers and commercial plant breeders, to seek protection for the plant varieties that they develop.

The legislation also specifies that breeders can exercise their rights over any variety that is essentially derived from the protected variety. An EDV is defined in the PPVFR Act as having one of the following characteristics: predominantly derived from an initial variety while retaining the expression of the essential characteristics that results from the genotype or combination of the genotype of such initial variety; any variety that is not clearly distinguishable from a protected variety; or conforms to such initial variety in the expression of the essential characteristics that result from the genotype or combination of genotype of such initial variety. An EDV in the Indian legislation is, therefore, similar to that in UPOV 1991.

Characteristics of varieties that can be protected

Section 15 of the PPVFR Act specifies the characteristics of the varieties that qualify for protection - distinctness, uniformity and stability. Thus, the legislation has followed the principles set by the UPOV Convention and each characteristic has been defined as in UPOV Convention.

Conditions imposed on applicants

Section 18 of the legislation requires any applicant intending to register for protection of a plant variety in India to make a series of declarations and also provide information about the origin of the genetic material that the variety uses. The imposition of these conditions on the applicant is significant given the on-going discussions on PVP, particularly in the developing countries and in the World Intellectual Property Organisation (WIPO) Intergovernmental Committee on Intellectual Property, Genetic Resources, Traditional Knowledge and Folklore.

An applicant must declare that the variety for which protection is sought does not contain any gene or gene sequence involving terminator technology²⁶ and that the genetic material or parental material acquired for breeding, evolving or developing the variety has been lawfully acquired.

The applicant will also have to provide the complete passport data of the parental lines from which the variety has been derived along with the geographical location in India from where the genetic material has been taken. In addition, the applicant will have to provide all such information about the contribution, if any, of any farmer, village community, institution or organisation in the breeding, evolution or development of the variety. Information on the use of genetic material conserved by any tribal or rural families in the breeding of such variety will also have to be provided along with the application [Section 40 (i)]. The above conditions will not, however, apply to the registration of farmers' varieties.

Breeders' rights

Breeders' rights recognised under the PPVFR Act extend, for seed and/or propagating material of the protected variety, to: production; selling; marketing; distribution; export; and import [Section 28(1)]. These rights are consistent with those that have been provided under UPOV 1991. However, in case the breeder's variety protected under the Act is an EDV from farmers' variety, the breeder cannot give any authorisation without the consent of the farmer or communities from whose varieties the protected variety is derived [Section 43].

Farmers' rights

Chapter VI of the PPVFR Act, entitled Farmers' Rights, contains specific provisions that seek to safeguard the interests of farmers and other village and local communities engaged in plant breeding in two ways – one, by protecting their on-farm activities and two, by providing incentives in the form of rewards for their contribution to farming.

Two specific provisions protect their on-farm activities. The first states that the farmer will be “entitled to save, use, sow, re-sow, exchange, share or sell his farm produce including seed of a variety protected” under the legislation “in the same manner as he was entitled before the coming into force” of this legislation²⁷. This provision, in essence, is what has been known as the “farmers’ privilege”, an accepted practice under UPOV 1978, which UPOV 1991 has severely diluted. The PPVFR Act, however, imposes a condition on the farmer; viz. the seeds that the farmers are entitled to sell cannot be branded. Although, this requirement may not appear to be too demanding on farmers, the definition of “branded seed” in the legislation could impose restrictions on farmers intending to sell their farm produce without being affected by the breeders’ rights. “Branded seed”, according to the PPVFR Act, “means any seed put in a package or any other container and labelled” in a manner indicating that the seed is that of a protected variety. Whether or not this qualification on the so-called “branded seeds” will affect the farmers’ ability to engage in “brown-bagging” will be the key issue during the implementation of the Act.

The second provision concerns the full disclosure of the expected performance of the seeds or planting material of protected varieties by the plant breeder. In case the seeds or planting material fails to perform in the manner claimed by the breeder, the farmer may claim compensation from the plant breeder. This provision appears to exceed the limits that the plant varieties’ legislation normally provide and transgresses into the domain of the Seed Act, which is the relevant legislation for verifying the quality of seeds.

The PPVFR Act also seeks to reward the farmer “who is engaged in the conservation and preservation of genetic resources of landraces and wild relatives of economic plants and their improvement through selection and preservation”. This provision, when taken in conjunction with the provisions relating to the farmers’ privilege mentioned above, is similar to the concept of “Farmers’ Rights” contained in the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) adopted in November 2001.

Researchers’ rights

Researchers’ rights are recognised in Section 30, which grants them free and complete access to protected materials for research use in developing new varieties of plants. However, authorisation of the breeder is required “where repeated use of such variety as parental line is necessary for commercial production of such other newly developed variety”²⁸. This provision in effect uses the formulation provided for in UPOV 1978 for breeders’ exemption.

Benefit sharing

The PPVFR Act provides for benefit sharing involving varieties registered under the Act in two circumstances. The first applies specifically to EDVs registered under the Act [Section 26]. In the second, any village or local community can claim benefit for contributing to the development of a variety registered under the Act [Section 41].

For a variety registered as an EDV, NGOs or individuals can claim a share of benefits that may arise from the commercialisation of that variety on behalf of any village or local community. The Plant Varieties and Farmers' Rights Authority (PVFRA), the designated authority to implement the Act, to whom the claims for benefit sharing must be made, has been empowered to investigate the claims and to indicate the amount of benefit sharing should the Authority find the claim justified. The Authority will use two criteria to establish the justification of the claims. These are: the extent and nature of the use of genetic material of the claimant in the development of the variety for which the benefit sharing has been claimed; and the commercial utility and demand in the market of the variety for which the benefit sharing has been claimed. The amount of benefit sharing, if any, would have to be deposited in the National Gene Fund by the breeder of the variety on which the claim has been made.

In the second circumstance, any individual or NGO can make a claim on behalf of a village or local community for the contribution that the particular village or local community had made in the evolution of any variety registered under the Act. If, upon investigation, the claim was found justified by the PVFRA, after the breeder was given an opportunity to file objection and to be heard, an amount of compensation, as the Authority deems fit, would be deposited by the breeder in the National Gene Fund.

Compulsory licensing

An important feature of the PPVFR Act is the priority attached to the public interest over the interests of the commercial breeders [Chapter VII]. The legislation authorises the granting of compulsory licenses to ensure availability of seed plant or reproductive material of the protected variety in reasonable quantity at reasonable price upon the following grounds:

- Three years have elapsed since the date of issue of a certificate of registration;
- Reasonable requirements of the public for seeds or other propagating material of the variety have not been satisfied; and

- The seed or other propagating material of the variety is not available to the public at a reasonable price.

If these conditions exist, the PVFRA can intervene. If, after giving an opportunity to the breeder of such a variety to file an opposition and, after hearing the parties the Authority may, on the grounds that reasonable requirements of the public concerning the variety have not been satisfied or that the variety is not available to the public at a reasonable price, order the breeder to license any one interested in undertaking production, distribution and sale of the seed or other propagating material of the variety in question.

The Authority will determine the period for which compulsory licences are granted in each individual case, taking into consideration the gestation periods and other relevant factors. The Authority will also give due consideration to the interests of the plant breeder in authorising grant of compulsory licences. The terms and conditions of a compulsory licence should ensure:

- Reasonable compensation to the breeder of the variety under the compulsory licence taking note of the nature of the variety, the expenditure incurred by the breeder in developing it and other relevant factors; and
- That the compulsory licensee is able to provide to farmers, the seeds or other propagating material of the variety in a timely manner and at a reasonable market price.

The PPVFR Act attempts to take on board the contributions made by different stakeholders in plant breeding. Arguably this system is consistent with the TRIPS Agreement because first, TRIPS does not define an "effective" *sui generis* system for PVP, and secondly, there are no limitations on members providing protection to farmers as well as protecting plant varieties under the Act²⁹.

Plant breeders belonging to the formal sector are, however, critical in their comments on the Indian legislation. According to ASSINSEL, the "Indian Bill mixes PBRs and FRs (Farmers' Rights), which are two different issues. Their association in a single text is not obvious since they could have been addressed separately in two different pieces of law. Moreover, as far as the Indian Bill is concerned, it is our opinion that the protection provided to plant breeders is definitively not effective"³⁰.

Apart from potential opposition from plant breeders in the formal sector, the challenge for the PPVFR Act may appear when it is implemented. Effective implementation will require the establishment of a network of institutions able to function in a well coordinated manner. The degree of success that India is able to demonstrate in the

implementation of this seemingly complex legislation should provide the basis for adoption of similar legislation in other countries.

The Namibian legislation

Namibia has proposed a *sui generis* legislation for the protection of plant varieties. The legislation, introduced in the country's Parliament in August 2001, is based on the "African Model Law for the Protection of the Rights of Local Communities, Farmers and Breeders, and for the Regulation of Access to Biological Resources" developed by the Organisation for African Unity (OAU). The proposed legislation, "Access to Biological Resources and Associated Traditional Knowledge Act" provides for the grant of farmers' rights and PBRs, while at the same time recognising the rights of local communities over their biological resources and associated knowledge, innovations and practices. The rights that the plant breeders and farmers would enjoy have been spelt out in the proposed legislation. The details are provided below.

Plant breeders' rights

The following provisions would apply to the plant breeders:

Scope of protection - The proposed legislation would apply to all plant varieties that are new, stable and homogenous in their essential characteristics. The three criteria adopted are based on UPOV 1978.

Rights of the breeders - Plant breeders would have the exclusive right to produce and sell, plant or propagating material of the protected variety. However, in selling the product, the proposed legislation does not clarify whether the act of selling would be restricted to Namibian territory or includes exports. Plant breeders would also have the right to license others to sell or produce the protected plant varieties or their propagating material.

Duration of protection - The proposed PBRs are 20 years for annuals and 25 years for trees, vines and other perennials from the date the rights are granted to the varieties protected.

Exceptions to the breeders' rights - Breeders' rights would not apply when farmers save, exchange or use a part of the seed from the first crop of plants, which they have grown for sowing on their own farms to produce a second and subsequent crops. In addition to respecting farmers' privilege, plant breeders would not be able to exercise their rights in:

- Propagating, using and growing plants of the protected varieties for non-commercial purposes;

- Selling plants or propagating material of the protected varieties as food or for another use that does not involve growing of the plants or the propagating material of the protected varieties;
- Selling within a farm or any other place where plants of the protected varieties are grown;
- Using plants or propagating material of the protected varieties as initial sources of variation for the purposes of developing new plant varieties, except when repeated use of the protected varieties are made for commercial production of another variety;
- Sprouting the protected varieties as food for home consumption or for the market;
- Using protected varieties in breeding, research or teaching; and,
- Obtaining the protected varieties from gene banks or plant genetic resource centres.

Restrictions on breeders' right: The proposed legislation authorises the government to restrict the rights of the breeder in the public interest. A non-exhaustive list of acts that may require intervention by the government for restricting the breeders' rights includes restrictions that may be imposed for:

- Controlling anti-competitive practices;
- Preventing any adverse effect on food security or nutritional or health needs;
- Checking inordinate import of the protected varieties;
- Redressing the situation where the requirements of the farming community for propagating material are not met; and
- Promoting public interest arising out of socio-economic reasons and for developing indigenous and other technologies.

Whenever such restrictions are imposed, the relevant government authority would have the right to convert the exclusive rights granted to the plant breeders into non-exclusive compulsory licence of rights.

The breeders would be entitled to a specific amount of compensation, if their rights were restricted. Although the mechanism for establishing the amount of compensation has not been spelt out, the proposed legislation provides that the rights holders can appeal against the compensation award.

Revocation of PBRs - Four grounds for revocation are given: if a plant variety was not new or if the facts existed, which if known prior to the

grant of the rights, would have resulted in the refusal of the grant; if the rights holder has failed to pay the fees 90 days after being notified that the prescribed fee was due for payment; the rights holder has failed to comply with the conditions for the PBRs; and the person to whom the rights have been transmitted or assigned has failed to comply with the provisions of the proposed legislation.

Farmers' rights

The Namibian legislation recognises farmers' rights stem from the enormous contributions that local farming communities have made in the conservation, development and sustainable use of plant and animal genetic resources that underpin plant breeding for food and agriculture. Farmers' rights are aimed at providing the incentives to the farming communities to continue making these contributions to agriculture and include the right to:

- protect traditional knowledge relevant to plant and animal;
- genetic resources ;
- obtain an equitable share of benefits arising from the use of plant and animal genetic resources ;
- participate in the decision making processes on matters related to the conservation and sustainable use of plant and animal genetic resources ;
- save, use, exchange and sell farm-saved seeds/propagating material; and
- use new breeders' varieties protected under the proposed legislation to develop farmers' varieties.

Farmers' varieties would be protected under the rules of practice as found in and recognised by the customary laws and practices of the local farming communities. The legislation also provides that farmers would not be able to sell their farm saved seed in the seed industry on a commercial scale.

Convention of Farmers and Breeders

Proposed by the Gene Campaign, the CoFaB is designed as a covenant between the farmers and breeders belonging to the germplasm owning countries of the South. CoFaB aims to ensure farmers have their rights stemming from the contribution that they have made towards identification, maintenance and refinement of germplasm while at the same time providing protection to the breeders of new plant varieties over the varieties they have bred. The main features of CoFaB are :

Coverage of varieties

CoFaB is designed to be applied to all botanical genera and species. All genera should be protected within 10 years of the adoption of the Convention. In this respect, CoFaB follows UPOV 1991, which also directs member countries to provide comprehensive protection to all varieties of plants within a specified period of time.

Characteristics of the varieties eligible for protection

The plant varieties eligible for protection in CoFaB have to be new and stable in the essential characteristics and homogenous. These characteristics have been defined along similar lines to that of UPOV 1978. The varieties for protection must meet two further conditions. First, breeders of new varieties have to declare the origin of all varieties used for the breeding of new varieties. Secondly, breeders are expected to base the new variety on a broader rather than a narrower genetic base, in order to maintain greater genetic variability in the field. These two conditions are together intended to enhance the sustainability of the genetic base of the gene rich countries

Rights of the farmers and breeders

CoFaB proposes to give rights to charge a fee from the breeders every time a landrace or traditional variety was used for the purpose of breeding or improving a new variety. The PBR includes prior authorisation for the production, commercial and branded marketing of the reproductive or vegetative propagating material, and for offering for sale or marketing of planting material that has been granted protection. For ornamental plants, the breeders' rights extend to parts of the plants marketed for purposes other than propagation, as for example, cut flowers. An optional clause included in the scope of breeders' rights was that for certain botanical genera or species, the rights of the breeders could extend to the marketed products. The rights that the breeders can enjoy under CoFaB are clearly more extensive than are generally available under UPOV 1991.

Period of protection

The farmers' rights proposed under CoFaB can extend for an unlimited period. For breeders, a minimum period of 18 years is proposed for vines, fruit trees and their rootstocks, ornamental trees and forest trees. For all other plants, the minimum period of protection would be 15 years. The duration of protection available to the farmers and breeders are hardly distinguishable in CoFaB. This is because instead of the usual practice followed by the legislation that provide for PBRs where the maximum period of protection is indicated, CoFaB seeks to impose restriction only on the minimum period of protection.

The two *sui generis* options for PVP discussed above illustrate contrasting ways of balancing the rights of the farming communities and those of the breeders. The proposed Namibian legislation gives primacy to the interests of the farming communities in unambiguous terms and provides measures that help realise this objective. CoFaB, on the other hand, provides relatively greater importance to the contribution made by the plant breeders in the formal sector.

Conclusion

Enactment of an "effective" *sui generis* legislation for the protection of plant varieties in keeping with their commitments under Article 27.3 (b) of the TRIPS Agreement has emerged as one of the most contentious issues in several developing countries. Article 27.3(b) of TRIPS aims at extending IPRs to developing country agriculture thus bringing their regimes of IPP in line with those existing in the developed countries. There is, however, an important difference between the two sets of countries in the process of extending PVP. While the latter had evolved the system of protection after decades of debate involving the local stakeholders, the former have to do so without any such process and that too within the relatively short time frame provided by the TRIPS Agreement.

One important consideration for the developing countries is that the TRIPS Agreement does not define what constitutes an "effective" *sui generis* system for protecting plant varieties. This offers the flexibility to WTO members to devise systems of protection of plant varieties, which suit their interests to the fullest extent.

The *sui generis* legislation that developing countries must introduce has to take into consideration the interests of both the farming communities as well as the plant breeders involved in the formal sector. Agriculture in most developing countries relies significantly on the traditional farming communities who have made their contribution to the production process through informal innovations as well. Most importantly, the seed supply systems in many of these countries continue to be in the hands of the farming communities, despite plant breeders in the formal sector starting to make in-roads into the seed markets in recent years.

Countries in the process of enacting legislation for PVP need to take this reality into consideration. There needs to be a balanced approach towards protecting the interests of the plant breeders in the formal sector and the traditional farming communities. This is particularly important given the evidence available from countries that have shifted the balance almost totally in favour of the former interest group. The introduction of PBRs in these countries has not proved to be favourable for the

agricultural sector in spurring research and development activities, which has been the main objective of providing legal protection to the breeders. Moreover, the prices of the seeds and other planting material have moved adversely for the users.

These experiences have provided the basis for discussions in the developing world about the possibilities of evolving various forms of *sui generis* legislation for PVP that could provide a balanced approach towards protecting the interests of formal plant breeders and the farming communities. India has taken a significant step in this direction by enacting a legislation that explicitly provides for farmers' rights in addition to the PBRs. Among the other countries, Namibia has taken a step forward in a similar direction. The country has been debating legislation that seeks to provide rights to traditional communities on the genetic resources they have been using in addition to providing rights to farmers and plant breeders. These legislative initiatives provide a useful starting point for introducing PVP in developing countries.

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Endnotes

¹ Leskien and Flitner, 1997

² Statement made by Matthijs Gueze in the Diplomatic Conference for the Revision of UPOV held in 1991, see UPOV, 1992 para 74.2, p 180

³ UPOV, 1998.

⁴ ASSINSEL, nd a

⁵ Heitz, 1987, p 87

⁶ Included in the list were wheat, barley, oats or rice, maize, potato, peas, beans, lucerne, red clover, rye grass, lettuce, apples, roses or carnations.

⁷ UPOV, 1981

⁸ Article 4(3).

⁹ Articles 4(4) and 4(5).

¹⁰ UPOV, 1981.

¹¹ Article 1 of the Agreement in TRIPs provides that "Members may, but shall not be obliged to, implement in their law more extensive protection than is required by this Agreement, provided that such protection does not contravene the provisions of this Agreement".

¹² UPOV, 1992, p 165

¹³ Paroda, R S, 1990, p 151

¹⁴ Article 3(1)

¹⁵ Article 3(2)

¹⁶ Articles 5(3) of UPOV '78 allowed use of a protected variety as an initial source of variation for the purposes of creating other varieties.

¹⁷ Article 14(5)(c).

¹⁸ UPOV, 1992, paragraphs 1119, 1126.

¹⁹ ASSINSEL, nd b

²⁰ For a seed industry perspective see Smith, 1996

²¹ Greengrass, 1993. In a subsequent personal communication, the author has reported that the extension of the right to cover essentially derived varieties is expected to be limited to those varieties which take over virtually the whole of the genome of the protected variety. In matters of dispute this may therefore require scientific evidence, referred to in Cohen, Crespi and Dhar, 1998.

²² For an earlier account of the plant breeding programmes in India see Mukherjee and Lockwood, 1973.

²³ UPOV (1992), para 858.2.

²⁴ ASSINSEL, nd c

²⁵ Rapid and wide distribution of new varieties and their availability to the public at adequate and reasonable prices are the grounds on which public interest is defined.

²⁶ This step taken by the Indian government appears to be consistent with the state of the debate on seeds that are based on Genetic Use Restriction Technologies (GURTs), more commonly known as the terminator seeds. See for instance, FAO 2001.

²⁷ Section 39(1)(iv) of the PPVFR Act

²⁸ Section 30 of PPVFR.

²⁹ This implication has been provided by Leskein and Flitner, 1997

³⁰ Personal correspondence with Mr. Patrick Heffer of ASSINSEL

Review of TRIPS: A Roadmap for Protecting Farmers' Rights

Ruchi Tripathi

Current state of play

The Trade Related Aspects of Intellectual Property Rights (TRIPS) Agreement is currently under review at the World Trade Organisation (WTO). The review of Article 27.3(b) of TRIPS dealing with patenting of life was mandated to begin four years after the Agreement came into force, i.e. in 1999. The whole of the TRIPS Agreement is also currently under review as per the provisions of Article 71.1.

Many developing country governments have been vocal and have expressed their concerns regarding the implications of TRIPS on their national development, for their farmers' livelihood and food security as well as for the moral and social cohesion of their societies. The African governments in particular have put forth a proposal, to clarify that "plants and animals as well as micro-organisms and all other living organisms and their parts cannot be patented, and that natural processes that produce plants, animals and other living organisms should also not be patentable". Farmer groups and civil society organisations (CSOs) around the world have joined in this call under the loose banner of the "No Patents on Life" coalition.

There have been various attempts to harmonise the TRIPS Agreement with Convention on Biological Diversity's (CBD) provisions of prior informed consent and equitable benefit sharing led by Brazil and India. Moreover, international and national legislation must take account the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA), 2001 of the United Nations Food and Agriculture Organisation (FAO) concluded in November 2001. ITPGRFA has recognised the significance and special nature of agricultural biodiversity and reaffirmed "farmers' rights to save, use, exchange and sell farm-saved seed and other propagating material to support food security".

More recently, some of the developed country governments including the European Union (EU) have started showing a more flexible stance towards the concerns of developing countries with regards to patents on life as well as the protection of farmers' rights¹. The UK government set up an Independent Commission on Intellectual Property

Rights to examine how IPR regime could be designed and improved to benefit developing countries. The Commission with eminent lawyers, academics, government as well as industry representatives reported in September 2002 with the message that "One Size Fits All" approach does not work in the area of intellectual property, and therefore, countries with varying levels of development must have flexibility in their policy making arena. Additionally, on the specific issue of patenting of staple foods, the report recommends that:

- Patents should not restrict farmers' rights to save, grow, exchange and sell seeds;
- Developing countries should have the right not to grant patents on plants and animals, including genes and genetically modified plants and animals;
- Governments should put in place measures to promote farmers' rights at the national level;
- The current system that has allowed patents on traditional knowledge should be revised to protect poor communities from bio-piracy; and
- Developing countries should introduce rules that restrict the application of patents to agricultural biotechnology.

A looming threat to the current flexibilities in the TRIPS Agreement that are being fought for could be undermined by World Intellectual Property Organisation's (WIPO) patent agenda with its three pillars (patent law treaty, patent cooperation treaty and substantive patent law treaty) that could make it simpler to file worldwide patents, harmonise the domestic laws further as well as possibly remove the exemptions currently allowed under the TRIPS Agreement ? in other words a one stop shop for a single global patent. CSOs as well as developing countries need to be vigilant and effectively counter the WIPO patent agenda. Any intellectual property system developed nationally or internationally must, at the minimum, acknowledge and respect the following three positions:

- No patents on life;
- Protection of farmers' rights to save, use, exchange and sell farm-saved seed; and
- Ensure that the provisions of TRIPS are consistent with the CBD provisions on prior informed consent and equitable benefit sharing.

Finally, investing in farmer-controlled seed development, production and preservation systems that take into account local climatic, social and economic situations can effectively reduce the threat posed by TRIPS.

The Doha Development Mandate²

The Doha Ministerial text deals with the issue of biodiversity, food security and farmers' rights as stated in the three documents: The Doha Ministerial Declaration; Implementation-Related Issues and Concerns; and; the Compilation of Outstanding Implementation Issues Raised by Members. Both the Implementation and Outstanding Issues form part of the negotiations based on para 12 of the Ministerial Declaration³. Most of the issues that CSOs and developing countries have raised form part of the list of outstanding implementation concerns.

Other issues such as review of Article 27.3 (b) and 71.1 are also under the Doha Agenda but as reviews not as negotiations. The list of Outstanding Implementation issues is being dealt with by the Trade Negotiating Committee (TNC) of the WTO. The TNC will direct the TRIPS Council on which issues to negotiate on. The TRIPS Council was supposed to have reported back to the TNC by December 2002 on progress made on the issues. However, with discussions in the TRIPS Council deadlocked on the TRIPS and access to medicines issue, there was not much to report back on. It is best to pursue the route of outstanding implementation issues to achieve our goal. We could follow several policy options⁴ during WTO negotiations:

Amend TRIPS

This could entail getting changes to the text to clarify:

- that no patents should be granted on life; and
- amendment of Article 27.3 (b) in the light of the principles of the CBD and the International Undertaking, as well as several issues linked to farmers' rights, food security, patentability of life, and protection of indigenous innovations.⁵

We would need to pursue these through the WTO delegates both in the capitals and in Geneva. We could work with selected government delegations to influence the TRIPS Council on patents on crops with the aim of them tabling papers at the TRIPS Council.

Some suggestions are also made in this regard from different countries/alliances such as:

- Africa Group on implications of patents on life;
- Brazil on disclosure, prior informed consent and benefit sharing, non-violation complaint;
- LDCs on transfer of technology, operationalisation of the objectives of the TRIPS Agreement, longer transition period; and
- India on farmers' rights and indigenous knowledge.

Clarify the flexibilities at the international level

Another route that could be pursued is to get an authoritative interpretation of the given flexibility in the TRIPS Agreement. There are several key areas that need to be clarified within the TRIPS Agreement. A list of these is found in Annex 9.3.

Two key outstanding issues that need clarification are:

Though TRIPS exempts plant varieties from patentability, it requires countries to grant patents on non-biological and microbiological processes as well as microorganisms. One of the concerns is that when a plant variety is created using a microbiological process the resultant plant also has to be patented. Developing countries must ensure that they exclude patents on plant varieties that have been created by a patented process as the TRIPS Agreement Article 27.3 (b) does exempt plant varieties from patentability. In fact, there is a law in Europe, as per which plant varieties are [under the European Patent Commission (EPC)] prohibited from being patentable as direct results of a patentable process in Europe (Implementing Guidelines 23c)⁶.

The other area of ambiguity is what happens when patented micro-organism is inserted into a plant ? does the plant also have to be patented? Again, developing countries should use the broader interpretation to ensure that they exempt the plant from patentability.

Use the flexibilities at the national level until challenged

Another key strategy is influencing implementation of the TRIPS Agreement at the national level by working with national governments that are in the process of drafting their national *sui generis* laws to ensure that they retain the maximum flexibility allowed by the WTO and protect farmers' rights. In this regard, it would be useful to share elements of various national *sui generis* laws that protect farmers' and communities'

rights [eg. Indian Plant Variety Protection and Farmers' Rights (PVPFR) Act and Organisation for African Unity (OAU) model law].

This element is the most critical one in the influencing strategy, given that not much progress has been made at the international negotiations and given that there has been some change in the analysis and perception of experts and governments on the blanket application of intellectual property laws across the world. It is crucial that the national governments put in place the laws that suit their need and are appropriate with the level of their development.

Other options

There are several options available to CSOs for influencing the debate and practice, in addition to engaging with the policy level discussions and negotiations.

Local level action

The biggest threat to farmers' rights to seed is their disappearance, due to a number of reasons (one of them being propagation of IPRs and commercial agriculture). An effective way to combat this is to make sure that there are local seed varieties in the hands of the farmers. Local level actions could go a long way, for example, in encouraging farmers to save, use, exchange and sell seeds freely; organising local seed fairs celebrating the agro-biodiversity and the traditional knowledge; investing in local level information sharing on IPRs and vigilance on the activities of seed companies; promoting farmer ? scientist partnership on the farmers fields etc.

National level action

Similarly, at the national level, it is critical that we share information and prepare strategies on the implications of IPRs for national level development and food security. Another important policy initiative could be to support public sector research in agricultural research and development (R&D) that is done in conjunction with and benefits small farmers.

Box: 9.1

The ActionAid Chip Campaign

ActionAid applied for a patent on potato chips to raise awareness and understanding of the food patenting issue and how patenting rules affect the rights of poor farmers in the developing world. It launched the campaign on 11 February 2002 at the beginning of National Chip Week. In producing the ActionAid Ready-Salted chip, it worked with a food bio-scientist from Reading University. It also got chip shop/restaurant owners, a lawyer and patent experts involved to ensure that the campaign was credible, emotive, legal and effective. The filing of the application at the patent office was accompanied by street activities ? road signs, distribution of chips and campaign leaflets from an ActionAid chip van.

A free spoof tabloid newspaper? Menu? was distributed at six underground stations and seven main line stations across the country by ActionAid staff and volunteers. Menu conveyed the key messages of the campaign and explained the food patent issue in an accessible and topical format. The Menu also formed part of the ActionAid lobbying package at the conference of the Commission on Intellectual Property Rights that took place at the Royal Society in London on 21-22 February 2002. Press advertising was also developed reflecting the chip theme. The campaign generated a lot of media coverage not only in the UK but other countries including India, Pakistan and Japan. The campaign was also extended to the ActionAid main website ? www.actionaid.org ? and our new Schools and Youth site ? www.actionzone.cc ? which was launched with the ActionAid Chip campaign. Over 5,000 supporters wrote to the Prime Minister urging him to support a ban on food patenting. The campaign helped raise the profile of the issue amongst the general public and the policy makers as well as that of ActionAid. It was one of the most successful campaigns of ActionAid in the recent past in the UK.

International action

The momentum to push for "no patents on life" seems to have died down at the international level and there is a need to revive the issue through public actions around the world. Global days of action are a good idea ? with several groups around the world taking action on the same day nationally to highlight the injustice of the patent system. Mass postcard/email/fax campaigns targeting key negotiators have worked in the past.

ActionAid launched a seed rights campaign in 2002 targeting the US, Canadian, Japanese and European TRIPS negotiators urging them to ensure that farmers' rights to save, use, exchange and sell seed are not threatened by TRIPS. Hundreds of groups around the world wrote letters to the negotiators with their own organisation logo under the banner of the seed rights campaign serving dual purpose of helping groups to get better informed, help them network, influence the negotiations leading to getting a response from the Canadian and European Commission (EC) negotiators.

Research strategy

In order to support public campaigning and lobbying, it is necessary that our arguments be well supported. There is a need to collate information and do some further research on the implications of IPRs on food security to further understand some of the legal implications and options available and so on. Some suggested topics are presented below:

- Some basic research on what patents and plant breeders' rights have been granted in the country in the area of food and agriculture? And if there haven't been any patents granted, why not?;
- Studies on the consolidation of the seed sector in developing countries and their impact;
- Implications of multiple IPR protection (legal opinion on the hierarchy of different forms of intellectual property protection ? i.e. PBRs, patents);
- Research looking at the levels of investment in agriculture ? both public and private funding ? and the trends towards it to help strengthen the argument that public funding in agriculture could be an alternative to protecting agricultural research through patenting and the preferred option for poor farmers.
- A short research to define 'life' ? what does "no patents on life" mean?
- What is the implication of the mandatory legal protection for patenting microorganisms and microbiological processes on farmers and breeders in developing countries?
- What would be the implications of patents on food items, especially processed foods and methods, for developing countries and food security?

Annex - 9.1

The Doha Mandate and TRIPS

The Doha Ministerial mandates negotiations on the following areas:

- The examination of the scope and modalities for the application of non-violation complaints (Article 64.2 of the TRIPS Agreement).
- Implementation of mechanisms for enforcement and monitoring developed countries' obligations to provide incentives to their enterprises in order to generate technology transfer (Article 66.2).
- Negotiations to extend protection of geographical indications to products other than wines and spirits (According to Articles 23 and 24 of the TRIPS Agreement).
- Interim suspension of granting patents that do not fulfill Article 15 of the CBD.
- Extension of the implementation period of the TRIPS Agreement for least developed countries.
- Operationalisation of Articles 7 and 8 of the TRIPS Agreement.
- Clarification that no patents should be granted on life.
- Amendment of Article 27.3 (b) in light of the principles of the CBD and the international undertaking, as well as several issues linked to farmers' rights, food security, patentability of life, and protection of indigenous innovations.

The Declaration further mandates review on the following ⁷:

Review of Article 27.3(b) (farmers' rights, patentability of life forms)

- Review of 71.1 (Examining new developments)
- Relationship between TRIPS and the CBD
 - Disclosure
 - Prior informed consent
 - Equitable benefit sharing
- Protection of traditional knowledge
 - *Sui generis* protection, IPRs or no IPRs
- All the above to be done taking account of the development dimension

Annex - 9.2

Policy options for protecting farmers' rights

In the context of the Doha Development Agenda, the review of Article 27.3(b) and the TRIPS review, WTO members could consider the following options to address some of the concerns regarding patenting of food and crops:

Farmers' rights to save, use, exchange and sell farm saved seed might not be protected in the case of patented varieties. TRIPS Council should confirm that this right is not affected by TRIPS. It is our belief that this provision is compatible with Article 30⁸ of TRIPS.

This could be further achieved through the following means⁹:

- Substantive review of TRIPS should clarify that nothing in TRIPS undermines farmers' rights to save, use, exchange, and sell farm saved seed and other propagating material.
- Substantive review of Article 27.3 (b) should clarify that plants and animals as well as microorganisms; non-biological and microbiological processes should be exempt from patentability, If this is not possible, then ensure that there is no requirement to patent micro-organisms, non biological and microbiological processes and exclude key food security/staple crops from patenting.
- Exemptions under Article 27.2 should be expanded to clearly state that farmers' rights to save, use, exchange and sell farm-saved seed are excluded from the exclusive rights of the holder of patent/breeder's certificate.
- The provision for an effective "*sui generis*" legislation should be interpreted within the framework of the CBD under which the State is obliged to protect biodiversity and indigenous knowledge. This would facilitate the development of *sui generis* legislation on the protection of community rights, farmers' rights and the conservation of agricultural biodiversity.

The above clarifications to protect public interests and in particular farmers' rights will ensure the primacy of food security and nutritional concerns vis-à-vis security of private IPRs.

Annex - 9.3

Policy options: Flexibility in the TRIPS Agreement¹⁰

Article 27.3(b) of the TRIPS Agreement in its current form accommodates the following flexibilities and interpretations:

- In applying the customary rules of interpretation of public international law, each provision of the TRIPS Agreement shall be read in the light of the object and purpose of the Agreement as expressed, in particular, in its objectives and principles.
- Given the existence of a *sui generis* protection system on the national level, countries may decide to exempt plants and plant varieties entirely from patent protection. This includes patent protection for both products and the immediate products of patentable processes. No mention is made in TRIPS of patents for plant parts (cells, proteins, genes, gene fragments, etc.). As parts of exemptible objects they too may be exempted from patent protection.
- If member countries of the WTO decide not to provide patent protection within their borders for inventions on the economically significant level of plant varieties, they are obliged to set up a *sui generis* protection system for plant varieties. TRIPS contain no specific provisions concerning the nature of such systems other than that they be "effective". *Sui generis* systems give developing countries considerable latitude in adapting IPRs for plant varieties to their socio-economic needs.
- If they opt for *sui generis* protection instead of granting patents for plant varieties, countries may also join the International Union for the Protection of New Varieties of Plants (UPOV) in one of its two valid forms. Although formal admission on the basis of the older 1978 version is no longer possible, members are still free to implement a protection system compatible with the 1978 UPOV version without actually joining the association.
- Members have the right to develop a uniform and consistent protection policy to make sure that protective instruments developed and provided for plant varieties are not subverted by other rights whose exclusivity clause might jeopardise the status of plants specifically exempted from patent protection. This is particularly important in the case of patents for micro-organisms and their components if the latter were implanted into crops by means of biotechnological procedures.

- Members may decide to end patent protection for micro-organisms and their components once the protected object is introduced into a crop. Also, they are not obliged to redefine the cells of plants, animals or humans (or components thereof) as micro-organisms. As they implement TRIPS provisions for their country, they also have the authority to draw their own line of separation between inventions worthy of protection and mere discoveries that deserve no such protection.
- In their patent laws, members may include all exemptions from special protection/variety protection granted for the benefit of farmers and breeders engaged in traditional activities. They may also adjust the implementation of TRIPS provisions nationally so as not to jeopardise the obligations of other relevant agreements dealing with living matter.
- Members may impose safeguards to prevent plant genetic materials provided or extracted under the multilateral system of the FAO Seed Treaty from being subjected to restrictive patent rights. This notably includes parts and components contained therein, even if these are present in an isolated and purified form.
- The effects of the provisions in the TRIPS Agreement that are relevant to the exhaustion of IPRs is to leave each member free to establish its own regime for such exhaustion without challenge, subject to the most favoured nation (MFN) and national treatment provisions of Articles 3 and 4.

Endnotes

¹ Communication by the European Communities and their member states to TRIPS Council on the review of article 27.3(B) of the TRIPS agreement, and the relationship between the TRIPS Agreement and the Convention on Biological Diversity (CBD) and the protection of traditional knowledge and folklore "a concept paper" 12th September 2002

² Annex 1

³ The Doha Ministerial text, paragraph 12 states:

".....we further adopt the decision on Implementation-Related Issues and Concerns in document WT/MINO(01)/W/10 to address a number of implementation problems faced by Members. **We agree that negotiations on outstanding implementation issues shall be an integral part of the Work Programme** we are establishing, and that agreements reached at an early stage in these negotiations shall be treated in accordance with the provisions

of paragraph 47 below. **In this regard, we shall proceed as follows: (a) where we provide a specific negotiating mandate in this Declaration, the relevant implementation issues shall be addressed as a matter of priority by the relevant WTO bodies,** which shall report to the Trade Negotiations Committee, established under paragraph 46 below, by the end of 2002 **for appropriate action.**" (emphasis added).

⁴ For further details on some of the policy options refer to Annexe 2

⁵ These are taken from the list of Outstanding Implementation issues

⁶ Rule 23c-Biotechnological inventions shall also be patentable if they concern: (a) biological material which is isolated from its natural environment or produced by means of a technical process even if it previously occurred in nature; (b) plants or animals if the technical feasibility of the invention is not confined to a particular plant or animal variety; (c) a microbiological or other technical process, or a product obtained by means of such a process other than a plant or animal variety.

<http://www.european-patent-office.org/legal/epc/e/r23.htm#R23c>

⁷ According to the Ministerial text, paragraph,19, the TRIPS council is instructed to pursue its work programme under article 27.3b. article 71.1 and paragraph 12 of the Ministerial Declaration *"to examine, inter alla, the relationship with the Convention of Biological Diversity and the protection of traditional knowledge....."*. We welcome the direction the Ministerial Declaration provides to the TRIPS Council in undertaking its work by focusing on *'the objectives and principles set out in articles 7 and 8 of the TRIPS agreement'* as well as *"the development dimension"*.

⁸ Article 30 states that 'Members may provide limited exceptions to the exclusive rights conferred by a patent, provided that such exceptions do not unreasonably conflict with a normal exploitation of the patent and so not unreasonably prejudice the legitimate interests of the patent owner, taking account of the legitimate interests of third parties.

⁹ Some of the following proposals have been made by developing countries; Including Braxi-IP/C/W/228 24 November 2000, India-IP/C/W/161 3 November 1999, IP/C/W/195 12 July 2000, Africa Group-WT/GC/W/302, 6 August 1999 .

¹⁰ Achim Seiler, Science Centre for Social Research, Berlin

Convention of Farmers and Breeders (CoFaB)

Rohit Priyadarshi

Introduction

The rise of transnational giants seeking global control of seed production, agriculture, food, and medicines (including herbal medicine) has brought drastic changes in the way biological resources are being treated at the international level. These resources have now become an important subject of treaties and conventions. The Uruguay Round (1986-1993) of the General Agreement on Tariffs and Trade (GATT) broke new ground and introduced food and agriculture into the multilateral trading platform. Despite opposition from many developing countries and civil society, rules on intellectual property rights (IPRs) were incorporated into the World Trade Organisation (WTO) in the form of the Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS). TRIPS, which sets minimum standard of IPR protection to be provided by all members, introduced patents and other forms of IPRs on biological materials. These days the TRIPS regime is becoming a convenient tool to monopolise biological resources, which are largely located in the developing countries and are under the control of local communities.

The Convention on Biological Diversity (CBD), signed in 1992, attempted to introduce some parity into what has become a highly skewed situation favouring big business at the cost of rural and indigenous communities. Among other things, the CBD acknowledged the sovereign rights of nations over their bio-resources and the rights of communities who had developed and conserved these resources. It laid down the terms and conditions for the use of bio-resources, including concepts like prior informed consent, material transfer agreement and benefit sharing. The biodiversity rich developing country governments should have ideally moved to enact domestic legislation to give force to the pro-community CBD principles. However, this has largely not happened.

Farmers' rights flow from the fact that farmers have performed and continue to perform the two important functions of conserving agrobiodiversity: recognising and maintaining important traits, and breeding new varieties on which global food security rests. In recognition of the contribution of farming communities, the United Nations Food and Agriculture Organisation (FAO) introduced the concept of farmers' rights in 1989 in its Undertaking on Plant Genetic Resources. After several years of negotiations on the Undertaking, finally, the International Treaty on Plant

Genetic Resources for Food and Agriculture (ITPGRFA) was adopted in November 2001. While ITPGRFA provides for four different types of rights to the farmers (See *Chapter Eleven of this volume*), it restricts the grant and implementation of farmers' rights to individual nations. There is no agreement on implementation of farmers' rights internationally.

Despite the fact that for a majority of farmers of developing countries agriculture is a means of livelihood and at least two international agreements recognise the rights of farming and local communities over plant genetic resources, it is a sorry state of affair that most governments of the developing nations have not come up with or implemented a *sui generis* plant variety protection legislation protecting the rights of the farming community.

UPOV

In this scenario, Convention of the International Union for the Protection of New Varieties of Plants (UPOV) is being pushed as the "effective" *sui generis* system for the protection of plant varieties. Strong pressure from the industrialised nations and absence of an alternative are compelling developing countries to accede to UPOV. It must be mentioned here that the TRIPS Agreement does not mention UPOV as a model of effective *sui generis* protection system for plant varieties.

UPOV has been criticised on several grounds because the UPOV model does not address the needs of developing countries for the following reasons:

First, it embodies the philosophy of the industrialised nations where it was developed and where the primary goal is to protect the interests of powerful seed companies who are breeders. In the UPOV system, rights are granted only to the breeders, there are no rights for the farmers. In the developing countries, we do not have big seed companies and our major seed producers are farmers and their cooperatives. Logically, our law will have to concentrate on protecting the interests of the farmer in his/her role as producer as well as consumer of seed. More importantly, farmers' right over seed would also keep alive a strong alternative of seed provider against the profit driven seed corporations.

Second, if and when we get into the UPOV system, we will be forced to go in the direction that UPOV goes, and it is the system headed towards outright patents. The amendments to the UPOV Convention stand testimony to this. The most recent 1991 amendment does not exempt breeders from royalty payments for breeding work and the exemption for

farmers to save seed has become provisional. UPOV permits dual protection, by plant breeders' rights and patents.

Third, UPOV laws are framed in countries with a completely different agriculture profile to ours. These are countries where subsidy to agriculture is of a very high order unlike in the developing countries. Because they produce a massive food surplus, farmers in industrialised countries get paid for leaving their fields fallow. The UPOV system does not have to protect the farming community of the North in the way that our seed law will have to protect ours.

Fourth, for a majority of farmers in the developing countries, agriculture is a major means to livelihood. These farmers are the very people who have nurtured and conserved genetic resources, the same genetic resources that breeders want to corner under breeders' rights. We must protect the rights of our farmers and these rights must be stated unambiguously in our *sui generis* legislation.

It must be mentioned here that like other IPR tools, plant breeders' right also grants exclusive rights to the holders of that right. In order to build equity and justice into a plant variety protection regime, civil society has been demanding that farmers' rights be granted along with breeders' rights.

Farmers' rights have different aspects with respect to exchange and sell seeds of all varieties that they grow. First, the varieties bred by farmers, i.e., land races or farmers' varieties should also be provided protection as provided to varieties developed by formal breeders. Second, the regime should reward farmers for their contribution in conservation and development of plant genetic resources, which are used by plant breeders in developing new crop varieties.

Convention of Farmers and Breeders

Developing countries need to craft their own platform, to address their special needs rather than acceding to UPOV which shows little or no concern for their interests. The model law drafted by the Organisation of African Union (OAU) is one good example. Similarly, Convention of Farmers and Breeders (CoFaB), developed by Gene Campaign in association with Centre for Environment and Agricultural Development (CEAD) in 1998, tries to provide an alternative to developing nations. The UNDP Human Development Report 1999 has described it as a "strong and coordinated international proposal" which "offers developing countries a far better alternative to European Legislation by focusing on the need to protect farmers' interests and nutritional and food security goals."

Important highlights of CoFaB

Preamble

The Preamble, though not the main provision of a legal instrument yet by no means unimportant, throws light on the purpose of the instrument.

The Preamble, among other things, recognises the need for the easy availability of reliable and good quality seeds to the small and large farmer; importance of maintaining genetic diversity in the field; enormous contribution of farmers to the identification, maintenance and refinement of germplasm; the need for breeders of new varieties to have protection for their varieties in the market, without prejudice to public interest and safeguarding the interests of breeders; the need for creating a system where in farmers and breeders have recognition and rights accruing from their contribution to the creation of new varieties.

Purpose

The Convention sets as its purpose to protect and reward both, the farmers and breeders, for their respective roles.

Farmers' rights

Each contracting state will recognise the rights of farmers by making arrangements to collect farmers' rights fee from the breeders of new varieties. The farmers' rights fee will be levied for the privilege of using landraces or traditional varieties either directly or through the use of other varieties that have used landraces and traditional varieties, in their breeding programme issue.

Farmers' rights will be granted to farming communities and where applicable, to individual farmers. Revenue collected from farmers' rights fees will flow into a National Gene Fund (NGF), the use of which will be decided by a multi-stakeholder body set up for the purpose.

The rights granted to the farming communities under Farmers' Rights entitle them to charge a fee from breeders every time a landrace or traditional variety is used for the purpose of breeding or improving a new variety. Rights granted to the farmer and farming communities under farmers rights will be for unlimited period.

Plant breeders' rights

The Convention provides that each member state will recognise the right of the breeder of a new variety by the grant of a special title called Plant Breeders' Right (PBR).

The PBR under the Convention is that prior authorisation shall be required for the production for purposes of commercial and branded marketing of the reproductive or vegetative propagating material of the breeders' variety, and also for the offering for sale or marketing of such material.

One of the major difficulties which strong IPR poses is the restriction on access to the protected subject matter for further research and development. Such a restriction in the crucial area of food and livelihood can have serious consequences.

The Convention, therefore, provides that authorisation by the breeder or his/her successor in title shall not be required either for the utilisation of the new variety as an initial source of variation for creating other new varieties or for the marketing of such varieties. However, authorisation shall be required, when the repeated use of the new variety is necessary for the commercial production of another variety.

The Convention provides certain degree of flexibility with regard to PBR. It provides that a state may, either under its own law or by means of special agreements, grant to breeders in respect of certain botanical genera or species, a more extensive right, extending in particular to the marketed product.

ITPGRFA: A Mechanism to Protect Farmers' Rights

Devendra Gauchan

Introduction

The International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) is a global treaty for food security and sustainable agriculture. The Treaty was approved by the United Nations Food and Agriculture Organisation (FAO) Conference at its 31st Session Meeting on 3 November 2001. The Conference was attended by 180 nations.

The Treaty is historic because it represents a legally-binding, international commitment on the management of the world's key food crops and agricultural biodiversity for food security and sustainable agriculture. The Treaty is in harmony with the Convention on Biological Diversity (CBD), 1992 and ensures the conservation and sustainable use of Plant Genetic Resources for Food and Agriculture (PGRFA) and the fair and equitable sharing of benefits arising from their use. The Treaty provides a legal footing for the status and management of *ex situ* collections of PGRFA, which was not addressed in the CBD. Through its recognition of farmers' rights including traditional knowledge and multilateral system of access and benefit sharing provisions, the Treaty provides important mechanisms and options for developing countries to adopt own tailor made effective *sui generis* system for Plant Variety Protection (PVP).

Evolution of the ITPGRFA

The ITPGRFA is the outcome of the International Undertaking of the Global Systems of the FAO Commission on Genetic Resources for Food and Agriculture (CGRFA), which was founded in 1983. The Commission is the political forum for agricultural germplasm debates, whilst the International Undertaking is the basis for negotiation and the main institutional mechanism of the Treaty.

Formation of FAO CGRFA

In the late 1970s, developing countries and many civil society organisations (CSOs) raised political concerns over control, ownership and access to PGRFA at the FAO (Crucible Group II, 2000). Subsequently, international debates on control, access and ownership required member nations of the FAO to form a global inter-governmental body, i.e., the CGRFA. The CGRFA provides an inter-governmental forum, where countries as donors and users of germplasm, funds and technologies, can

meet on an equal footing to discuss and reach consensus on matters related to PGRFA. It is the forum where countries negotiated the International Treaty. Its mandate (and name) was broadened in 1995 from plant genetic resources to include all genetic resources for food and agriculture. Presently, 160 countries and the European Community (EC) are members of the Commission. The Commission monitors the development of the Global System. The aims of the Global System are: conservation of biological diversity; sustainable use of its components; and fair and equitable sharing of benefits arising from the utilisation of genetic resources (FAO, 2001).

Formation of International Undertaking on PGRFA

The main institutional and negotiating body of the FAO Global System is the International Undertaking, which was adopted by the FAO Conference in 1983 through Resolution 8/83. It is an instrument to promote international harmony in matters relating to access to PGRFA. The Meeting of International Undertaking (Resolution 4/89) in 1989 recognised that PBRs, as provided for by the International Union for the Protection of New Varieties of Plants (UPOV), were not consistent with the Undertaking (FAO, 2001). The approval of PBRs was balanced with the simultaneous recognition of the farmers' rights concept (Resolution 5/89), which can partly be understood as a direct response to plant breeders' right regimes (Leskien and Flitner, 1997).

The sovereign rights of nations over their genetic resources were recognised in Resolution 3/91 and it was agreed that farmers' rights would be implemented through an international fund for plant genetic resources. In 1992, the Agenda 21 (Chapter 14) called for the strengthening of the FAO Global System on Plant Genetic Resources, and its adjustment in line with the outcome of negotiations on the CBD.

Revision of FAO International Undertaking on PGRFA

The Nairobi Final Act of the CBD in May 1992 adopted Resolution 3, which recognised the need to seek solutions to outstanding matters concerning PGRFA, in particular with respect to access to *ex situ* collections not addressed by the Convention, and the question of farmer's rights (CBD, 1992; FAO, 1996). In 1993, the FAO Conference accordingly adopted Resolution 7/93 for the revision of the International Undertaking and requested the FAO to provide a forum in the CGRFA and initiate the negotiations among governments for: the adaptation of the International Undertaking on Plant Genetic Resources (IUPGR) in harmony with the CBD; consideration of the issue of access on mutually agreed terms to plant genetic resources, including *ex situ* collections not addressed by the CBD; and the realisation and recognition of farmers' rights. The inter-

governmental FAO Commission initiated formal negotiations to revise the International Undertaking in harmony with the CBD in 1994. The negotiations started in the First Extraordinary Session of the Commission on Plant Genetic Resources, in November 1994 (FAO, 2001). The negotiations were technically and politically very complex.

In 1996, the FAO convened the Leipzig International Technical Conference on Plant Genetic Resources, where 150 countries formally adopted the *Leipzig Declaration* and the Global Plan of Action (GPA). They also declared that it was important to complete the revision of the Undertaking. The implementation of the GPA was one of the major subjects for discussion in the Undertaking. The other key subjects included the *scope and access* to plant genetic resources; *the fair and equitable sharing of benefits* arising from the use of PGRFA; and the realisation of *farmers' rights* (Bragdon and Downes, 1998).

During the negotiations of International Undertaking, considering the special nature and public good character of PGRFA, countries agreed that the Undertaking should maintain a multilateral system of access and benefit sharing that meets the specific needs of agriculture. Consequently, the Sixth Extraordinary Session of the Commission adopted a revised International Undertaking on 1 July 2001. The revised text was finally submitted to the 31st Session of the FAO Conference in November 2001 paving the way for the adoption of ITPGRFA by the FAO Conference on 3 November 2001 (FAO, 2002).

Need of international treaty on PGRFA

PGRFA are crucial in feeding the world's population. They are the raw materials for genetic improvement of crop plants by farmers and plant breeders and are essential in maintaining sustainability of global food production systems (IPGRI, 1996; FAO; 2002). Unlike genetic resources of wild biodiversity, PGRFA are of special nature since they are the result of human intervention, consciously selected and improved by farmers and plant breeders and spread throughout the globe with the diffusion of agriculture and the association of major crops with human migrations since ancient times (Gauchan *et al*, 2002). Furthermore, there is a global inter-dependence on genetic resources for food and agriculture since all countries largely depend on PGRFA that originate elsewhere ? no countries are self-sufficient on them (IPGRI, 1996; 2000).

The decision of the CBD to cede the issue of farmers' rights and *ex situ* collections to the FAO underscores some of the complexities and peculiarities of dealing with agricultural genetic resources in bilateral framework. In contrast to those genetic resources that are rare and geographically localised, such as wild species of pharmaceutical interest,

the market value of agricultural biodiversity is not easily established, and it is especially difficult to determine the origin because of the widespread diffusion and adaptation of crop genetic resources worldwide (Crucible Group, 2000). For example, Hargrove, *et al.* (1985) outline the pedigree of one improved (public) variety, IR 64, that was released in 1985 by the International Rice Research Institute (IRRI). This variety has some 75 *parents*, and among these are 20 landraces from eight countries. To identify the pedigree record and source of origins of all 75 *parents* are quite complex and there is no way to estimate the contribution of all *parent* landraces to the development of IR 64 variety for sharing benefits. The problem is further compounded by the fact that *in situ* diversity of PGRFA often concentrated in particular parts of the world distinct from areas rich in other forms of biodiversity.

Furthermore, the need of the Treaty was conceptualised due to the CBD's focus on natural biodiversity and its silence on the legal status of *ex situ* collections, farmers' rights issues and difficulties of dealing with PGRFA on a bilateral basis. After the CBD, the Nairobi Act (Resolution 3 of the CBD, 1992) also suggested the FAO Global Commission to seek solutions to outstanding matters concerning PGRFA, in particular with respect to access to *ex situ* collections not addressed by the CBD, and the question of farmer's rights (CBD, 1992). Considering the high level of interdependence for PGRFA between regions and countries, an open access and exchange regime is crucial for research and development in agriculture and consequently for further agricultural progress.

Special features of the ITPGRFA

The Treaty aims at the conservation and sustainable use of PGRFA and the fair and equitable sharing of benefits arising out of their use in harmony with the CBD. It recognises the enormous contribution that farmers and their communities have made and continue to make to the conservation and development of plant genetic resources, and gives governments responsibility for realising farmers' rights (FAO, 2001; 2002). A major feature of the Treaty is the creation of a multilateral system for the access and benefit sharing with respect to PGRFA. Brief highlights of the specific features of the Treaty are outlined below:

Farmers' rights

The Treaty (Article 9) recognises the past, present and future contributions of farming communities in all the regions of the world, particularly those in centers of origin and diversity, in conserving, improving and making available these resources as the basis of farmers' rights. This could be done, for example, through the protection of relevant traditional knowledge and the right to take part equitably in

benefit sharing and in decision making process regarding the conservation and sustainable use of plant genetic resources (FAO, 2002). Participating nations are encouraged to fulfill their commitment in protecting and promoting farmers' rights through their appropriate national legislation. The specific features of farmers' rights, as mentioned in the Treaty, are:

- protection of traditional knowledge relevant to PGRFA
- the right to equitably participate in sharing benefits arising from the utilisation of PGRFA
- the right to participate in making decisions, at the national level, on matters related to the conservation and sustainable use of PGRFA
- the rights of farmers to save, use, exchange and sell farm-saved seed/propagating material, subject to national law and as appropriate.

Equity consideration represents one of the major rationales for farmers' rights. Traditional farmers, in conserving, using and developing PGRFA create economic value, from which other agents in the system such as breeders and seed companies benefit. The Treaty, therefore, has a provision to recognise and reward the enormous contribution of farming communities in the development and conservation of PGRFA, which constitute the basis of food and agriculture production throughout the world.

Multilateral System of access and benefit sharing

The future of agriculture depends on international cooperation and the open exchange of the crops and their genes that all over the world have developed and exchanged over thousands of years. Through the Treaty (Article 10), countries agree to establish an efficient, effective and transparent Multilateral System to facilitate access to PGRFA, and to share the benefits in a fair and equitable manner. It recognises that, in the exercise of their sovereign rights over the PGRFA, States may mutually benefit from the creation of an effective Multilateral System for facilitated access to a negotiated selection of these resources and for the fair and equitable sharing of benefits arising from their use (FAO, 2002). From 'unrestricted or free access', the Treaty uses shared access that promotes and facilitates access with those who participate in the Multilateral System and involve in benefit sharing (Correa, 1999). Under such a system, access to PGRFA and the resulting benefits would be open to all parties, who are the participants of the Multilateral System.

The Multilateral System of exchange applies to over 64 major crops and forages viz., a list of 35 genera of crops (Annex 11.1) and 29 species

of forages (Annex 11.2). The Governing Body of the Treaty, which comprises the countries that have ratified it, will set out the conditions for access and benefit sharing in a "Material Transfer Agreement". Two criteria for the selection of materials included in the Treaty are important for food security and their inter-dependence (Article 12.1).

Access will be provided for utilisation and conservation in research, breeding and training for food and agriculture, and subject to property rights and access laws. A key point is the payment for an equitable share of the monetary benefits from the commercialisation of a product that uses plant genetic resources from the Multilateral System. This is voluntary when the product is available without restriction for further research and breeding, and mandatory when it is not. The Treaty's Governing Body can also decide, within five years of its entry into force, whether there should also be a provision of mandatory payment when such commercial products are available for further research and breeding without restriction.

Why Multilateral System of access and benefit sharing?

Considering the special nature of PGRFA, as mentioned above, particularly for species, such as food crops with a wide distribution of genetic diversity, any country might possess only a small fraction of the total gene pool diversity. The Multilateral System offers participants access to a greater range of germplasm that are generally not possible through bilateral arrangements. For example, the world's largest and most complete collection of rice, located in the IRRI in the Philippines, comprises about 100,000 samples from more than 111 countries (IRRI, 2000). IPGRI (1996) reports that for any country to have an access to the entire range of rice diversity through bilateral arrangements, it would be necessary to conclude agreements with other 110 countries. For all countries represented in the IRRI collection, to have an access to this material, a total of 12,210 bilateral agreements would be necessary. A multilateral approach, therefore, is likely to provide a greater opportunity for exchanging and screening food crop genetic resources with a cheaper cost than bilateral arrangements.

Modern varieties, especially those with a long history of breeding, may have scores of landraces and improved lines in their parentage, originating from farms, local communities and breeding programmes in many countries? for example, as mentioned above, for a rice variety like IR 64. To negotiate specific benefit sharing arrangements with every country of origin would be totally exhausting and complicated. And to negotiate with individual farmers or communities would be virtually impossible. The enormous cost of such negotiations and the implementation of multiple benefit sharing arrangements would almost certainly result in drastic reduction of the use of new germplasm for crop

improvement and food production (IPGRI, 1996). Multilateral approaches to exchanging germplasm and benefit sharing could prevent such a situation and might even lead to greater use of PGRFA for enhancing food production and sustainability of global food production systems. The need for such a multilateral system is now well accepted. As it is evidenced by the fact that the FAO Conference adopted the Treaty by *consensus* in November 2001 and to date 83 countries, including the EC, have signed the Treaty (FAO, 2002).

Benefit sharing mechanism

The rationale behind the idea of sharing benefits is that those conserving and developing genetic resources through their sustainable utilisation shall be compensated and shall obtain incentives to carry on doing so (Cooper *et al*, 1994). The Treaty (Article 13) provides a mechanism for sharing the benefit arising out of the use of the PGRFA through information exchange, access to and the transfer of technology, capacity building taking into account the priority activity areas in the rolling GPA, under the guidance of the Governing Body.

The Treaty recognises that facilitated access to PGRFA, included in the Multilateral System, constitutes itself a major benefit of the Multilateral System and confirms that benefits accruing therefrom shall be shared fairly and equitably in accordance with the provisions of this Article. It also foresees a funding strategy to mobilise funds for activities, plans and programmes to help small farmers in developing countries. This funding strategy also includes the share of the monetary benefits paid under the Multilateral System (FAO, 2002). It drops specific provisions of intellectual property rights (IPRs) and links the obligations for payment to the contractual arrangement: the Material Transfer Agreement (MTA). The standard MTA will require that the recipients of the material, included in the Multilateral System, who commercialise products incorporating accessed material, pay an equitable share of the product into the financial mechanisms, except where the product is available without restriction for further research and breeding (IPGRI, 2001).

Expected benefits from the Treaty

The Treaty provides benefits to all humankind since it aims at guaranteeing global food security and access of diverse genetic resources needed for the sustainability of global food production systems. For farmers and their communities, it is expected to provide benefits through farmers' rights. Farmers have increased incentives to conserve and use local diversity and use this mechanism for sharing benefits arising out of the use of their genetic resources. For plant breeders (particularly for small scale breeders in developing countries), the Treaty ensures easy

access to plant genetic resources they need and prevents their monopolisation, in particular, by large players.

For the first time, the Treaty provides the International Agricultural Research Centres of the Consultative Group of International Agricultural Research (CGIAR) with a long-term and secure legal framework for the *ex situ* collections, which they hold in trust, and on which their research programmes are based (FAO, 2001). For the private sector, it sets out a clear and predictable framework for access to plant genetic resources, which will promote investment in agricultural research. Consumers (both non-farming and farming households) will benefit with availability of greater variety of food and the agricultural products and increased food security (FAO, 2002). "No less importantly, the Treaty provides the agricultural sector with a new forum, on a par with the trade and environment forums, in which to address the special needs and problems of agriculture" (FAO, 2001). This will lead to greater equilibrium (balance of power) in the international policy making arena.

Ratification, acceptance, approval and accession

Under Article 26, the Treaty shall be subject to ratification, acceptance or approval by the Members and non-members of the FAO referred to in Article 25. Instruments of ratification, accession, acceptance or approval are deposited with the Director-General of the FAO. Under Article 27, the Treaty shall be opened for accession from the date on which the Treaty is closed for signature by all Members of the FAO and any States that are not Members of the FAO but are Members of the United Nations, or any of its specialised agencies or of the International Atomic Energy Agency.

In accordance with Article 28, the Treaty enters into force on the 19th day after the 40 governments ratify it. Each country follows its own legal and political procedures to ratify. The countries that ratify the Treaty will form the Governing Body, which will set out rules and conditions for the implementation of Treaty. Each country develops its own legislation and regulations to implement the Treaty. To date, 83 countries, including the EC, have signed the Treaty (FAO, 2002). Among the countries in the Hindu-Kush Himalaya (HKH) region, India, Bangladesh and Bhutan have signed the Treaty. India has also ratified it. Nepal is in the process of signing it.

Conclusion

The ITPGRFA is an outcome of International Undertaking through the FAO Commission on Genetic Resources for Food and Agriculture. Given the interdependence of regions for PGRFA and the nature of PGRFA as a public good, the Treaty at the international level was considered vital by the FAO Global Systems during the negotiations at the International

Undertaking. Three outstanding issues that dominated the International Undertaking negotiations were scope and access, benefit sharing, and farmers' rights.

The Treaty supports *in situ* conservation by farmers of crops and forages. It, more or less, guarantees access at low cost with minimum administrative hurdles to the PGRFA included in the list. It recognises the enormous contribution of farmers and communities in the conservation and development of genetic resources and making these resources available. The Treaty provides a legal footing for the status and management of PGRFA held in public genebanks, particularly held in trust by CGIAR. Through the recognition of farmers' rights, including traditional knowledge and Multilateral System of access and benefit sharing provisions, it provides an important mechanism and option for gene-rich developing countries to prepare their own tailor made *sui generis* systems.

Presently, however, the list of material under the Treaty is very small, and provides absolutely no support to farmers' *in situ* conservation and use of materials that are not included in the list. For example, soybean, an important protein rich crop, is not included in the list. The species that are considered part of the genepool for certain crops such as *Aegliops* (associated with wheat) are excluded from the list (IPGRI, 2001). Especially in light of a limited number of crops and forages included in the list, national policymakers should work to formalise additional regional agreements wherein they secure access to materials that are important to their domestic breeding programmes and systems of on farm conservation and use.

Some of the provisions regarding IPRs and benefit sharing approach, however, still remain to be worked out. Matters left outstanding also include the provisions dealing with the relationship between the Treaty and other international agreements, in particular the CBD and the WTO Agreements.

Management of PGRFA is the meeting point between agriculture, environment and commerce. Therefore, it needs synergy among these sectors and is of common concerns to all countries. It is impossible to ensure food security and sustainable agriculture without a sufficiently wide genetic base for food and agriculture.

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Annex 11.1: List of food crops covered under the Multilateral System

SN	Food crops	Genus	Observations
1	Breadfruit	<i>Artocarpus</i>	Breadfruit only
2	Asparagus	<i>Asparagus</i>	
3	Oat	<i>Avena</i>	
4	Beet	<i>Beta</i>	
5	Brassica complex	<i>Brassica et al.</i>	Genera included are: <i>Brassica</i> , <i>Armoracia</i> , <i>Barbarea</i> , <i>Camelina</i> , <i>Crambe</i> , <i>Diplotaxis</i> , <i>Eruca</i> , <i>Isatis</i> , <i>Lepidium</i> , <i>Raphanobrassica</i> , <i>Raphanus</i> , <i>Rorippa</i> , and <i>Sinapis</i> . This comprises oilseed and vegetable crops such as cabbage, rapeseed, mustard, cress, rocket, radish, and turnip. The species <i>Lepidium meyenii</i> (maca) is excluded.
6	Pigeon Pea	<i>Cajanus</i>	
7	Chickpea	<i>Cicer</i>	
8	Citrus	<i>Citrus</i>	Genera <i>Poncirus</i> and <i>Fortunella</i> are included as root stock.
9	Coconut	<i>Cocos</i>	
10	Major aroids	<i>Colocasia</i> , <i>Xanthosoma</i>	Major aroids include taro, cocoyam, dasheen and tannia.
11	Carrot	<i>Daucus</i>	
12	Yams		
13	Finger Millet	<i>Eleusine</i>	
14	Strawberry	<i>Fragaria</i>	
15	Sunflower	<i>Helianthus</i>	
16	Barley	<i>Hordeum</i>	
17	Sweet Potato	<i>Ipomoea</i>	
18	Grass pea	<i>Lathyrus</i>	
19	Lentil	<i>Lens</i>	
20	Apple	<i>Malus</i>	

SN	Food crops	Genus	Observations
21	Cassava.	<i>Manihot</i>	<i>Manihot esculenta</i> only
22	Banana/Plantain	<i>Musa.</i>	Except <i>Musa textiles</i>
23	Rice	<i>Oryza</i>	
24	Pearl Millet	<i>Pennisetum</i>	
25	Beans	<i>Phaseolus</i>	Except <i>Phaseolus, polyanthus</i>
26	Pea	<i>Pisum</i>	
27	Rye	<i>Secale</i>	
28	Potato	<i>Solanum</i>	Section <i>tuberosa</i> included, except <i>Solanum phureja</i> .
29	Eggplant	<i>Solanum</i>	Section <i>melongena</i> included.
30	Sorghum	<i>Sorghum</i>	
31	Triticale	<i>Triticose Triticum et al.</i>	
32	Wheat	<i>Secale</i>	Including <i>Agropyron, Elymus,</i> and <i>cale</i>
33	Faba Bean/ Vetch	<i>Vicia</i>	
34	Cowpea <i>et al.</i>	<i>Vigna</i>	
35	Maize	<i>Zea</i>	Excluding <i>Zea perennis, Zea diploperennis,</i> and <i>Zea luxurians.</i>

Annex 11.2: List of Forages included in the Multilateral System

SN	Genus <i>Legume Forages</i>	Species
1	<i>Astragalus</i>	<i>chinensis, cicer, arenarius</i>
2	<i>Canavalia</i>	
3	<i>Coronilla varia</i>	<i>Varia</i>
4	<i>Hedysarum</i>	<i>coronarium</i>
5	<i>Lathyrus</i>	<i>cicera, ciliolatus, hirsutus, ochrus, odoratus, sativus</i>
6	<i>Lespedeza</i>	<i>cuneata, striata, stipulacea</i>
7	<i>Lotus</i>	<i>corniculatus, subbiflorus, uliginosus</i>
8	<i>Lupinus</i>	<i>Albus, angustifolius, luteus</i>
9	<i>Medicago</i>	<i>arborea, falcata, sativa,</i>

Evolving *Sui Generis* Options for the Hindu-Kush Himalayas

SN	Genus	Species
		<i>scutellata, rigidula, truncatula</i>
10	<i>Melilotus</i>	<i>Albus, officinalis</i>
11	<i>Onobrychis</i>	<i>viciifolia</i>
12	<i>Ornithopus</i>	<i>sativus</i>
13	<i>Prosopis</i>	<i>affinis, alba, chilensis, nigra, pallida</i>
14	<i>Pueraria</i>	<i>phaseoloides</i>
15	<i>Trifolium</i>	<i>alexandrinum, alpestre, ambiguum, angustifolium, arvense, agrocicerum, hybridum, incarnatum, pratense, repens, resupinatum, rueppellianum, semipilosum, subterraneum, vesiculosum</i>
	Grass forages	
16	<i>Andropogon</i>	<i>gayanus</i>
17	<i>Agropyron</i>	<i>cristatum, desertorum</i>
18	<i>Agrostis</i>	<i>stolonifera, tenuis</i>
19	<i>Alopecurus</i>	<i>pratensis</i>
20	<i>Arrhenatherum</i>	<i>elatius</i>
21	<i>Dactylis</i>	<i>glomerata</i>
22	<i>Festuca</i>	<i>arundinacea, gigantea, heterophylla, ovina, pratensis, rubra</i>
23	<i>Lolium</i>	<i>hybridum, multiflorum, perenne, rigidum, temulentum</i>
24	<i>Phalaris</i>	<i>aquatica, arundinacea</i>
25	<i>Phleum</i>	<i>pratense</i>
26	<i>Poa</i>	<i>alpina, annua, pratensis</i>
27	<i>Tripsacum</i>	<i>laxum</i>
	Other Forages	
28	<i>Atriplex</i>	<i>halimus, nummularia</i>
29	<i>Salsola</i>	<i>vermiculata</i>

***Sui Generis* Options: Review of the Bangladesh Draft Legislation**

S. Rizwana Hasan

Background

There are two sets of draft legislation on plant variety protection that are pending before the government for finalisation. Two different committees constituted by the Ministry of Agriculture (MoA) made these drafts. The first Committee, namely National Committee on Plant Genetic Resources constituted on 18 September 1997 submitted two separate but inter-linked drafts: Biodiversity and Community Knowledge Protection Act and Plant Varieties Act of Bangladesh on 29 September 1998. The second Committee consisting of six members that was formed vide Gazette notification dated 26 January 2002 submitted the other draft on Plant Variety Protection Act. Since all these drafts may be considered in the final decision making process in exploring the *sui generis* option for the country, main features of all these drafts are given below.

The first two drafts were prepared prior to the International Treaty on Plant Genetic Resources, 2001 (Gene treaty) and hence do not mention the obligation of Bangladesh under the said Treaty. However, conscious effort to match them with the obligations of the Convention on Biological Diversity (CBD) is visible. Both the original drafts propose for the formation of a regulatory body called the National Biodiversity Authority (NBA) (Section 11 of the draft Biodiversity and Traditional Knowledge Protection Act, 1998) comprising both public and private sector representatives to ensure proper implementation and enforcement of their provisions. The NBA shall, amongst others, be responsible for the establishment of a National Biodiversity Information System that again shall prepare a Community Biodiversity Register and a National Biological Inventory.

Salient features of the first two drafts

In line with the CBD, the drafts establish sovereign rights of the states over natural, genetic resources and biodiversity and attempt to guarantee the farmers' rights and other local/indigenous community a set of rights/protections. While the draft law on biodiversity protection deals with community knowledge, collective innovation and community rights, the draft on plant protection deals with introduction of newly innovated plant varieties to recognise and reward the role of human agency, individually or in groups.

Preamble and objectives

The draft Biodiversity Act reaffirms sovereign right of the State over natural and biological resources and the authority of the national governments to determine access to such resources (Preamble and Article 15). It also reaffirms the spirit of Article 8 of the CBD that seeks to promote wider application of innovation of the local and indigenous community with their approval and on equitable benefit sharing. Following CBD, the draft includes provisions to determine *access to biological and genetic resources and related knowledge based upon prior informed consent (PIC) and fair and equitable sharing of benefit arising from use of such resource and knowledge.*

The draft recognises the global tendency towards affirmation of intellectual property right (IPR) over biological diversity, the related products and processes and declares it imperative for Bangladesh to protect her own resources against such backdrop.

The draft Biodiversity Act declares the patenting of life forms being against the moral, intellectual and cultural values of the people of Bangladesh. Access, use and innovations that have biological and genetic resources at the center shall be guided by this principle (Section 5.3). It also prohibits all forms of monopolisation of biological and genetic resources and related knowledge and culture (Section 5.16).

In line with Article 8 (g) of the CBD, one of the objectives of the draft law is to protect the biological and ecological environment of the country from the potential and actual pollution caused by the release of Genetically Modified Organism (GMO) in the environment.

Scope of the draft law

The draft includes all biological and genetic resources, related knowledge and their derivatives within the jurisdiction of the country. It implies all varieties in life forms including plants, animals, fish, micro-organism, cell lines, genetic materials characteristics, traits, products and processes involved therein. The traditional use and exchange of biological and genetic resources shall remain outside the purview of the proposed law.

For the purposes of this draft, biological resources include all biological resources, organisms or parts thereof, populations, or any other biotic components of ecosystems of Bangladesh. Genetic resources shall mean resources related to the genetic material and include material of plant, animal, microbial or other origin containing functional units of heredity (Section 4).

Provisions on access includes PIC and mutually agreed terms

The draft declares the indigenous, local, fishing and farming communities as the stewards and custodians of biological and genetic resources. No access to such resources shall be allowed without the PIC of the communities. Inventions, arising out of such resources, shall not be sold or otherwise transferred without PIC of the communities. Access to and use of such resources for economic transactions and trade will be based on mutually agreed terms beneficial to both, the economic agents as well as the communities. The State shall not have the power to negotiate access by foreign/commercial interests without the full participation of other co-owners (Section 8.2.a). Where access is allowed, the State shall ensure payment of royalties or compensation where applicable (Section 8.2.b).

The State shall ensure the right of the communities to deny collection of biological and genetic resources (Section 7.9). The community of the country of origin must also be informed about entry of such resources to Bangladesh.

No IPR on accessed resource or products

The general conditions regulating access to biological and genetic resources declare certificate of intellectual property or similar certificate and licences over such resources or products of such resources and process invalid and illegal. Any certificate of IPR or similar certificate of licences upon resources/products/processes resulting from any such access shall be invalid and illegal (Section 13.21). The draft Act, however, requires the NBA to study and recommend policies and regulations on the utilisation of biological and genetic resources including IPRs and community rights in accordance with the draft (Section 11.13.d).

Access shall be allowed

- to undertakings being carried out within Bangladesh (Section 13.1);
- to undertaking outside Bangladesh when NBA can ascertain benefits in terms of enhancement of biodiversity (Section 13.2); and
- with written prior informed consent of NBA and concerned community (Section 13.4).

Access shall be denied

- to collector accused of irregular and unauthorised transaction (Section 13.3);
- to collector who has collected specimen in any country without prior informed consent (PIC) (Section 13.3); and

- if collection is to be done without written commitment from the collector that research reports and results shall be provided to NBA and concerned community (Section 13.7).

Procedure for access

Section 13 lays down detail procedure as to how request for access would be made and also the requirements and conditions for such access. The proviso to Section 13.9 also requires the collector to inform the NBA while applying for access about proposed mechanism and arrangements for benefit sharing. Such sharing of benefit shall include knowledge, technology and/or financial transfer, involvement of the country in research and development (Section 13.9.vi). The collector shall also give indication of the benefits, whether economic, technical, biotechnological, scientific, cultural, social or otherwise that might derive to the country and concerned communities (Section 13.9.xi).

Access is conditional to benefit sharing

After fulfilling all the requirements of Section 13 and upon scrutiny of the application for access by the NBA, an agreement may be signed by the NBA and the collector allowing access (Section 13.13). As a minimum requisite, such agreement shall be specific on the terms and conditions of equitable benefit sharing including transfer of technology, sharing of research result, participation by Bangladesh in the economic, social, environmental benefits as may accrue from processes and products obtained through use of collected resources (Section 13. 15. a,b,e,f,g). Where the collector is not a national of Bangladesh, the State in the jurisdiction of which s/he operates must guarantee to ensure compliance with the mutually agreed terms of the agreement and enforce the same (Section 13.20).

In case commercial benefit is derived or products result, the collector shall pay at least a defined percentage of benefits, which is not less than 50 percent of net monetary gain from direct or indirect use of biological and genetic resource in respect of which access was given (Sections 7.5;16.6).

Collector to comply with Biosafety Law

The agreement for access shall also contain a commitment that the collector would abide by the law and other relevant rules including rules on bio-safety (Section 13.15.h). Access may be restricted or prohibited in case of non-compliance with rules on bio-safety and food security (Section 22.6).

Result of research to be public property

Access to biological and genetic resources shall be allowed to any citizen of Bangladesh to enhance scientific and technological capacity in research (Section 14.1). All results and benefits of such national research, whether carried out privately or by public institutions shall remain public property (Section 14.2). In all research carried out by academic institutions, PIC of the community concerned must be undertaken and benefits equally shared (Section 14.3). While the Section specifies maximum term for public research institutions as five years, the time limit for private research is not specified (Section 14.4).

Observations

The draft is quite detailed, complex and sometimes repetitive. The language must be simplified in order to make it implementation/reader friendly and also to add appropriate legal vernacular. It frequently refers to the CBD but proposes definitions that do not always follow the definitions of the CBD. This could be avoided to minimise confusion.

The draft law contains detailed provisions on PIC, access and benefit sharing (ABS). The draft proposes for public participation in determining ABS, but does not detail out modalities for such participation. In allowing access, it also does not say who on behalf of the concerned community shall give consent (Section 13.4). Also in case of import of biological and genetic resources to the country, the modality to check PIC of the communities of country of origin has not been mentioned (Section 13.18).

One major element of the draft is the introduction of common property regime in Bangladesh that lacks constitutional recognition. Article 152 of the Constitution of the People's Republic of Bangladesh, however, recognises custom as part of law.

The proposed law allows the NBA, as a regulatory body to draft rules without identifying areas in which such rules may be made (Section 14.a). The draft may be seen as an encroachment over the powers of other agencies inasmuch as it declares some items as non-patentable that falls under the jurisdiction of the Ministry of Industries.

Frequent reference in the proposed draft to bio-safety rules will make the related provisions of this draft infructuous; as such rules have not been drafted nor are there any such initiatives.

It is not clear how the proposed draft matches with the obligation of Bangladesh under TRIPS. It is noted that in contrast to the TRIPS provision, the draft exempts all life forms from patentability. To ensure that such aspirations of the drafters of the proposed law get recognition, the same must receive appreciation at the policy level for negotiation at

the TRIPS Council. A law of such vital importance must not be kept pending and must be finalised immediately with wider public participation.

Main features of the Plant Variety Act

The draft Plant Varieties Act of Bangladesh regulates the commercial transaction of plant varieties including new plant varieties in Bangladesh. The provisions of this draft Act is to be interpreted in the context of the draft Biodiversity Act and so would be the provisions on ABS. The draft law has overriding power in that any other law to the extent of its inconsistency with this draft shall be void and discarded (Section 4.9).

For the purposes of this draft 'plant' shall mean any living organism in the plant kingdom, fungus kingdom excluding bacteria and other micro-organism. The other definitions provided in the draft include plant variety, community variety, local variety, transgenic plant, genetic material, propagation material and so on.

Nature of protection

'Protection' to be accorded under this Act shall always mean defined and specific commercial privileges, whether explicitly mentioned or not, approved and granted to an innovator by the NBA. Such protection shall not constitute any generalised IPR and may vary from applicant to applicant on the basis of nature of innovation. It is to be noted that unlike this draft, the draft on biodiversity protection does not define 'protection'.

In general, it can be said that the draft on Plant Variety Act does not recognise any claim of new variety for private IPR protection. It is only when communities recognise an independent human agency over and above the social process and the innovation serves definite and useful needs of the people of Bangladesh that protection may be accorded under the draft (Section 7.2; 7.3).

A new plant variety for protection under the law must be a hitherto non-existent variety, have consistent, stable and distinctive specific traits. For new plant variety, the NBA may either give 'citation of award' (where no protection for personal gain or commercial privilege is sought) or 'commercial permit' (Section 7.1) in the name of New Plant Variety Certificate (Section 8.1). To be eligible for consideration for commercial privileges, the New Plant Variety must meet definite and useful needs of the people of Bangladesh (Section 7.3).

It is only the recipient of the New Plant Variety Certificate, who can commercially produce, sell or distribute, offer, import into or export from Bangladesh such variety or the propagation material (Section 21.1/21.2). The permission for export must be pre-conditional to the fact

that there will be no claim of IPR over such exported material (Section 21.3).

Breeders' rights

A breeder may claim commercial privileges over hybrid only if the parents are available in Bangladesh as community variety in the public domain (Section 7.3). The protection shall in no way affect the rights of farmers to have unencumbered access to biological and genetic resources of Bangladesh and related knowledge. Also the rights to collect, conserve, use etc. plants for personal and non-commercial purposes shall not be affected under the privileges proposed under the draft Act (Section 4.5.6/Section 20.5). For improvement or development of local variety, common variety and wild variety for commercial purposes and also for commercial transaction of plant varieties or materials to propagate plants, a commercial permit shall be needed (Section 20.6; 20.8).

Treatment of foreign nationals

The draft law is specific in naming those who can apply for protection. Nationals of Bangladesh and other countries also may apply for protection provided the country to which s/he/it belongs:

- recognises the biodiversity law of Bangladesh;
- allows Bangladeshi national to apply for similar protection in that country; and
- has headquarters in a country that is a signatory to the CBD (Section 9.1/9.2).

Innovations/inventions to be public property

Innovations by public agencies, individuals, non-governmental organisations (NGOs) with funds for public goods shall be considered 'common property' and shall be entitled to 'citation of award' but not to any protection for commercial privileges (Section 7.11).

Application for protection may be rejected in case the applicant refuses to disclose vital information on use of community variety, indication of origin or to return resources or provides an invalid contract of benefit sharing or has the history of abusing IPR (Sections 10 and 11).

Period of protection

The period of plant protection or commercial privileges shall be seven years for annuals, 10 years for bi-annuals, 15 years for perennials and 25 years for woody plants utilising timber (Section 16).

Observations

The draft clearly distinguishes between local/widespread/common plant variety and new plant variety. This draft shall protect the later variety for commercial privileges and award while the former ones are protected under the draft Biodiversity Protection Act.

If TRIPS obligations are to be met, the great challenge would be to ensure that the 'nature of protection' as proposed under the draft is 'effective' as envisaged in the TRIPS Agreement. The conditional approval to foreign nationals may well contradict Article 3 of TRIPS requires members to accord to the nationals of other members treatment no less favorable that that it accords to its own nationals with regard to IPR protection. Although the protection proposed under the law is not IPR and hence it does not call for application of Article 3 of TRIPS, in ensuring its 'effectiveness' if the obligations under TRIPS have to be met, it may need modification both in the nature of protection and treatment of foreign nationals.

Main features of the draft Plant Variety Protection Act, 2002

In contrast with the earlier version (The draft Plant Variety Act, 1998) that referred to the obligation of Bangladesh under the CBD, this new draft seeks to fulfill the obligation of Bangladesh under Article 27.3(b) of TRIPS that requires countries to provide protection to their plant either by patents or effective *sui generis* system (*a system of its own kind*) or a combination of both.

Other than TRIPS, the draft, in dealing with eligibility for applying for protection, also refers to the Gene Treaty (Section 9). Thus it can be said that the earlier (that refers to CBD) and latest version of the draft laws (that refer to TRIPS and Gene Treaty) are not based on the same premises to the extent the treaties differ. Such reference has not addressed the complexity of issues like ABS, PIC and so on. Instead by not referring to the draft Biodiversity Act, 1998 the latest version of the draft Plant Varieties Protection Act, 2002 has left these issues unapprised. Although the applicant for a new plant variety protection must show that s/he has permission of the community in using their variety or knowledge and append an appropriate arrangement for benefit sharing (Sections 13.4 and 13.5), the mechanism and detailed of these are not prescribed as done in the draft Biodiversity Act, 1998.

The draft proposes the formation of a statutory authority to be called the Plant Variety Protection Authority (PVPA) to grant either New Variety Certificate or Citations of Awards (Section 4). The PVPA shall be the implementing agency of the draft and not the NBA as proposed under the earlier draft. It shall consist of 11 members (Sections 5 and 6) with apparently no representation from the civil society or farmers'

community. In contrast to this, Section 38 of the draft Biodiversity Act requires representation of farmers in the NBA. However, if the recipient of a citation of award is a citizen of Bangladesh, s/he shall be eligible to be represented in the PVPA (Section 22), a provision that does not match with section 6 lining out composition of PVPA.

In addition to its function to grant certificate of new plant variety/citation of award, the PVPA shall also have the authority to negotiate benefit for new plant variety derived with the use of community variety and/or related knowledge (Preamble).

The draft has a different title than the earlier one. It has added the term 'protection' in the title but has not defined the same like the earlier one. Also the term 'propagating material' as defined in the earlier draft has not been defined in the latest version although the use has been targeted for regulation (Sections 16 and 17).

A statement in the preamble shows that the draft aims at 'providing *incentives to breeders, individually or in groups or in collaboration with farmers*, for better and stepped up breeding of new crop varieties'. The text in Section 23 (2) rather suggests the opposite. According to the said section, the National Plant Variety Development Fund (NPVDF) to be established shall be utilised "*to provide a range of incentives measures for farmers and local community to participate in various form of activities related to the development of new plant varieties in collaboration with private and public funded breeders...*". Since farmers and breeders have two distinct definitions, incentive to the one shall not necessarily mean and include the other. The definition of farmers recognise the role of farmers in the development of varieties (Section 2.e), but the definition of breeder has excluded the informal communities and has apparently referred to the formal sector by mentioning the breeder as 'employer' (Section 2.a). It is felt that the law should put priority in providing incentives to the farmers while breeders may be given the necessary protection for commercial purposes.

Nature and term of protection

For breeders

As stated earlier, the draft seeks to protect two groups, namely the 'breeders' and 'farmers'. The protection to be accorded to the breeders under a New Plant Variety Certificate shall entitle them to exclusive commercial exploitation of the protected variety (Section 16.1). However, for a New Plant Variety Certificate, the varieties must have the characteristics of novelty, distinctness, uniformity, stability and utility (Sections 10 and 11). A variety that uses genes involving terminator technology shall not be protected (Section 8.8.e). Also transgenic plants/GMOs without Environment Impact Assessment (EIA) as to

harmlessness shall be rejected any protection (Section 8.8.d). The draft, however, omits the definition of transgenic plants/GMOs.

The protection to a breeder shall be 20 years for fruits, tree species and vines and 15 years for all other species of annual habit.

In dealing with eligibility for application, the new draft adds one more condition in stating that the applicant shall be eligible if s/he is national of a country that is party to the Gene Treaty (Section 9.1.c). Also the new draft is more stringent in declaring applicants having headquarter in a country that has not *ratified* the CBD as not eligible (Section 9.2.b). The earlier draft in section 9.2.b only demanded *signing* of the CBD and not ratification. It is felt that such conditions of the drafts may be made a condition for eligibility rather than non-eligibility for application.

For farmers

The PVPA shall not only protect but also promote the rights of the farmers. These rights of the farmers include (Section 26):

- right to protect their traditional knowledge relevant to plant genetic resources from being accessed in formal sector without compensation;
- right to claim significant contribution to a registered variety
- right to claim an equitable share of benefits if their varieties have contributed to the registered variety; and
- right to save, use, exchange and sell farm-saved seed/propagating material of registered variety for non-commercial purposes.

Farmers' and Breeders' Rights Issues in the Design of a *Sui Generis* System for Nepal

Madhusudan Upadhyay

Background

The Trade Related Aspects of Intellectual Property Rights (TRIPS) Agreement under the World Trade Organisation (WTO) requires all members to provide intellectual property protection for plant varieties. According to Article 27.3 (b) of TRIPS, protection is to be provided "...either by patents or by an effective *sui generis* system or by any combination thereof". Since *sui generis* itself can take many forms, the range of options is basically very wide. This also means that individual countries can develop their own mechanism to protect plant varieties taking account of their unique features such as the level of economic development, resources, agricultural and industrial policy, the role of public research and breeding, special needs of small farmers and indigenous communities, and so on.

A *sui generis* system can be potentially very comprehensive, with many elements. Some of these are addressed in TRIPS while others are found elsewhere, e.g. in the Convention on Biological Diversity (CBD). Often, these elements are developed as components and then integrated to formulate the *sui generis* system as a whole. The objective of this paper is rather modest - towards the formulation of the *sui generis* system; it focuses on two key elements of the system: *breeders' rights* and *farmers' rights*. Recent experience from other countries shows that an effective *sui generis* system needs to include both these rights, with the assumption that not only innovations are encouraged but also the rights of farmers and indigenous communities are protected, and ultimately the benefits shared equitably.

An overview of the TRIPS Agreement

TRIPS came into effect on 1 January 1995. Under TRIPS, all members of the WTO are required to meet certain minimum standards for the protection of intellectual property. The term 'intellectual property' refers to a design, technology or product invented by a person or corporation and 'rights' refer to the recognition that the inventor should be granted a reward such as the exclusive right to use it or to earn royalties renting out its use. Under TRIPS, such 'rights' are conferred by provisions related to patents, copyrights, trademarks, geographical indications, industrial designs, layout-designs of integrated circuits and protection of undisclosed information. As per the provisions under Article 27.3 of TRIPS,

micro-organisms such as bacteria, viruses, fungi, algae, protozoa and non-biological and microbiological processes for the production of plants and animals will be eligible for patent. Even though plants are excluded, the plant varieties have to be protected either by patenting or by an effective *sui generis* system.

TRIPS has provided an option for developing a *sui generis* system through national legislation. The Latin term *sui generis* means 'of its own kind'. In the present context, a *sui generis* system of rights means an alternative and unique form of intellectual property protection (IPP), designed to fit a country's particular context and needs. It can have a wider meaning to cover those aspects of intellectual property not protected under conventional systems of IPP of a system embodying community, farmers' or indigenous people's rights.¹

The Agreement, in general can be divided into seven parts. Part I (Articles 1-8) of the Agreement contains general provisions (such as framework of implementation) and basic principles (such as principle of national treatment and most-favoured nation treatment). Part II (Articles 9-40) addresses, in its various sections, the seven types of IPR such as copyrights, trademarks, geographical indications, industrial designs, patents, layout-designs of integrated circuits, and trade secrets and establishes standards for each category of IPR. Part III (Articles 41-61) deals with the enforcement mechanism. Part IV (Article 62) explains the procedural requirements for obtaining IPR. Part V (Articles 63-64) includes dispute prevention and settlement procedures. Part VI (Articles 65-67) explains the transitional arrangements with respect to the obligation to apply the provisions of the Agreement by member countries. Finally, Part VII (Articles 68-73) has identified the TRIPS Council as the compliance monitoring institution of the Agreement.

Some other provisions of the Agreement, which are directly relevant to the agricultural sector, are described in brief below.

Provisions under geographical indications²: As per Article 22.1, geographical indications are defined, for the purposes of the Agreement, as indications, which identify goods as originating in the territory of a member, or a region or locality in that territory, where a given quality, reputation or other characteristic of the good is essentially attributable to its geographical origin. Several products are traditionally produced in specific geographical area and the specific characteristics of such products are associated with the area. The provision of geographical indications allows such products to be identified by their respective area of origin. Champagne produced in Champagne region of France, Scotch whisky of Scotland, Ceylon tea of Sri Lanka, Darjeeling tea of India, and Ilam tea of Nepal are some of the examples. The provision of geographical indications under TRIPS necessitates the legal protection of such

geographical indications. Member countries of the WTO are obliged to provide legal framework to prevent misuse of geographical indications as to mislead the general public with respect to goods not originating in the area indicated.

Provisions under patents: Patent is the most relevant IPR regime under TRIPS for the agricultural sector. Under the patent regime, the inventor, as owner of the patent, has the exclusive right to make/produce, use, sell or import the invention protected by the patent, for certain period of time in a given territory. According to the definition of United Nations, patent is a legally enforceable right granted by a country's government to an inventor and to other persons deriving rights from the inventor, for a limited number of years. At the same time, a patent excludes other persons from manufacturing, using or selling a patented product or from utilising patented method or process.

As per Article 27.1 of TRIPS an invention is patentable only if it is:

- noble
- has followed an inventive step
- commercially applicable or industrial applicability

There are three exceptions to the rule of patentability in TRIPS. According to Article 27.2, the exception to the patent applies where the inventions are contrary to order public or morality, or where inventions are dangerous to human, animal or plant life or health or seriously prejudicial to the environment. Also, member countries may exclude from patentability diagnostic, therapeutic and surgical methods for the treatment of humans or animals (Article 27.3 a). The third exception (Article 27.3 b) allows members to exclude plants and animals other than microorganisms and essentially biological processes for the production of plants or animals (natural breeding methods). However, members are required to provide patent protection for non-biological and micro-biological processes such as biotechnological gene manipulation and gene transfer. Countries, which exclude plant varieties from patent protection, are required to provide an effective *sui generis* system of protection. Further, the whole provision was subject to review four years after the entry into force of the Agreement.

As per Article 29.1, the applicant for a patent has to disclose the invention in a manner sufficiently clear and complete for the invention to be carried out by a person skilled in the art and may require the applicant to indicate the best mode for carrying out the invention known to the inventor at the filing date or, where priority is claimed, at the priority date of application.

As per Article 31, compulsory licensing and government use without the authorisation of the right holder are allowed. However, such licensing can be granted only if an unsuccessful attempt has been made to acquire a voluntary license on reasonable terms and conditions within a reasonable circumstance. In each case of such licensing, the patent holder needs to be adequately remunerated taking account of economic value of the license.

As per Article 33, members need to provide the patent protection for a minimum period of 20 years from the filing date.

Some analytical interpretation of Article 27.3 (b)

As Article 27.3 (b) is one of the most controversial Articles of TRIPS, the interpretation of the wordings in the Article can have significant legal implications. In this context, the United Nations Food and Agriculture Organisation (FAO) has analysed the Article and has come up with following interpretation of some of the terminology in the Article.

Plants: Article 27.3 (b) excludes plants from patentability. Here, the term plant includes whole plant and parts of the plant as well (genetic material, tissues, leaves, etc.). The Article 27.3 (b) has kept open a number of botanical genera and species that can be included for protection. This means, in principle, all genera and species of plants can be included in the list of protected varieties. On a similar note, nothing in the Article precludes member countries from granting protection under the *sui generis* system to subject matter that goes beyond plant varieties only. Therefore, even traditional or indigenous knowledge and farmers' rights can be subject to protection under the *sui generis* system.

Microorganism: As per Article 27.3 (b) microorganisms must be patented. Microorganisms have been defined as any microscopic organism, including bacteria, viruses, unicellular algae and protozoan, and microscopic fungi. Microorganisms are considered to be a category different from the kingdoms of plant and animals.

Essentially biological process: As per Article 27.3 (b), essentially biological process may be excluded from patentability. Natural Science defines 'biological process' as any biological activity carried out by any living organism at molecular, cellular or organism level. Extending this concept, essentially biological process may be understood as a process, which is performed without the application of any external technical skill by humans. However, this interpretation of essentially biological process is under debate and leaves a room for interpretation by member countries themselves.

Microbiological and non-biological process: Microbiological and non-biological process are mandatorily patentable under Article 27.3 (b).

Microbiological processes are those, which apply microbiological techniques using plant cells or microorganism. The provision of including microbiological process under patents has been controversial owing to the fact that, microbiological process may be applicable at some stage of production of entire plant, which in contrast, may be excluded from the patent provision. Moreover, the option of excluding essentially biological process from patentability compared to the provision of compulsory patenting of microbiological process, which can be argued to be a biological process, has made Article 27.3 (b) a controversial one (Khor, 2002).

In the case of non-biological process, it has been interpreted as the process, which will result in a product that cannot be created naturally. Generally any method of genetic engineering may be regarded as being a non-biological method.

Plant varieties: Article 27.3 (b) has provisioned that plant varieties can be protected either by patents or by an effective *sui generis* system. However, the Article does not define plant varieties. In that case, the industrialised countries have been trying their best to broaden the term - plant varieties - to include biotechnological products also, in order to make them eligible for patent protection. On the other hand, countries with traditional agricultural economies will seek a narrow interpretation of the term to promote unrestricted availability of plant species. Therefore, to avoid misinterpretation plant variety needs to be explicitly defined in TRIPS.

Provisions related to international agreements

Convention on Biological Diversity (CBD)

The CBD was conceived during the United Nations Conference on Environment and Development (UNCED) in 1992 and came into force in December 1993. The CBD covers all fields of biodiversity encompassing all issues concerning genes, species and ecosystem (FAO, 2000). It takes a comprehensive approach to all issues concerning conservation and sustainable use of biodiversity. It addresses issues such as access to genetic resources, sharing of benefits from the use of genetic material and access to technology. The Article 1 of the CBD states its objective as "...The conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of benefits arising out of the utilisation of genetic resources, including by appropriate access to genetic resources and by appropriate transfer of relevant technologies..."

Sovereign rights of States: Article 15.1 of the CBD states, "Recognising the sovereign rights of States over their natural resources, the authority to determine access to genetic resources rests with the national governments and is subject to national legislation'."

Recognition of the contribution of local population: Article 8 (j) of the CBD recognises the role of indigenous and local communities in conserving biodiversity. The CBD has stressed the importance of maintaining local knowledge and practices of conservation and sustainable use and the need to encourage equitable sharing of benefits derived from the use of local knowledge.

Access to genetic resources: Article 15 recognises the authority of national governments in determining access to genetic resources within their national territory. However, the CBD also stresses the need to facilitate access to genetic resources and opposes imposition of restriction that run counter to the objectives of the CBD. The Convention has also made provision of access on mutually agreed terms and prior informed consent (PIC) for providing such access.

Access to and transfer of technology: The CBD in Article 16.3 has stressed the adoption of legislative, administrative and policy measures to provide access to and transfer of technology to developing countries on mutually agreed terms, including technology protected by patents and other IPRs.

Sharing of results and benefits: Under Article 15.7, the contracting parties to the CBD are obliged to take legislative, administrative or policy measures with the aim of sharing in a fair and equitable way the results of research and development and benefits arising from the commercial and other utilisation of genetic resources with the contracting party providing such resources.

FAO International Undertaking on Plant Genetic Resources (IUPGR)

The IUPGR adopted in 1983 by FAO Conference Resolution 8/83 was the first comprehensive international agreement governing the conservation and sustainable utilisation of agricultural biodiversity. The objective of IUPGR is to ensure that plant genetic resources of economic and/or social interest, particularly for agriculture, will be explored, preserved, evaluated and made available for plant breeding and scientific purposes (FAO, 2000).

The first resolution (4/89) of the undertaking recognises the enormous contribution that farmers of all regions have made to the conservation and development of plant genetic resources, which constitute the basis of plant production throughout the world and form the basis for the concept of farmers' rights. The second resolution (5/89) has defined farmers' rights as rights arising from the past, present and future contribution of farmers in conserving, improving and making available plant genetic resources, particularly those in the centres of origin/diversity. The third resolution (3/91) reaffirms that the concept of "plant genetic resources are heritage of mankind" and is subject to the

sovereign rights of nations over their genetic resources. The third resolution also establishes "that breeders' lines and farmers' breeding material should only be available at the discretion of their developers during the period of development". The resolution redefines the principle of unrestricted access to genetic resources as access granted conditional to the adequate compensation for the access and subject to the sovereign rights of countries over their plant genetic resources.

The most recent negotiating draft of IUPGR, revised in December 1997, calls for the establishment of the *sui generis* system for the protection of farmers' innovations and for sharing of benefits, at both national and international levels. It also spells out the need to establish a 'collective rights regime' to protect the knowledge of farmers.

International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA)

ITPGRFA encourages contracting parties to protect and promote farmers' rights through national legislation for:

- Protection of traditional knowledge;
- Right to equitably participate in sharing benefits arising from the utilization of genetic resources;
- Right to participate in decision making at national level; and
- Rights to save, use, exchange and sell farm-saved seed/ propagating materials.

Conflict between TRIPS and CBD

Difference in overall framework: The principle of sustainable utilisation and conservation of biodiversity is central to the CBD whereas TRIPS is more focused on assuring rights and benefits of IPR holder and the principles of environment protection and conservation are not adequately addressed (Khor, 2002).

Access to natural resources and national sovereignty: The CBD recognises the sovereign rights of states over their natural resources and the authority to determine access to genetic resources rests with national governments. The CBD has made provision of PIC from national governments for ensuring access and benefit sharing.

In contrast to this provision, TRIPS enables persons or institutions to patent a country's biological resources or knowledge relating to the resources in countries outside the country of origin of the resources or knowledge. The principle of national treatment under TRIPS necessitates providing equal status to the foreigner as the citizens for granting patents and other IPRs.

Private rights versus community rights: TRIPS has provisioned the exclusive IPR to its owner, who can prevent others from making, using, marketing and importing patented products. IPRs under TRIPS are thus private rights.

In the developing countries, the traditional system of local communities has been established in such a manner that they collectively contribute to the conservation and development of their local genetic resources. Such a local system comprises of free exchange of knowledge as well as materials for the conservation and development of the resources. The contribution of local communities is recognised in the CBD and has made provisions to protect community rights. However, the contribution of local community is not recognised in TRIPS, instead it endorses the private rights over the products and knowledge, which are the result of contributions from local communities over several generations.

Traditional knowledge versus modern technology: Under TRIPS, patent protection can be granted only to those inventions, which have identifiable inventor. As traditional knowledge is the product of collective contribution of many individuals/communities, the possibility of recognising the contribution of traditional knowledge is highly diminished. Moreover, TRIPS requires that the invention must have a prospect of industrial application to be considered for patent protection. However, the innovations through traditional knowledge are more of implicit in nature and rarely have direct industrial application. While the CBD adequately recognises traditional knowledge and practices, TRIPS, on the other hand, rewards addition to knowledge made through modern technology.

Prior informed consent: As the CBD recognises the sovereign rights of states over its biological resources, there is a provision of PIC of the states providing access to such resources. The consent seeking party has to provide sufficient information regarding his/her work, how it is intended to be used, and obtain consent, before starting the work. Under TRIPS, there is no such provision of PIC, which ignores the sovereign rights of the states over their biological resources.

This may facilitate and accelerate 'bio-piracy'. There is a growing evidence of bio-piracy and misappropriation of traditional knowledge of local communities by researchers and institutions in developed countries (Timsina, 2000). The provision of patenting and IPR in TRIPS will increase the number of countries, which have to legalise such piracy by enacting legislation to implement patents or other forms of IPR protection.

Benefit sharing arrangement: The provision of sovereign rights of states over its biodiversity and PIC in the CBD has enabled states to enforce

arrangements to share benefits accruing through the commercial and other utilisation of its biological resources. However, under the CBD, such a sharing needs to be on mutually agreed terms.

Under TRIPS, there is no obligation of patent or other IPR holder to share benefits arising from the utilisation of biological resources with the states or communities in the county of origin of such resources.

***Sui Generis* systems of plant variety protection**

As mentioned earlier, the Article 27.3 (b) of TRIPS provides an option to introduce 'an effective *sui generis* system' for the plant variety protection. The following section discusses features of some of the models of *sui generis* systems that are already in operation or in the process of being operational.

International Union for the Protection of New Varieties of Plants (The UPOV Convention)

The UPOV is an international convention established in 1961 by five European countries to coordinate the implementation, at the international level, of the PBRs. It is often the developed countries who claim UPOV to be the only internationally recognised *sui generis* system for the protection of plant varieties.

In 1968, there were 50 members, including the United States of America (USA), of which only 14 were the developing countries. UPOV has been amended three times - first in 1972, then in 1978 and ultimately in 1991. During the amendments made in 1972 and 1978, basic structure almost remained unchanged. Where as in 1991, there were major changes to the structure of protection significantly strengthening breeders' rights. Restriction was put on the reuse of seeds, which could have implication for the farming communities using the protected varieties. The latest amendment included of the notion of essential derived varieties (EDVs) that could affect the ability of breeders to freely use protected varieties for research. These changes in UPOV have compelled the developing countries to think of alternative models for the protection of plant varieties. This led the adoption of *sui generis* option for the protection of plant varieties. The option takes into consideration the contribution made by both traditional farmers and commercial plant breeders in shaping present day agriculture (Dhar, 2002).

Indian Legislation on the Protection of Plant Variety and Farmers' Rights (PPVFR)

The PPVFR Act was approved by the Indian Parliament in August 2001 (Dhar, 2002). The Act aims to establish "an effective system for the protection of plant varieties, the rights of farmers and plant breeders to

encourage the development of new varieties of plants" in line with Article 27.3 (b) of TRIPS. The three key aims of the Act are as follows:

- Protection of the rights of farmers for their contribution made at any times in conserving, improving and making available plant genetic resources for the development of new plant varieties;
- Protection of PBRs to stimulate investment for research and development, both in the public and private sector, for the development of new plant varieties; and
- Giving effect to Article 27.3 (b) of the TRIPS Agreement on plant variety protection.

The other salient features of the Act are:

- Breeders' rights are protected in terms of production, selling, marketing, distribution, export and import of the seeds for the protected varieties. These rights are in line with those provided under UPOV, 1991. The duration of the protection is 18 years for vines and fruit trees and 15 years for all other plants.
- Farmers rights are protected in terms of safeguarding the interest of farmers and other village and local communities engaged in plant breeding in two ways: (i) by protecting their own on-farm activities; and (ii) providing incentives in the form of rewards for their contribution to farming.

The Act has made provision of granting compulsory license to ensure availability of protected plant variety. However, the granting of license should ensure reasonable compensation to breeders and provide farmers the seeds or other propagating material of the variety in a timely and at a reasonable manner.

Convention of Farmers and Breeders (CoFaB)

Gene Campaign, a Delhi-based non-governmental organisation, along with Centre for Environment and Agriculture Development, has drafted an alternative treaty to UPOV, namely CoFaB (CoFaB, 1998). CoFaB is designed as a covenant between farmers and breeders belonging to the germplasm-owing countries of the South. It aims to ensure that farmers have their rights stemming from the contribution that they have made towards identification, maintenance and refinement of germplasm while at the same time providing protection to the breeders of new plant varieties. It illustrates a contrasting way of balancing the right of the farming communities and breeders.

CoFaB has provisioned that breeder will forfeit his/her rights if he/she: a) is not able to meet the demand of farmers leading to scarcity of planting

material, increased market price and monopolies; and b) fails to disclose information about the new variety or does not provide the authority with the reproductive or propagating material.

African Model Legislation for the Protection of the Rights of Local Communities, Farmers and Breeders, and for the Regulation of Access to Biological Resources

The main aim of this model legislation, developed by Organisation of African Unity (OAU), is to ensure the conservation, evaluation and sustainable use of biological resources, including agricultural genetic resources, and knowledge and technologies in order to maintain and improve their diversity as means of sustaining all life support system (OAU Model Law, 2000). The specific objectives of the legislation are to: a) recognise, protect and support the inalienable rights of local communities including farming communities over their biological resources, knowledge and technologies; and b) recognise and protect the rights of breeders

Community rights: The legislation recognises the rights of communities over (a) their biological resources; (b) rights to collectively benefit from the use of their biological resources; (c) their innovations, practices, knowledge and technologies acquired through generations; (d) the rights to collectively benefit from the utilisation of their innovations, practices, knowledge and technologies; (e) their rights to use their innovations, practices, knowledge and technologies in the conservation and sustainable use of biological diversity; and (f) the exercise of collective rights as legitimate custodian and users of their biological resources.

The State will ensure that at least 50 percent of benefits provided shall be channelled to the concerned local community or communities in a manner which treats men and women equitably.

Farmers' rights: Farmers' rights are recognised as stemming from the enormous contribution that local farming communities, especially their women members, of all religions of the world, particularly those in the centres of origin or diversity of crops and their ago-biodiversity, have made in the conservation, development and sustainable use of plant and animal genetic resources that constitute the basis of breeding for food and agricultural production.

Farmers have the rights to: a) the protection of their traditional knowledge relevant to plant and animal genetic resources; b) obtain an equitable share of benefits arising from the use of plant and animal genetic resources; c) save, use, exchange and sell farm-saved seed/propagating materials of farmers' varieties; d) use a new breeders' variety protected under this law to develop farmers' varieties, including material obtained from gene banks or plant genetic resources centres; and e) collectively save, use, multiply and process farm-saved seeds of protected varieties.

Plant breeders' rights: PBRs stem from the efforts and investment made by persons/institutions for the development of new varieties of plants, as defined in the legislation (a variety will be considered new if it is distinguishable from all varieties, stable in its essential characteristics; and sufficiently homogenous). Breeders will have the rights to sell, including the rights to license other persons to sell plants or propagating materials of that variety, and produce, including the right to license other persons to produce propagating materials of that variety for sale.

Relevance of different models of *Sui Generis* systems for Nepal

To the poor country like Nepal, protection through patents seems inappropriate not least because it is one of the most paradoxical provisions under the WTO but also because under a patent system, farmers will not be able to utilise their seeds for further cultivation, and have to purchase seeds every time. This is not feasible at this level of economic development and moreover, there is always a danger of further marginalisation of poor farmers. Purchased seeds can be expensive as these are produced by seed companies for every season. Further, this reliance on markets could also pose serious threats to the indigenous knowledge and plant varieties prevalent in developing countries.

Thus, protection through an 'effective *sui generis* system' as being pursued by most developing countries seems appropriate. However, before deciding on the appropriate model of *sui generis* system, it is imperative to understand the Nepalese context, which will be the basis for the design of the eventual *sui generis* system.

The Nepalese context

The agricultural system in Nepal is subsistence-oriented and mainly dependent on low input agriculture. The cereal crops such as rice, wheat and maize are the most predominant crops. The seed required for cultivating these cereal crops is mainly supplied through informal sector. Most of the farmers get seeds mainly through savings from previous years or through farmer to farmer exchange. It has been reported that around 95 percent of the seeds required by farmers to cultivate cereal crops is supplied by informal system (Timsina, 2000). The informal seed supply system not only provides seeds for cultivation but also a mechanism of varietal development. Farmers over the years utilise their indigenous knowledge, technology and skills for varietal selection of crop varieties, which eventually contribute to the variety development.

It has been reported that about 95 percent of the total vegetable seeds supply in Nepal is done from the market sources (agro-vets, seed entrepreneurs and individual vendors) and mainly imported from the

exotic seed companies (Timsina, 2000). As farmers started to cultivate more of exotic hybrid seeds of vegetables, the locally adopted and resilient indigenous varieties were sidelined and gradually disappeared, making farmers increasingly dependent on the seed supply from the market and improving the monopoly status of seed companies. Studies show that many varieties of cucumbers, pumpkins, and gourds have been lost (Rana *et al.*, 1998 and Timsina, 2000). If this genetic erosion persists, it will only increase the vulnerability of the poor farmers, directly threatening their livelihood options.

Seed security is vital for maintaining food security. The problem of food insecurity and poverty is mainly caused by lack of secure access and entitlements to food rather than supply of food (Sen, 1980). Seed is also a part of culture in Nepal. The use of different seeds in religious ceremonies such as Balachaturdashi (Satbeej), Gatasthapana (Jamara), Dipawali, etc. is well evident. Exchange of seeds among farmers also involves exchange of ideas and knowledge of culture and heritage, which helps to build up connectedness and bond within communities. With the erosion of indigenous seeds, the possibility of erosion of culture and social capital also increases in countries such as Nepal. Conserving seed is more than merely conserving germplasms; it is about conserving biodiversity, conserving knowledge of the seed and its utilisation, conserving culture and conserving sustainability. Farmers' rights to use, reproduce, multiply, share, exchange, sell and modify seeds play a vital role here, particularly for the conservation of biodiversity.

The major stakeholders involved in seed sector are:

- Government/Semi-governmental - Department of Agriculture (mainly Vegetable Development Directorate and different farm stations: Seed Quality Control Center, Central/Regional Seed Testing Laboratories), Nepal Agricultural Research Council (NARC), National Seed Board (NSB) and National Seed Company (NSC)
- Private-Agro-Enterprise Center, Seed Entrepreneurs' Association of Nepal (SEAN), SEAN Seed Service Center (SSSC)
- NGO/INGOs/Donor Projects ? German Technical Cooperation (GTZ), CARE/Nepal, Canadian International Development Agency (CIDA/CBED), Danish International Development Agency (DANIDA/CEAPRED), Department for International Development of the UK (DFID/SSSP)
- Farmers' groups and cooperatives

The public sector institutions are involved mainly in policy formulation, provisioning of breeders' and foundation seeds, quality control aspects of seed production. The role of private institutions are limited to trading of

mainly vegetable seeds, while different donor agencies have supported seed sector development by implementing various seed sector development programmes/projects in partnerships with NGOs and INGOs.

This means the responsibility for breeding and/or varietal development of crops lies specifically with the public sector research institutions.

In the case of cereal seeds, major share of production and marketing (informal exchange) is done by informal sector, with less than five percent of total requirement being met through the formal sector and less than one percent is imported (mainly hybrid maize). Private sector participation in commercial vegetable seed production and marketing accounts for more than 90 percent of total commercial vegetable seed market.

Quality aspect of seeds (mainly vegetables) produced in Nepal leaves ample room for improvement. This accounts for the quality of foundation seeds produced in public farms as well as lack of proper post-production activities (adoption of proper quality control measures, processing and packaging) done by private seed traders. The legal mechanism to ensure proper development of seed industry is lacking in the country. The prevalent legal mechanisms do not provide basis for development of seed industry and incentives for export promotion of seed produced.

The above points indicate that the Nepalese seed sector is still in its infancy stage to be developed into seed industry. There is still no concept of commercial seed trading in the case of cereals, while vegetable seed sector is premature enough to be considered as seed industry. These considerations need to be taken into account while designing a *sui generis* system of plant variety protection for Nepal as seed sector will be the most affected sector following Nepal's compliance with the TRIPS Agreement under the WTO.

Legal and institutional context for formulation of *Sui Generis* system in Nepal

Legal context: There is no any legal mechanism in Nepal, which can be directly translated as a *sui generis* system. Moreover, there are no laws directly stipulating the issue of farmers' rights. However, some of the legal provisions are concerned with collective rights on common property resources. These legal provisions are to be considered while designing eventual a *sui generis* system for Nepal (Pant, 2002).

The legal mechanisms that are relevant in the context of designing a *sui generis* system for the plant variety protection are:

- Protection of indigenous knowledge - The Constitution of the

Kingdom of Nepal, 1990

- Protection of rights on productive resources - Local Self-Governance Act, 1999; Land Act, 1964; Water Resources Act, 1992; Aquatic Animals Protection Act, 1961; Forest Act, 1993
- Protection from environmental pollution, food adulteration, diseases and pests - Environment Protection Act, 1996; Pesticides Act, 1967; Food Act, 1967; Plant Quarantine Act, 1972; Animal Health and Services Act, 1998
- Protection of rights to technology and information - Agricultural Research Council Act, 1991; Industrial Development Act, 1992; Cooperative Act, 1991
- Protection of seeds and other genetic materials - Seed Act, 1988; Plant Protection Act, 1972

Institutional context: There is no institution as yet, which is directly responsible for the protection of farmers' rights and eventually, implementation of a *sui generis* system of plant variety protection. However, there are some institutions, whose works relate to the protection of farmers' rights. Natural Resources and Environment Committee of the House of Representatives evaluates the policies and programmes of the sectoral ministries that are more closely concerned to the rights of the farmers. Ministry of Water Resources (MoAC), Ministry of Land Reform and Management (MoLRM), Ministry of Forest and Soil Conservation (MoFSC) and Ministry of Population and Environment do also work for the protection of farmers' rights with respect to water rights, agricultural technology, land rights, conservation of genetic resources and protection of environment respectively.

Under the MoAC, the Nepal Agricultural Research Council (NARC) is responsible for the development of agricultural technology and maintenance of gene pool of different varieties of cultivated species and their wild relatives. National Seed Board under MoAC is responsible for policy aspects related to seeds in Nepal. On the other hand, Seed Quality Control Center and Central/Regional Seed Testing Laboratories are involved in quality control aspect of seed.

The Department of Plant Genetic Resources under MoFSC maintains herbarium, records of ethno-botanical knowledge, *in situ* and *ex situ* conservation of plant genetic resources and exploration of potentials of the plants for economic exploitation. National Biodiversity Unit, under the same ministry, acts as a focal point for guiding the implementation and monitoring of the CBD.

On INGOs/NGOs and private front, several Nepalese NGOs such as

ActionAid Nepal, South Asia Watch on Trade, Economics & Environment (SAWTEE) and its member institution, Forum for Protection of Public Interest (Pro Public) are acting as pressure groups for the protection of farmers' rights. Their efforts towards the evolution of a *sui generis* system of plant variety protection are indeed noteworthy. Seed Entrepreneurs' Association of Nepal is involved in providing seeds to the Nepalese farmers through seed business.

Even though there are several institutions working for the protection of farmers' rights, there is no any single entity dealing specifically with the issues of farmers' rights and *sui generis* system. As soon as the *sui generis* system of plant variety protection becomes functional in Nepal, an independent institution dealing with the administration of provisions of the *sui generis* system would be necessary.

The UPOV model - How relevant for Nepal?

The International Union for the Protection of New Varieties of Plants (UPOV) Secretariat claims that the UPOV model of *sui generis* system is an 'effective *sui generis* system' and that completely matches with the TRIPS Agreement. However, the UPOV model has come under severe criticism. Some key provisions of the UPOV 1991 expand breeders' right under the patents model but at the expense of farmers' rights.

The UPOV 1978 was farmer-friendly to some extent but it was amended and now UPOV 1991 is effective. Hence, countries willing to join UPOV can accede only to UPOV 1991 and have to agree to adopt stricter protection standards in favour of PBRs. Some of the key issues of concern for developing countries with UPOV 1991 are as follows:

- The UPOV system is not suitable for developing countries because it spells out rights for breeders only. There is no mention of farmers rights (Sahai, 2002). Given the state of Nepal's agriculture, farmers' rights should be the central concern for Nepal.
- The provisions of UPOV 1991 restrict farmers' rights in several ways. It does not consider farmers' traditional rights and customary practice of saving, using, exchanging seeds and sharing or selling, his/her farm produce.
- A variety developed by farmers in developing countries does not stand a chance to be recognised as a 'novel' under UPOV. This effectively reduces the chance of the farmers to be recognised as a breeder of new variety and acceptance of his/her plant breeders' right.

- UPOV does not recognise farmers' knowledge and contribution of informal breeding system to the development of a plant variety, which is more often less individualistic and mostly shared by the farming community. As per UPOV, to have plant variety protection, there should be an exclusive inventor, which is hardly possible in the case of farmers' knowledge.

These considerations make it obvious that the UPOV model of plant variety protection is more suitable for developed countries rather than developing countries. The curtailment of farmers' rights and consolidation of breeders' rights in UPOV 1991 make it much more favourable for commercialised agricultural economies and not for subsistence-oriented economy like Nepal.

Table 13.1: Comparison of UPOV with Other Models

S.N.	Particulars	UPOV 1991	Indian Legislation	CoFaB
1.	Breeders' rights	Strong provisions for securing breeders' right	Recognises plant breeders and farmers' rights	Strong provisions for farmers' rights however, recognises plant breeders' rights and includes termination of plant breeders' rights.
2.	Scope of Protection	a) production or reproduction; b) conditioning for the purposes of propagation; c) offering for sale; d) selling or other marketing; e) exporting; f) importing; and g) stocking for any of the purposes referred to above	The breeders' right extends to production, selling, marketing, distribution, export and import of seed and/or propagating material of the protected variety. However, if the breeders' variety is an essentially derived variety, the breeder has to take consent from the farmer or communities from whose varieties the protected variety is derived.	Includes prior authorisation of the breeder of a new plant variety for the production, sale or commercial and branded marketing of the reproductive or vegetative propagating materials

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S.N.	Particulars	UPOV 1991	Indian Legislation	CoFaB
3.	Farmers' Rights	As per UPOV 1991 Farmers' Privilege allowed in UPOV 1978 is no longer the general rule but only an exception.	Farmers are entitled to save, use, re-sow, exchange, share or sell his farm produce including seed of a variety protected. The farmers however, are prohibited from branded sale of protected varieties.	Same as Indian legislation, rights granted for unlimited rights.
4.	Researchers' Right	The breeders' exemption provided under UPOV 1978, which allowed breeders to freely use protected varieties for research purposes and for breeding new varieties is excluded.	Grants researcher right to free and complete access to protected materials for research use in developing new varieties of plants. However, authorization of breeders is required 'where repeated use of such variety as parental line is necessary for commercial production of such other newly developed variety.	Same as Indian Legislation
5.	Possibility of Double Protection	Possible	Not possible	Not possible
6.	Benefit Sharing	Not Possible	In case of essentially derived varieties, NGOs or individuals on behalf of local community can claim a share of benefits that may arise from commercialization of the local varieties.	Same as Indian Legislation
7.	Duration of protection	a) 25 years for vines and fruit trees b) 18 years for all other plants	a) 18 years for vines and trees b) 15 years for all other plants	a) 18 years for vines and trees b) 15 years for all other plants

Conclusion

As per Nepal's commitment for WTO membership, the country needs to apply provisions of TRIPS by 31 December 2006. The foregoing discussion reveals that adoption of a *sui generis* system for plant variety protection is the best option for countries like Nepal rather than the patent system of protection. The eventual *sui generis* system for Nepal needs to be reflective of the peculiarities of Nepalese agricultural system and practices discussed earlier, rather than imitative of the other dominant models of *sui generis* systems. The system should address food security and livelihood concerns of poor farmers and protect their farming practices. Similarly, Nepal, being a biodiversity rich country, the eventual *sui generis* system should help to promote the conservation and sustainable utilisation of biodiversity and environment. In that sense, the *sui generis* system should be truly 'of its own kind'.

Although at the time of the accession to the WTO, Nepal rejected the patent system as well as UPOV 1991 in favour of a genuine *sui generis* system, it would be useful to note various arguments in this area. In particular, the following elements should be included but not limited in the eventual *sui generis* system for Nepal:

- The patent model should be rejected straight away on grounds of various reasons including the monopoly on seeds it leads to in the developing countries where research and development is weak and not competitive.
- The UPOV 1991 model does not consider the concerns of developing country farmers. Therefore, it does not make sense for Nepal opting for UPOV 1991. Moreover, TRIPS does not include the UPOV model as the only *sui generis* system.
- So, the choice is obvious - the *sui generis* model, one that is truly Nepal's own.
- National *sui generis* system for plant varieties protection must be developed by a multi-stakeholder platform that should include government, NGOs, CBOs, farmers' representatives and private entrepreneurs.
- The system must recognise and protect the rights of farmers and local communities over genetic resources, which were developed collectively by them over generations (Adhikari *et al.*, 2000). Provisions should be made such that PIC is sought in the case of use of such community owned plant varieties and these varieties need to be protected from being subject to any property rights

claim by others.

- In order to encourage possibility of innovation by private research organisation (which is very promising in the case of vegetable seeds) in Nepal, the *sui generis* system must recognise and protect breeders' rights for their creation. However, provisions should be made such that breeders disclose the source of genetic resource used in developing a new variety.
- Farmers should be allowed to save, reuse, exchange and sale seeds of protected plant varieties, especially so in the case of cereals (as 95 percent of cereal seeds is supplied through informal channels compared with five percent in the case of vegetables). Considering resource poor condition of farmers, the provision of unrestricted use of seeds is very essential. In absence of such a provision, farmers may be further marginalised as the purchase of expensive seeds for every cycle of cultivation will be hardly affordable to them. However, the sale of such seeds should be limited to unbranded retailing, as provided for in the India legislation.
- The provision should be made such that it does not hinder researchers' exemption and at the same time helps to claim farmers' right over their varieties.
- TRIPS has not defined plant varieties; it would be useful to define this in the context of Nepal's *sui generis* system. At the same time, narrow interpretation of the term plant variety should be avoided, and indeed can be avoided.
- The criteria for the protection of farmers' varieties/landraces should be limited to identifiable and stable materials.
- In clearly identified matters of public interest, varieties should be excluded from protection. Such matters should be related to, for example, potential threat to agricultural system, human and animal health, varieties that adversely affect environment, varieties that do not possess normal regenerative and reproductive capacity, where introduction of the variety may have an adverse socio-economic impact or affect the innovative capacity and indigenous technologies of farmers and local communities, and where ethical reasons are involved.
- A provision, which allows for compulsory licensing, has to be considered in certain situations such as: where anti-competitive practices of the rights holders are identified; where food security may be affected; where a high proportion of the plant variety offered for sale is being imported; where requirements of the farming community for propagating material of a particular

variety are not met.

- A suitable institutional arrangement for proper implementation of the provisions of the *sui generis* system needs to be identified.
- A separate legal arrangement for the biodiversity conservation needs to be established complementing the *sui generis* system of plant variety protection. The biodiversity conservation legislation should incorporate principles such as PIC and benefit sharing for providing access to genetic resources.
- There should be provisions for officially registering 'farmers' varieties/landraces' in order to establish the ownership of communities/farmers over the plant varieties and thus preclude unauthorised piracy of such resources. These varieties must be conserved through in situ and ex situ conservation strategies. Efforts should be made to restore genetic resources collected from Nepal prior to the coming into operation of the CBD and preserved at international gene banks.

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Endnotes

- ¹ The International Undertaking on Plant Genetic Resources (IUPGR) adopted by FAO Intergovernmental Commission on Plant Genetic Resource, Resolution 5/89 has defined Farmers' Rights as 'rights arising from the past, present and future contributions of farmers in conserving, improving and making available plant genetic resources particularly those in the centers of origin/ diversity.
- ² A separate chapter in this volume covers this topic (Malla and Shakya 2003).

The Sri Lankan Draft Act to Provide Protection for New Plant Varieties (Breeders' Rights)

Jagath Gunewardena

The Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS) under the World Trade Organisation (WTO) places various obligations on member countries in conferring intellectual property rights (IPRs). One such obligation is the extension of IPR protection to certain living beings, which is spelt out under Section 5 (Patents) of the Agreement. The inclusion of IPRs over living things in the section on patents means that the Agreement mandates either patent or "patent like" protection for living beings.

According to Article 27.1 of TRIPS, patents shall be available for any invention, whether it be a new product or a new process in all fields of technology. The issue of IPRs over living beings is found in Article 27.3(b). This paragraph gives members the option of either granting or refusing patents for animals and plants. But, it has two proviso clauses. One is that patents have to be provided for micro-organisms. The second is that plant varieties have to be protected by patents or by an effective *sui generis* system or by any combination of the two systems.

In conclusion, Article 27.3 (b) states that the provisions of this sub-paragraph shall be reviewed four years after the date of entry into force of the WTO Agreement. Since the WTO Agreement came into force in 1995, the provisions of the sub-paragraph that deal with providing intellectual property protection should have been reviewed in 1999. The round of WTO negotiations that was to be held in 1999 (known as the Seattle Round or the Millennium Round) failed due to widespread protests and demonstrations. Thus, this sub-paragraph has not yet been reviewed. It will be open to review during the next round of WTO negotiations. The stand taken by the Sri Lankan government in 1999 was that the sub-paragraph had to be amended to categorically disallow the patenting of life forms, including the patenting of plant varieties.¹

Since the contents of the sub-paragraph were not reviewed in 1999, it is not clear whether a country such as Sri Lanka, which does not agree with its contents, has to comply with it before having an opportunity to present its views at a negotiating round. This is an open issue that could be made use of until the next WTO round is held and the issue is discussed and agreed upon. However, it is seen that the drafting of an enactment to provide protection to plant varieties as required under TRIPS is in

progress. This drafting has been carried out by the Department of Agriculture and the National Intellectual Property Office. Sri Lanka has opted in favour of a *sui generis* system as opposed to the patenting of plant varieties.

The term *sui generis* means "unique" or "of its own kind" and means a system that is unique as opposed to the standard IPR regimes. This at best gives Sri Lanka an option to follow a course that is best suited to the needs of the country or at least to minimise the adverse implications that may arise from giving IPRs over plant varieties. The *sui generis* option available under Article 27.3 (b) is not really *sui generis* in the sense of the word and has to be taken within the context of the scope of TRIPS.

The term "protection of plant varieties" is misleading because neither a patent nor a *sui generis* Act provides any protection of any sort to a plant variety. Rather, it is intended to grant a monopoly right over a plant variety. These rights are to be enforced legally against other parties. This monopoly right is granted to an individual which could be either a physical person or a corporate entity. They are subjected to the general provisions of TRIPS. That is they have to be recognised as private rights.² They have to be subjected to National Treatment under Article 3 of TRIPS, which means that the same treatment should be afforded to nationals of the country and all others from other member countries of the WTO.³ In addition, any advantage, favour, privilege or immunity granted to any member country has to be immediately and unconditionally provided to nationals of other member countries.⁴

A *sui generis* Act to grant protection to plant varieties in Sri Lanka has to consider several aspects. This is especially important as this kind of law is enacted not due to any national need but only because it is deemed as necessary under an international treaty. One important aspect that has to be given careful consideration to is the impact of such laws on farmers. A large proportion of Sri Lankan farmers have only a small extent of land and are already spending a considerable amount of money on inputs. They have a long tradition of saving seed from one cropping season to the next and in some crops, notably paddy, those saving seed is as high as 90 percent or more⁵.

The other aspect is that Sri Lanka has a large variety of traditional crops that have been bred, developed and kept alive by farmers and are available in the public domain. No one can claim any type of ownership over these nor are there any restrictions placed on the use of these for cultivation or breeding. There are also a large number of crop varieties bred by public funded research institutes and provided to farmers.⁶ These are also in the public domain and no one has claimed any rights over them. Unlike in the case of the traditional varieties, these varieties can

be traced to the breeders. Another vital asset possessed by Sri Lanka are the crop wild relatives. These could be varieties, sub-species or even related species. The new *sui generis* Act has to decide whether to afford a kind of monopoly rights over these in order to prevent them from being abused or misused or to even obtain "just compensation" in an instance that they are used to make new varieties.

The Department of Agriculture of Sri Lanka, together with the National Intellectual Property Office, drafted a new enactment to protect plant varieties. A preliminary draft was made available as a working paper in July 2001. It was titled "Protection of New Plant Varieties (Breeders' Rights)". This draft has 30 sections in it. It was not *sui generis* in any sense but is based on the 1991 version of the International Union for the Protection of New Varieties of Plants known as the UPOV 1991⁷. Some of the main features of this draft are described below.

The draft has six definitions under Section 1. It defines a breeder as one who has bred, discovered or developed a variety. Thus, this definition has equated breeding (a conscious effort with specific aims and objectives) with a discovery (a chance encounter that needs only visual observation). According to the definition of a variety, it is necessary to have a difference of only one character. Therefore, this definition has made it possible to obtain monopolies over variations that can be compared with the normally known characteristics and shown to be different in just one feature. These variations can even occur in nature, but not be described in literature. This goes well beyond the rewarding of breeders' efforts, often used as a justification for the granting of monopoly rights for breeders.

The definition of "variety" in the draft is a word for word recital of the definition of the word "variety" provided in UPOV 1991.⁸ It means a plant grouping within a single botanical taxon of the lowest known rank, which grouping, irrespective of whether the conditions of the grant of a breeder's rights 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.

This definition is not confined to those that can be granted a breeder's right and includes all the different variations including traditional varieties and all known varieties. The main idea in the definition of a variety is that it should show at least a difference of one characteristic which is evident. The last part of the definition - a unit with regard to its suitability for being propagated unchanged - seems convoluted and unnecessary. But this part serves a valuable purpose, which is the extension of PBRs to hybrids.

Hybrid seeds are those that result from the crossing of two different varieties. The hybrid seeds germinate to produce plants that give high yields. But they are not stable and do not perform in the next generation as expected. Therefore, hybrid seed has to be prepared anew for every growing season. In hybrid making, pollen from one variety (the male line) is used to fertilise the ova of another variety (the female line). These lines keep breeding true since both produce pollen of their own. In some self-pollinated crops such as maize and rice,⁹ they employ Cytoplasmic Male Sterile (CMS) lines to make hybrids. The CMS lines do not produce pollen and have to be monitored with the help of another line (called the maintainer line) in order to keep the CMS trait. In making hybrids, the CMS line is crossed with the necessary male line (known as a restorer line) instead of the maintainer line.

It is possible to get breeders' rights to both male and female lines involved in making hybrids since they are able to fulfill the criteria of stability. That is, these lines can maintain the same set of characteristics through successive generations. In the other kind of hybrids (the three line hybrids) the restorer and maintainer lines have no problem of getting breeders' rights. It is not a problem to get breeders' rights over CMS lines since they too breed true in being crossed with the appropriate maintainer line. But, a hybrid cannot be given breeders' rights protection because it is unstable in that the next generation does not show the same traits. This problem is solved by considering a unit that can be propagated unchanged into the category of a variety. Accordingly, as long as two known male and female lines or a CMS and restorer line are used, the hybrid would also show a definite set of traits (characteristics). Thus, it can be considered as a unit that can be propagated without change and eligible for breeders' rights protection.¹⁰

The scope of breeders' rights is one of the most important parts in this kind of law. It is described in Section 14 of the draft, which is again an exact replica of Article 14 of UPOV 1991. According to these, the scope covers the production or reproduction (multiplication) of the variety, conditioning for propagation, offering for sale, selling and other forms of marketing, exporting, importing and stocking for any of these purposes. These are the activities that require permission or authorisation of the breeder. It will prevent farmers from saving seed for subsequent planting unless permitted to do so by the breeder. This leaves farmers without any rights over planting materials.

The UPOV Convention has the concept of farmers' privilege accepted until the revision of 1991. This privilege of farmers was that they can use a variety covered by a breeder's right for propagation purposes of their own, including saving seed for the next crop season. Although this privilege was removed in the 1991 revision, it has been

retained as an Optional Exception in Article 15(2). The draft prepared by Sri Lanka has paraphrased Article 15(2) in Section 14(4)(ii) empowering the Minister to make regulations. It means that the farmers' privilege has been made optional and can be restricted to a particular crop or even to a specific variety. In contrast, developed countries such as the United States of America (USA)¹¹, Australia¹² and the European Union (EU)¹³ have made good use of Article 15(2) to give this privilege to farmers as a mandatory right.

Exceptions to breeders' right are given in Section 14(4) of the draft. These are found in Section 14(4)(i). They are acts done privately and for non-commercial purposes, acts done for experimental purposes and acts done for the breeding of other varieties, except those that can be deemed as EDVs. These are a replication of the Compulsory Exceptions to Breeders' Rights provided under Article 15(1) of UPOV 1991. Section 14(4)(ii) of the draft gives the option of the farmer's privilege, which is provided in Article 15(2) of the UPOV 1991. The phrase "acts done privately and for non-commercial purposes" is interpreted by some to state that it means that farmers can save seeds for re-planting. They tend to interpret "non-commercial" to mean the non-commercial use of planting material. But if a person who plants the seed of a variety with a breeder's right in one's own property saves some to be planted in the same place or in part of it, it qualifies to be within the meaning of "private". However, if the harvest of the re-planted crop is sold then it becomes commercial as the farmer derives a profit. If this was not so and was to be interpreted the other way there would not have been any necessity to provide for an Optional Exception in the nature of the farmer's privilege.

The period of protection for a variety is given in Section 16 of the draft. The period of protection for vines, forest trees and ornamental trees is 15 years and the period of protection for all other genera or species is 20 years. This is basically the same period of protection in Article 19 of UPOV 1991 as the duration of the breeder's right. There is an additional provision in Section 16(3) of the draft, which states that if the variety had been offered for sale in Sri Lanka for more than a year before the application had been filed, the period of protection is reduced. The reduction is calculated by counting the number of full years in which the plant was offered for sale before protection and deducting one year, and then reducing the scope of protection by this number. For example if a plant was sold for four years before the application, then the duration is reduced by three years.

This reduction of duration is in direct conflict with the Section on Novelty, which is Section 3 of the draft. According to this Section, a variety is considered new if it had not been sold in Sri Lanka for longer

than one year before the date on which protection is applied for, or outside Sri Lanka for a period longer than six years in the case of trees or vines, or longer than four years in the case of other plants before the effective filing date in Sri Lanka. Therefore, if it had been sold in Sri Lanka for more than one year, it fails the test of novelty and becomes ineligible for breeders' rights. This means that there is no possibility of applying the provision in Section 16(3) of the draft.

The draft deals with variety denominations in Section 22. A denomination is a name given to a variety that helps it to be identified as a distinct one. This is elaborated by the clauses under Section 22(3), which say that a variety denomination has to enable it to be identified, should not mislead a person of average intelligence (attentiveness) to cause confusion concerning the origin, deviation, characteristics, value or identity of the variety or the breeder, is identical or likely to be confused with another, refers solely to attributes which are also common to other varieties, consist of a botanical or common name of a genus or species, suggests that it is derived from, or related to another when it is not so, or includes the words such as "variety" "cultivator" "form" "hybrid" "cross" or a translation of any of these.

An interesting and unusual clause is found in Section 22(3)(e), which says that no person should use a variety designation, which is contrary to public policy or morality. This could be constructed to mean that a name that is deemed offensive or likely to hurt the sensitivities of a particular nationality, religion, social class, group or community can be refused acceptance as a variety denomination. This is a thoughtful measure that is needed to maintain and uphold certain moral criteria in determining the name of a variety.

Another departure from UPOV 1991 is that the variety denomination is granted protection even after the expiry of the breeders' rights. According to Section 24 of the draft, a person, who offers for sale or markets a registered variety, can use the denomination even after the expiration of the period of protection. In addition, thus, a person cannot invoke a trademark, trade name or other right against a variety denomination held by another. This prohibition, according to Section 24(3), extends to the period even after the expiration of the breeders' rights.

While going through the draft, it is seen that no provision has been made to affect any rights to crop wild relatives, traditional crop varieties, or newly developed crop varieties already in the public domain. There are no provisions to get just compensation in cases where one or more of these are used to make a variety, which would be covered by a breeder's right. Such an instance would cause an anomaly since the very farmers, who nurture and kept such variety alive, would have to pay the required

fee and would be subjected to the same restriction. Therefore, anyone, who uses such varieties, should be made to pay part of the profits as a royalty.

The draft has not provided any rights to the farmer. The farmers are relegated to the role of an "optional exception". There should be provisions to provide rights to farmers and research rights to use varieties when they are to be used to breed varieties for public interest and by government institutes. Similarly, the period of protection, especially in the case of food crops such as cereals, legumes and vegetables, has to be reduced. Another important provision would be the rights on the part of the government to grant compulsory licences for seed production for planting. This is needed to avoid possible unfair trade practices by private companies.

It is seen that the proposed draft does not meet or fulfill the needs of Sri Lanka. It would rather act against the interests of the farmers if passed in the same draft form. Thus, it needs to be drastically altered or has to be even set aside and a new law drawn in its place. This is possible under Article 27.3 (b) of TRIPS, which does not define what an "effective *sui generis* law" should have or should not have. Sri Lanka should strive to have a really unique law that will meet the requirements of not only the farmers, but of other stakeholders in the society also.

Endnotes

- ¹ Paper on some suggestions with regard to national policy/position on Article 27(3)(b) of the TRIPS Agreement [unpublished policy document. (Ref. 04/02/02/148)]
- ² TRIPS Preamble
- ³ TRIPS Article 3
- ⁴ TRIPS Article 4
- ⁵ Source: personal communication from the Department of Agriculture
- ⁶ Sustainable farming systems through traditional plant genetic resources and indigenous knowledge based practice (2002) Helvitas, Sri Lanka.
- ⁷ International Convention For the Protection of New Varieties of Plants, of December 2, 1961, as revised in Geneva on November 10, 1972, October 23, 1978 and March 19, 1991.
- ⁸ Article 1 - Definitions, variety is defined under headings (vi)
- ⁹ Yuan, Long-Ping and Fu Xi- Zin (1995). Technology of Hybrid Rice Production Food and Agriculture Organisation of the United Nations, Rome.

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- ¹⁰ A programme to develop hybrid rice in Sri Lanka is underway. The progress of it can be found in Abeysekera S.W. and Abey Siriwardene, D.S. de S. (2000) Recent Development in hybrid rice research in Sri Lanka. Paper presented at the Annual Symposium of the Department of Agriculture, September 2000
- ¹¹ Plant Variety Protection Act of U.S.A. (1994) Section 113
- ¹² Plant Breeders Rights Act of Australia (1994) Section 17
- ¹³ EU resolution No. 2100/94 on Community Plant Variety Rights (O.J. (L227) 6)

The Implementation of Farmers' Rights through the Creation of *Sui Generis* Rights to Traditional Knowledge¹

Susette Biber-Klemm

Introduction

While analysing options to implement farmers' rights through the concept of traditional knowledge (TK), it is understood that the major concern is in the context of the review of Article 27.3 of the Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS), which requires protection of plant varieties under patents, or an effective *sui generis* regime or a combination of both. The question of the inter-relationship between this provision of the TRIPS Agreement and the protection of TK is of high actuality. The Doha Ministerial of the World Trade Organisation (WTO) mandated the TRIPS Council in the Doha Declaration to "examine, *inter alia*, the relationship between the TRIPS Agreement and the Convention on Biological Diversity (CBD), the protection of TK and folklore ..."².

For this review, developing countries propose, *inter alia*, to widen the scope of Article 27.3(b) and to allow for protection of community rights, indigenous knowledge and farmers' rights. The proposition is to integrate a specific protection regime for TK that regulates access to, prohibition of and rewards for the use of TK³. Some parties (mainly from the developing world) argue that only a proprietary protection of TK will ensure that market forces will operate to generate fairness.⁴

The goal of this paper is to explore the feasibility of protecting the informational value of farmers' plant genetic resources for food and agriculture (farmers' varieties of PGRFA, traditional PGRFA) and TK by a regime of *sui generis* intellectual property rights (IPRs). It examines the policy options and strategies to put such a system into place not only at the international, but also at the national level, keeping in mind the goal to secure the rights of mountain farmers and to improve their livelihoods.

To this end, it is necessary to describe in a first step origin, concept and scope of farmers' rights and to explore the specifics of TK in connection with the former. In a second step, an overview over the options to protect TK in connection with farmers' rights will be given, in order to then focus on the options to create *sui generis* rights to protect farmers' TK.

The focus will be put on farmers' rights as laid down in the

International Treaty on Plant Genetic Resources for Food and Agriculture (Seed Treaty, ITPGRFA)⁵ and on the protection of TK according to the CBD⁶. Therefore, the following discussions divided into two parts concentrate on options, policies, and rights related to (domesticated and non-domesticated) plant genetic resources and related TK, with the exclusion of arts, crafts and folklore⁷.

Part I: Factual Background, Problem and Rationale for Protection

Background

The creation of farmers' rights is to be viewed in the context of the development of science and technology within the last decades.

In the industrialised world, biotechnological inventions and the increasing privatisation of research and development have led to an increase in the protection of information by IPRs. In the field of the industrial breeding of PGRFA, the so-called PBRs, were created to protect the results of commercial breeding processes.

In contrast, there is no protection for the traditional varieties as bred by small scale farmers and the associated knowledge and technology. This type of information does not correspond to the protective criteria asked for by the "formal" IPRs. Thus, from the point of view of the industrial IPRs system, it remains in the so-called public domain, is freely accessible and can be used as a basis for (further industrial) innovative or breeding processes. Frequently, these (traditional) informational values were acquired without the consent of their creators and without compensation? a fact labelled as "bio-piracy" by concerned people.

It is true that TK has been protected, and the exchange of seeds regulated by customary laws within the cultural framework and structures of the communities. Such systems may be sufficient for the exchange between the communities, and for local markets. However, they are not apt to regulate conditions of exchange and trade in wider areas, and in the broader context of growing (intercontinental) interdependence, and the globalisation of markets.

In sum, the protection of the informational values resulting from the on farm breeding processes is a question of creating an equitable situation, not only in view of financial gains, but also in the sense of the acknowledgement of the so-called "informal" system of innovation.

What are farmers' rights?

Origin and development

The development of the present regulation of farmers' rights is closely linked to the process leading to the conclusion of the CBD and beyond.

Farmers' rights were first enshrined in the International Undertaking on Plant Genetic Resources (IU)⁸. The goal was to counterbalance the existence of PBRs and other IPRs in the field of genetic engineering with some form of incentive and compensation for farmers. Yet, the farmers' rights did not define any type of individual or collective property rights of farmers over their varieties and/or their TK, but stipulated only a general form of compensation, which, however, never became operational.

The conclusion of the CBD, which confirmed the sovereignty of States over their biogenetic resources (in contrast to the principle of common heritage of humankind) led to the revision of the IU. The mandate for the revision by the United Nations Food and Agriculture Organisation (FAO) Conference included the goals of harmonising the IU with the CBD and explicitly to "consider" the issues of access to plant genetic resources and the realisation of farmers' rights⁹. The revision resulted in the conclusion of the Seed Treaty.

In the debates on the implementation of the farmers' rights, two basically different concepts were discussed: the "political" approach, which understands the notion of farmers' rights merely as a political issue; and the "legal" concept, which encompasses proposals to define the farmers' rights as an alternative form of IPR, adapted to the specific requirements of conservation and maintenance of PGRFA and related TK.

Present regulation

The regulation of farmers' rights agreed upon in the Seed Treaty does not itself create rights to the farmers' varieties and related TK. Hence, it rather corresponds to the first, *i.e.* the political, option.

As mentioned, the regulation is based on the sovereignty of States over their natural resources (Art. 10. 1). The responsibility for realising farmers' rights ? which in the IU was vested in the global community ? is now provided to the nation states. Member states of the Seed Treaty are ? in principle ? obliged to protect and promote farmers' rights "in accordance with their needs and priorities, as appropriate and subject to its national legislation". This means that within this obligation they are free to adapt the regulation to their specific needs, policies and strategies according to the specific situation and objectives.¹⁰

Yet, the ITPGRFA makes explicit the minimum level of protection of farmers' interests, which include:

- The protection of TK, which is relevant to PGRFA;
- The equitable sharing of benefits, which arises from the utilisation of PGRFA;
- Participation in decision-making with regard to the management of agro-biological resources; and
- Confirmation of the rights of farmers to save, use, exchange and sell farm-saved seed, within the limits of the national legislation (Art. 9).

This list of possible elements for the realisation of farmers' rights is not exhaustive: it indicates only some of the measures - considered as essential - that States can take for the protection and promotion of farmers' rights, and does not exclude other measures. In the context of our discussion, it must be pointed out that the protection of TK is only one element among others.

Traditional knowledge

Provisions aiming at the protection of TK have first been included in the CBD (Art. 8 j). The implementation of this provision has been amply discussed in the follow-up process of the Convention, in particular within its Working Groups on TK and on Access and Benefit Sharing.

Before setting out to evaluate the options to protect farmers' rights by creating rights to TK, the meaning of the term in the context with farming practices is to be explored.

What is traditional knowledge?

In the relevant literature, different terms are used for what in the CBD is characterised as "traditional knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles (relevant for the conservation and sustainable use of biological diversity)" (Art. 8(j))¹¹.

This fact indicates that there exists no simple, universally agreed upon definition. However, according to WIPO (2002, 5-6), a precise definition of TK is not necessarily a crucial requisite for identifying the legal elements of a mechanism for its protection. More important is the identification of certain characteristics that it must meet as a *condition* for protection.

The following descriptions give some examples as to such characteristics: TK frequently is not perceived as the creation of individuals, but is understood as the achievement of a specific community, having evolved – and further evolving – in cumulative steps over generations. It is managed and exchanged according to the customs

or customary laws of the community. There exists a close interaction between TK of any kind and the surrounding ecosystem. TK plays a key role in the preservation and sustainable use of the diversity of wild and domesticated plant varieties and animal species. In turn, it depends on the surrounding environment it has been created in. It is a cross-cutting issue which is embedded in the culture of a people. Thus, its existence is dependent on, and determined by, the maintenance of this culture and the continued existence of the ways and means of its tradition to the next generations.

An indication as to the value and significance of TK in the context of farming practices can be found in the “Farmers’ Rights Charter”, a document drafted by Indian Farmers’ Unions¹². The document has emphasised the intellectual contribution of farmers to the diversity of crop varieties and animal breeds. It is stated that “...Farmers are the original breeders *and through their breeding science and technology*, they have produced the rich diversity of crop varieties and animal breeds as a gift to the world” (emphasis added). The Charter concludes that therefore, farmers ought to have the right to “participate fully in any benefits derived from the improved use of these genetic resources”.

In view of the implementation of the concept of farmers’ rights by a TK approach, it is important to clearly indicate that the ITPGRFA limits the protection of TK to knowledge which is relevant to PGRFA (Art. 9.2 (a)). It defines PGRFA as “any genetic material of plant origin of actual or potential value for food and agriculture” (Art. 2 para 4).¹³

Such PGRFA-related TK may vary in characteristics, which are relevant for its protection. So, first, an important difference is to be made between TK, which is *associated* to a specific resource and knowledge *integrated* in the genetic information of traditional PGRFA. While the examples of the former include information on the specific characteristics or qualities of a crop variety, or the knowledge about specific farming methods or technologies, the example of latter is the breeding skills of (generations of) farmers and breeders, who maintain and improve their varieties in the traditional way. This type of information corresponds to the subject matter protected by the PBRs. In the following sections, both types of information, that is the farmers’ associated TK, and the farmers’ varieties are taken account of.

A second important difference consists in the allocation of the information integrated in the PGRFA to its breeders. Whether this allocation is possible depends, on one hand on the seed supply system it has been produced in, and, on the other, on the identifiability of a specific variety. Within the farmer-oriented seed supply systems (which frequently are characterised as “informal”¹⁴), different types can be distinguished.¹⁵ The first is the traditional system, which is based on the

use and continuous improvement of farmers' varieties. This system is characterised by farmers engaged in selecting and saving seeds, in bartering with neighbouring farmers or farmers in different villages. The second is a system in which some farmers specialise in the production of improved seeds for the local (regional) market¹⁶, or even, for their utilisation in intensified farming systems¹⁷.

The two systems differ with regard to the characteristics relevant for the creation of *sui generis* rights. While in the second case it is possible to clearly identify both breeders and bred varieties¹⁸, the crucial question is whether this is also possible in the first case.

The allocation might be easy in cases, where a landrace has been bred in specific communities for as long as anyone can remember. However, allocation to a specific person or group of people might also be impossible, either because for instance, a variety of a landrace is widespread and/or not clearly distinguishable, or specific information is held by various communities or is even generally known.¹⁹

Legal instruments for the protection of farmers' TK must find solutions corresponding in an optimal way to these different situations.

Present regulation in the CBD

In analogy to the realisation of farmers' rights, the CBD refers the regulation of the protection of TK to the national level and gives only some guidelines: States are to - as far as possible and appropriate - respect, preserve and maintain TK, to promote its wider application with the approval and involvement of its holders and encourage the equitable sharing of the benefits arising from its use (Art. 8(j)).

In the follow-up process of the CBD, in particular in the context of the concretisation of the regulation of access and benefit sharing (ABS), this regulation has been further developed and operationalised. The Guidelines on Access to Genetic Resources and Fair and Equitable Sharing of the Benefits Arising out of their Utilisation²⁰ provides a more detailed framework and guidance for the development of ABS regimes and to inform the practices and approaches of the stakeholders involved. One of their goals is explicitly to "contribute to the development... of mechanisms and access and benefit sharing regimes that recognise the protection of TK ... in accordance with domestic laws and relevant international instruments."

The Seed Treaty points out the close interrelationships between the two instruments (Art. 1). Accordingly, the described CBD framework could well serve as basis for the implementation of some components of farmers' rights, in particular in view of the operationalisation of the

concept of access to farmers' TK, and the sharing of the benefits resulting from its use on the level of farming communities.

The question is, how these regulations and guidelines can be adapted to the specifics of TK in the agricultural sector. It is submitted that while developing clear objectives and lines of arguments, it is helpful to take into account the background rationales for the protection of TK in the context of agriculture. This will help elucidate the objectives of protection, and to clarify what the societal goals are and how they can be realised. Once these aims are defined, the legal instruments in the form of property or other rights might be accordingly designed as instruments to attain the proposed goals (see also Correa, 2000a, 252)

Rationale, objectives, and arguments for the protection of TK

TK is recognised to be of great value for the conservation and sustainable use of biological diversity. In the field of agriculture, the close inter-dependence between the maintenance of agro-ecosystems, the diversity and further evolution of PGRFA, and human intervention is pointed out in the Global Plan of Action²¹. The ITPGRFA, in its recital, and in Article 9.1 on farmers' rights, explicitly recognises this "enormous contribution that the local and indigenous communities and farmers ... have made and will continue to make for the conservation and development of plant genetic resources" and affirms that these contributions are the basis for the farmers' rights (Preamble para 7).

In order to maintain these values, a first essential element is the maintenance and further development of the traditional breeding systems and technologies. However, these systems are essentially depending on the free flow of germplasm. Conservation and continuous adaptation of farmers' varieties depend on the possibility to save and exchange seeds. The designing of rights to protect PGRFA and associated TK must take this fact into account. In this context, on one hand, farmers' rights, in securing the right to save, use, exchange and sell farm-saved seeds, may serve as a counterbalance to IPRs such as PBRs and patents, avoiding the creation of barriers against the farmers' use and improvement of plant genetic resources (PGRs) (Correa 2000b, 13). On the other hand, the definition of the rights of the farmers to their knowledge and their varieties might provide a clear legal basis for the exchange of the relevant information.

A second important point is that traditional farmers, in conserving, using and developing PGRFA, create economic value, from which other agents in the "plant genetic resources system" (Correa, 2000, 240) - breeders and seed companies - benefit. The problem is that the value created by the farmers has no direct expression through market mechanisms. Traditional PGRFA, even if they are valuable as the basis for

breeding processes, at present have no - or hardly any - commercial value.

This is the basis for the argument that the dichotomy between the protection of the results of the industrial breeding process and of the more traditional breeding is to be balanced. The value of the results of the traditional breeding systems, including the investment in time, labour and inventive and creative energy, as well as the maintenance and development of know-how and specific breeding technology, is to be acknowledged, and the resulting benefits are to be shared in a fair and equitable manner.

The CBD and the Seed Treaty build up on this line of argument in establishing a mechanism for access to PGRs and sharing the benefits resulting from their use. Farmers' rights could be designed to create a basis for (economic) compensation. They might thus serve as an instrument to support the maintenance of traditional varieties on the level of the farming communities.

It is, third, essential to take account of the fact that the traditional PGRFA have not only private values. Traditional farmers, in maintaining the diversity of PGRFA, also create values accruing to the local, national and global population, so-called public goods.

Yet, the market value produced by the gene flow from farmers' varieties to privately marketed cultivars is very modest. According to one study, materials from *ex situ* genebanks contributed three percent of the germplasm used by industrial breeders, and materials from *in situ* conservation areas a further one percent (Swanson and Luxmoore, cited from Correa 2000,10). Thus, "though it is expected that the demand for primitive materials may increase in the future ... it would be unrealistic to think that substantial value may be derived from current gene flow of farmers' varieties held in *in situ* conditions ..." (Correa 2000b, p. 10).

From this, two conclusions must be drawn: first, any economic measure directly linked to these flows would grossly underestimate the entire value of farmers' varieties and therefore would not be appropriate to internalise also their public value. And second, consequently, besides the direct market-based compensation for the utilisation of the germplasm of farmers' varieties, additional (economic) means and instruments must be found to make the maintenance of traditional PGRFA, associated know-how and technologies worth-while for the farmers.

From this follows that there are not only the interests of individual breeders or farming communities involved in the implementation of farmers' rights, but also the interests at the local, regional and even global levels. Accordingly, the following (and other) objectives and policy

needs (or a combination thereof) might influence the choice of means to implement farmers' rights:

With regard to the individual breeders and/or the farming communities:

- The autonomy to decide if and how information is going to be used and the right to say “no” to third parties and, in specific cases, absolute protection and secrecy (e.g. with sacred knowledge). The argument would be that it is the farmers that have bred the varieties and developed and maintained the related knowledge, who ought to decide who is going to make use of them and in what context.
- The empowerment and capacity building of holders of TK. The performances of the so-called “informal” system of invention and technology need to be acknowledged and further developed by both the farmers and farming communities, and the representatives of the industrial processes of research and development.
- Economic compensation for the use of TK or farmers varieties in industrial processes by instruments regulating ABS and funding. Such measures would be based on the argument of economic fairness. It is not fair if someone benefit from creative achievements based on creative inputs and labour from others.
- Procedural rights such as means and institutions to prove prior art (e.g. in registers).

*With regard to local and/or global society*²²

- The maintenance and development of the genetic diversity of traditional PGRFA and associated TK as well as technologies, and the preservation of culture. This objective is closely linked to the goal to provide food security at the local (decentralised) level and also for the - present and future - world population.
- To this end, another objective may be to avoid conversion from traditional to commercial varieties and/or conversion from traditionally used land to more lucrative, but less diversified land uses. In this case, a system that compensates farmers for lost income may be required. This calls for the creation of a clear legal basis and legal security for ABS. The creation of property rights, in this context, may be a means to provide this clear basis and to internalise some of the generated value. However, as has been explained above, the benefits generated by the market system may not be sufficient and public funding needed to this

end.

- Another related objective might be to create incentives to invest and innovate into the development of (specific) landraces/farmers' varieties. This too would mean the investment in a public good, the value of which does not in its totality accrue to the individual farmer and thus calls for support by public funding.

In sum, from this first part, the following conclusions can be drawn:

- In taking account of the various types of knowledge, it can be concluded that - in order to protect farmers' rights through the protection of TK - a multi-faceted approach is necessary. A strategy encompassing different legal instruments, institutional devices and flanking measures ought to be chosen²³.
- Within this strategy, the creation of *sui generis* IPRs, is *one* option, among others. It must be further explored, in what specific cases traditional IPRs might be advantageous and optimally serve the defined goals.

Part II: Options for the Legal Protection of TK in the Context of Farmers' Rights, in particular the Option of *Sui Generis* IPR

Introduction

A variety of instruments for the realisation and implementation of farmers' rights on the national (and international) level are proposed, e.g.:

- The conclusion of contracts in the framework of an ABS system;
- The creation of funding systems;
- The creation of *sui generis* (intellectual property) rights;
- The application of "industrial" IPRs (for instance geographical indications, trade marks);
- Registration of the information, in order to attain various goals such as: documentation of TK and of its holders, proof of prior art in the context with patenting procedures, marketing of the information, or as an instrument to create *sui generis* rights; and

- Flanking measures in the framework of the world trade order (labelling, tax preferences, measures within the Agreement on Agriculture *et al.*).

All these instruments have their pros and cons and are discussed extensively, sometimes even creating controversies.

Access and benefit sharing within ITPGRFA: A brief overview

In the context of the realisation of farmers' rights by mechanisms of *sui generis* IPRs, it is important to take account of and make some further reflections on the interface of possible *sui generis* IPRs to farmers' varieties and associated knowledge, with the TK system of ABS, in particular with the Multilateral System of Access and Benefit Sharing.

Hence, in the following sections, the relevant elements of this system will be described and the interface explored. The questions are - If and how the individual farmers or farming communities, and the *in situ* conservation of PGRFA come into the system, and what would be the repercussions of the option of a *sui generis* IPR to farmers' varieties and associated knowledge.

The ITPGRFA's basic provision reigning the access to PGRFA takes up the CBD concept - the authority to determine access to plant genetic resources entirely rests with national governments and is subject to national legislation (Art. 10.2). In analogy to the CBD, the national sovereignty is limited by the obligation to facilitate access for contracting parties.

On this basis, and in recognising that PGRFA are a common concern of humankind, the Seed Treaty establishes a specific system of facilitated access to the varieties specified in the annex to the Treaty, *i.e.* Multilateral System of Access and Benefit Sharing (Art. 10).

Thus, within the Seed Treaty, there exist two different regimes for the access to PGRFA and the sharing of the benefits resulting from their use: the Multilateral System for facilitated access for the listed PGRFA; and an ABS system covering the remaining species. The specifics of this system are to be defined by the Contracting Parties. In addition to this, the CBD system of ABS will also apply.

The Multilateral System in some ways takes up the former concept of PGRs being the common heritage of humankind. At its outset is the insight that, in view of the genetic information for the further breeding and evolution of PGRFA, a high degree of inter-dependence exists at the regional and global levels. Accordingly, the goal of the Multilateral System is to support the free flow of germplasm, which is important for the maintenance of the evolutionary breeding process. The system is based on

the idea of solidarity and mutual benefit. Varieties negotiated to be included in the system are selected according to the criteria of food security and inter-dependence. The goal is to provide an instrument which is efficient, effective and allows transparency and the fair sharing of benefits. Access is to be provided for research, breeding and training for food and agriculture. Together with the accession, all available passport data and other associated descriptive information are to be made available "subject to applicable law". This information may well encompass TK elements. It is important to note that access to such information is to be granted without the need to track individual accessions to its (*in situ* or *ex situ*) origins. Accordingly, there is no prior informed consent (PIC) to be given by the original holders of the knowledge or traditional variety for the handing on of the information stored in an *ex situ* facility.

The Multilateral System includes PGRs which are under the management and control of the Contracting Parties and in the public domain. It is meant to primarily cover *ex situ* collections. Access to PGRFA in *in situ* conditions is to be provided according to national legislation, or, subsidiary, according to standards set by the Governing Body of the Treaty (Art. 12.3(h)).²⁴

As the Treaty is not yet in force, the details are still in flux. They still have to be worked out. Also the provisions on access to *in situ* resources and associated knowledge need further clarification.

Two different situations are to be taken account of: First, access to *in situ* resources, which are integrated in the Multilateral System, and second access to the remaining varieties. It is important to decide whether an ABS procedure is to be applicable for both types of resources. In the case of the varieties integrated in the Multilateral System, the PIC of the breeders would be needed at the time of collecting the accessions *in situ*. It would have to encompass the consent to the further distribution of the accession and related TK.²⁵

It is put forward, that in this case, and in the case of the varieties outside the system, *sui generis* rights to PGRFA and associated TK, in creating a clear legal basis, would facilitate the ABS, and help to prevent the resources being hold back for fear of bio-piracy (Cottier and Panizzon, nd.).

Farmers' rights as *Sui Generis* IPRs?

What are *sui generis* IPRs?

IPRs are a set of rules that regulate the acquisition, use and loss of rights and interests in intangible assets, which might be used in commerce. The rationale of IPRs is to promote technical progress, the transfer and

dissemination of technology, and to serve the rights and interests of creators, as well as fairness in commerce. The main momentum of an IPR is that it covers intangibles and provides its holders the right to exclude others from reproducing works as well as to exclude others from using the protected subject matter (WIPO 2002, 8-9).

A *sui generis* intellectual property system is characterised by the fact that some of its features are modified so as to properly accommodate the special characteristics of its subject matter, and the specific policy needs, which lead to the establishment of a distinct system. This means that if a *sui generis* system is created for the protection of traditional PGRFA and TK, this system has not to be entirely invented from scratch but can be developed on the basis of the existing structures.²⁶

If developed in appropriate ways, IPRs might serve different ends in the context of TK: they may empower the holders of TK to say “no” to the unauthorised or distorting use of their traditional knowledge; they may generate a clear, transparent and effective system that increases legal security and predictability, to the benefit of all involved stakeholders, i.e., not only the TK holders but also firms and research institutions engaged in bio-prospecting; and the creation of rights to the intangibles of traditional societies transforms them into marketable goods, thus generating the opportunity to benefit from their economic value (see WIPO 2002, 9).

Elements of a *sui generis* system to protect TK in the framework of farmers' rights

In order to identify the general features of an adequate *sui generis* system and the elements that the system must contain in order to be effective, WIPO puts forward several essential questions (2002, 16).

What is the policy objective of the protection?

For instance, are the rights essentially defensive, i.e., are they meant to primarily prove prior art or are they meant to promote commercialisation of TK?

What is the subject matter?

For instance, are the rights to be confined to traditionally bred farmers' varieties and associated knowledge or are they to comprise TK regarding PGRs in general (including, for instance, pharmaceutical knowledge)?

What criteria should this subject matter meet to be protected?

What would be the protective criteria? One basic element would, for example, have to be the identifiability of the variety, as it must be possible to distinguish the varieties to be protected from other similar varieties.

Other possible criteria might be the susceptibility of commercial exploitation, the link to traditional and/or semi-formal breeding systems, or that the information in order to be protected must be documented or stored in collections.

A further question is, whether subject matter which has already entered the public domain can be protected? How is the public domain defined?

Who owns the rights?

A basic decision to be taken is whether the rights are to be vested in individuals or in communities or in both. Frequently, it is put forward that rights to TK and traditional PGRFA ought to be vested in communities. In this case, it might be necessary to establish a system of geographical and administrative definition of communities. Further, a solution must be found concerning- how the rights and benefits are attributed within the communities? And what happens if two more communities are holders of the identical information?

What are the rights?

The scope of the right can be defined according to the specific needs and objectives. It may be restricted to financial compensation, or include the right to autonomously decide about the use made of the information, and comprise the right to assign, transfer and license the information, for instance, in the framework of an ABS procedure.

How are the rights acquired? And how are they administered and enforced?

A system of protection of rights to traditional PGRFA and TK would require the establishment of administrative structures for examination and registration of protected materials. An agency should be designed who supports and audits the farming people in filing for protection and at the same time follows the implementation of contracts and rights at the international level. This could result in potentially high transaction costs for governments and users of the system and it must be decided, who bears these costs (users, society, funding system?)

Besides the above discussed objective of protection, additional criteria to guide the design of a concept would be e.g. the cost-benefit ratio; the practicability of the system; and the level where benefits are to accrue (state or communities or individual farmers).

Some problems of the creation of legal instruments on the level of farmers and farmers' communities

The creation of *sui generis* rights to protect traditional PGRFA and associated TK has become contentious. There is a general argument, frequently brought forward by indigenous peoples, that TK is holistic in

nature. Accordingly, it has to be applied in the entirety of its socio-cultural and spiritual context. Rights which aim at the commercialisation of one element out of this entity, such as IPRs, are not considered to be appropriate.

Besides this general line of argument, some others indicate open questions and practical problems, which must be taken into account if the creation of *sui generis* rights to farmers' varieties and associated TK is envisaged. Some are discussed below.

The prevention of the free-flow of germplasm

One of the main arguments against the creation of *sui generis* rights for the protection of farmers' varieties and associated TK is that it prevents the free-flow of germplasm.

The open access to the resources and the exchange of crop varieties and related information is a key issue in plant breeding. At the local level, in traditional societies and in subsistence farming systems, sharing and exchange of varieties are traditional practices and of high importance for the management and evolution of local varieties, and food security. This exchange takes place in a reciprocal relationship. At the international level, due to the movement and exchange of crops throughout history, crop species have spread from their primary centres of origin, and secondary centres of diversity have developed. Thus, with regard to crop diversity, a high inter-dependence between countries and continents exists. In the long term, breeding programmes would be at risk, if access to the full range of genetic diversity were to be restricted.

It is feared that the creation of *sui generis* rights to farmers' varieties could block this open exchange. However, it is also maintained, that legal solutions can be found to this problem: in e.g., limiting the right to commercially viable information.

The allocation of PGRFA to specific holders

If legal instruments - such as *sui generis* IPRs - are to be created on the level of individual farmers or (political) communities, it must be possible to define who is the holder of the right, i.e., to allocate the information - either the farmers' varieties or associated knowledge - to a specified social entity or person.

Such allocation might prove to be difficult in the case of traditionally bred farmers' varieties or of associated knowledge known by a great part of the population.

A variety of PGRFA can only be allocated to specific holders if it can be distinguished from other varieties²⁷. In the case of farmers' traditional varieties, this might be difficult for the following reasons: First,

traditionally, seeds are exchanged between farmers and farming communities. Accordingly, identical or very similar varieties might be found in various regions. Secondly, farmers' varieties are by definition not uniform, but (genetically and morphologically) diverse. Therefore, it might be difficult to distinguish one landrace clearly from another on the basis of morphological criteria. Thirdly, farmers' varieties, in adapting to the environmental circumstances, are continuously changing. This lacking stability makes it difficult to define and design a specific variety for a specified time frame.

However, it is not excluded that in some instances, not only in the case of the "formalised" breeding of traditional varieties by farmers, but also in the case of the traditional ways, the allocation of a specific landrace to a specific social entity is possible.

The territoriality of the *sui generis* rights

IPRs have the advantage that, in comparison with contractual obligations resulting from an ABS procedure which are valuable only between the parties of the contract, they can be enforced against any third person.

However, IPRs are territorial in nature, implying that they can only be enforced within the territory they have been established for, but not at the regional or international levels. Given the international - regional and/or global - dimension of the interests involved, this clearly asks for the establishment of a regulatory system at the international level. The option would be to negotiate the inclusion of a *sui generis* option for the protection of TK and traditionally bred PGRFA in the TRIPS Agreement.

Cost benefit analysis

There are different instruments/concepts to create funding for the support of *in situ* conservation of PGRFA:

- Funding mechanisms as proposed by the Seed Treaty, which would be used to implement specific plans and programmes (Seed Treaty Art. 18.4)
- The benefits accruing to the State out of access and benefit sharing (and other sources); these benefits can be used to implement specific programmes but possibly also to finance direct payments to farmers fulfilling specific requirements.
- The creation of rights, which allow assigning the benefits directly to the farmers/farming communities.

The economic benefit resulting from direct commercialisation of traditional PGRFA and associated TK alone is bound to be not very high. In any case, it won't be sufficient to cover the public good values generated

by the traditional breeding systems. It also must be assured that the costs of the system do not exceed the benefits.

Therefore, it seems advisable - if the option to create *sui generis* rights to TK - is chosen to:

- create a system, which encompasses not only landrace/farmers' variety and associated TK, which can be allocated to specific holders, but also other TK related to plant genetic resources in general;
- vest the rights for traditional PGRFA, which cannot be clearly allocated to specific owners to the state;
- integrate into the Multilateral System on ABS as created by the ITPGRFA; and
- To create a funding system, sponsored by e.g. the results from ABS and from funding of the Multilateral System, administered by representatives of the stakeholders involved.

Conclusion

Sui generis IPRs to protect traditional PGRFA and associated traditional knowledge could be a viable instrument in the cases where the relevant information can be clearly allocated to its creators/holders. Yet, viewed only from an economic standpoint, the rights might prove not to be as effective as wished for. In particular, they are not apt to capture all the public good values of PGRFA and associated TK.

However, viewed from a broader perspective, such rights serve other purposes, which are also to be taken into account: They recongnise the role of people , who are at origin of the information and allow for the acknowledgement for their creative, inventive work, skills and labour in maintaining the resources. They could form the basis for autonomous decisions about the use of the resources, thus contributing to capacity building and a participative approach. Properly designed *sui generis* rights could form a clear legal basis for the ABS regimes and thus contribute to legal security and transparency.

It is therefore proposed to:

- further explore the option of *sui generis* IPRs to protect traditional PGRFA and traditional knowledge as one of various elements for the implementation of farmers' rights, within a clearly defined strategy and taking account of the main objectives of protection;
- explore this option in the broader context of knowledge on PGRs

in general, keeping in mind that within the concept, differentiation as to scope, duration etc. of the rights can be made according to the different types of knowledge;

- check out the cost benefit ration and who is bearing the costs; and
- maintain/open up the possibility to integrate the option to protect TK by *sui generis* rights at the regional and international levels, including a system of implementation, control, opposition procedures and judicial review, without, however, losing sight of the possible trade-offs.

Endnotes

- ¹ The paper incorporates some of the results of research projects on "Legal instruments for the protection of traditional knowledge in the framework of the world trade order" which was/is mandated by the Swiss Science Foundation and the Swiss Agency for Cooperation and Development. Results presented in the paper are drawn from contributions of Philippe Cullet, Michael Halewood and team (IPGRI), Thomas Cottier, S. Biber-Klemm. For more background information, see the forthcoming publication of the result of the research (mid 2004). The paper is meant as a basis for discussion. Comments and requests for further information are welcome. Susette.Biber-Klemm@unibas.ch
- ² WTO Doc. WT/MIN(01)/DEC/1.
- ³ See WTO Doc. IP/C/W/370: The protection of Traditional Knowledge and Folklore; Summary of Issues Raised and Points Made; Nos 24-28.
- ⁴ Review of Article 27.3(b), Communication of Brazil, WTO Doc IP/C/W/228. This option is discussed controversially. Mainly in the context of questions on the protection of cultural and spiritual knowledge, the utilisation of intellectual property types of instruments is deemed to be too market-oriented. In this context it is to be taken account of the fact that, if the option of *sui-generis* protection of traditional knowledge is to be introduced into Art. 27.3 of TRIPS, it can be expected that the industrialised countries propose a trade-off with the binding obligation to allow the patentability of living matters.
- ⁵ International Treaty on Plant Genetic Resources for Food and Agriculture, Rome, 3. Nov. 2001.
- ⁶ Convention on Biological Diversity, Rio de Janeiro, 5. June 1992.
- ⁷ Being aware that farmers' varieties of PGRFA and related traditional knowledge are embedded in, and dependent on the culture of a people.
- ⁸ International Undertaking on Plant Genetic Resources, Rome, 23. Nov. 1983.

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- ⁹ FAO Conference Resolution 7/93.
- ¹⁰ It is submitted that the means selected must be appropriate to serve the intended ends. Therefore, the objectives of the strategy must be clearly elaborated beforehand. It is necessary to clarify what are the intended objectives of the protection and to clarify what goals society intends to reach through the protection and how these goals can be realised. Once this stage is clear, the property rights or other rights might be designed accordingly (see Correa, 2000 p, 251/2).
- ¹¹ Compare the analysis in WIPO/GRTKF/IC/3/9 p. 6, and the non-exhaustive enumeration of 20 different terms in Annex I of the same document!
- ¹² Draft Charter by Indian Farmers Unions, circulated by Third World Network, February 1996, cit. from Posey (1996).
- ¹³ As the wording of this article closely follows the definition found, in Article 2 (7) of the CBD, it may be helpful to additionally consider the definition found in the International Undertaking, which defined PGRFA in a more differentiated way as being: “the reproductive or vegetative propagating material of the following categories of plants: cultivated varieties (cultivars) in current use and newly developed varieties; obsolete cultivars; primitive cultivars (landraces); wild and weed(y) species, near relatives of cultivated varieties; special genetic stocks (including elite and current breeders’ line and mutants)” (Article IU)
- ¹⁴ Proposition: decentralized seed supply systems, farmers seed supply systems in contrast to the industrialised, centralised production of seeds.
- ¹⁵ See also Correa, 2000, p. 13.
- ¹⁶ Personal information: Sanjaya Gyawali, Li-Bird, Pokhara, Nepal.
- ¹⁷ Personal information: Renato Salazar, PEDIGREA, Philippines. See also the initiative by SATIVA (www.sativa.org) in Switzerland. These varieties frequently cannot be protected by PBRs as they do not correspond to the criteria of uniformity, stability and distinctness.
- ¹⁸ The variety at least for the time being, as it is bound to change over time (and space).
- ¹⁹ Another distinction can be drawn between knowledge, which is publicly, generally known (e.g. phyto-pharmaceutical remedies) and knowledge which is kept secret or otherwise restricted to specific social entities (as e.g. spiritual knowledge). However, in the context of farmers’ varieties this distinction might be less relevant.
- ²⁰ Accepted as Decision VI/24 by the VI meeting of the Conference of the Parties in Bonn,
- ²¹ Global Plan of Action for the Conservation and Sustainable Utilization of Plant Genetic Resources for Food and Agriculture. Adopted by the International Technical Conference on Plant Genetic Resources. Leipzig, Germany, 17-23 June 1996

-
- ²² In particular with regard to the generation of benefits for the global public good, two points must be made: 1) No farmer/farming community is meant to and going to maintain the diversity of PGRFA for the beauty of it - and 2) the costs for the maintenance of the global public good agro-biodiversity have not to be borne by the individual farmer or farmer community, neither by the individual state, but by the global community as a whole.
- ²³ The flanking measures including capacity-building, and regional cooperation in the upcoming negotiations of e.g. the Agreement on Agriculture, the TRIPS-Agreement
- ²⁴ As to benefit sharing, facilitated access to PGRFA included in the Multilateral System is in itself considered to be a major benefit. Further mechanisms for benefit sharing are the exchange of information; access to and transfer of technology; capacity building and the sharing of benefits arising from commercialisation (Art. 13.2). The benefits arising from the commercial use of PGRFA shared under the Multilateral System are to be paid to the Trust Account set up under the Treaty and meant to be in the first place used for the benefit of farmers who conserve and sustainably use PGRFA (Art. 13.3).
- ²⁵ According to the research by IPGRI, at present there is very little ethnobotanical information stored in the passport data.
- ²⁶ *Sui generis* rights are rights of "their own kind", adapted to a specific situation. In the context of PGR, there exist other concepts for the creation of *sui generis* rights, outside the IPR system *stricto sensu*, such as e.g. options for the protection of the products resulting from the use of traditional knowledge and technologies, making use of elements of copy-rights, trademarks and similar.
- ²⁷ IPGRI working paper, draft, on file with author

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* Complete Working will be available in printed form in Summer 2004. For Further Information, Contact The Author (Susette.Biber-Klemm@Unibas.Ch)

Annex 15.1

Legal Sources

International Treaty on Plant Genetic Resources for Food and Agriculture, Art. 9

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 centres 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 realising 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.

Convention on Biological Diversity

Article 8. In-situ Conservation

Each Contracting Party shall, as far as possible and as appropriate ...

- (j) Subject to its 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, innovations and practices and encourage the equitable sharing of the benefits arising from the utilization of such knowledge, innovations and practices.

Documentation of Biological Resources and Associated Traditional Knowledge in Nepal

K. C. Paudel

Introduction

Biological diversity plays a vital role in the preservation and maintenance of world's cultural, environmental, ecological and economic systems. In the Nepalese context, biodiversity is closely linked to livelihood of many people, agricultural production and sustainability, conservation and protection of unique flora, fauna and natural environment, human health and nutrition, traditional knowledge, skills and technologies, cultural integrity and social well-being.

The Kingdom of Nepal is one of the richest countries in terms of biodiversity. Nepal stands 31st in world's biodiversity ranking. The main attributes to this richness are sharp altitudinal variation (60 meters to 8,848 meters), different geographical positioning (transition zone between eastern and western Himalayas), climate (tropical to arctic) and their interaction forming diverse ecosystems leading to greater floral and faunal diversity. Nepal houses 118 different ecosystems, 75 vegetation types and 35 forest types (NBS, 2002). Of the total area, 29.6 percent is under forest cover with another 10 percent shrub lands and about 21 percent under agriculture (MPFS, 1989). Around 80 percent of the Nepalese people are employed in the agricultural sector. Agriculture is characterised by a complex and labour intensive system with various proportion of crops, livestock and forests. Complexity in farming system for centuries has enriched the Nepalese people with wealth of traditional knowledge about the resources they use and the ecosystems they survive in.

Less than 0.1 percent of the earth's land mass in Nepal supports about eight percent of all birds, four percent of all mammals, six percent of all bryophytes, three percent of all pteridophytes and 1.53 percent of all reptiles (NBS, 2002). Moreover, Nepal houses above 7,000 species of flowering plants, over 200 species of commercially important medicinal and aromatic plants, 5,000 species of insects, 185 species of fishes, 400 species of agro-horticultural crops (Regmi, 1990), over 60 species of wild edible fruit crops (Kaini, 1999) and over 300 species of orchids. Details of different biological resources are described elsewhere (NBS, 2002). All these gifted resources provide unlimited amount of goods and services to over 23.2 million people living within 147,181 sq. km of the country offering employment and income opportunities for rural population.

Proper management and wise use of such resources can bring substantial improvement in the livelihood of subsistence farming communities (Paudel, 2001).

Nepal's efforts towards biodiversity conservation and her international commitments

The Nepalese government has initiated conservation of biodiversity by developing a National Conservation Strategy in 1989. Conservation of biodiversity through expansion of protected area system has become a part of regular planning process since the Eighth Plan (1992-1997). The Ninth Plan (1997-2002) further highlighted the importance of biodiversity and provisions were made for - conservation, management and expansion of the habitat of rare plants and animals; conservation of wild genetic diversity; implementation of Ramsar Convention; ecosystem based conservation concept; expansion of conservation area and buffer zones; promotion of eco-tourism; and identification and conservation of major sites for agro-biodiversity, animal genetic diversity, wetlands and forest areas.

Similarly, Forestry Sector Master Plan (MPFS) was formulated in 1989, which put people at the centre of conservation and development process. By giving adequate priority to the Community Forestry Programme and developing subsequent programmes to cover the larger part of the renewable natural resources, it has empowered people for the conservation and sustainable utilisation of the resources. Likewise, the Agricultural Perspective Plan (APP, 1995-2015) has realised the significant role of agro-biodiversity and envisaged the linkages between the forestry and the agricultural sector. The Tenth Plan (2002-2007), providing for the continuity of the past programmes, emphasises on preparation and implementation of National Biodiversity Strategy that covers all aspects of biodiversity conservation, sustainable utilisation, and fair and equitable sharing of benefits arising from the conservation.

The United Nations Resolution in 1992 passed the Convention on Biological Diversity (CBD). Nepal signed the CBD during the Earth Summit on 12 June 1992 and became a party to it since 21 February 1994 after the then House of Representative ratified it in September 1993. The main objective of the CBD is to ensure conservation of biological diversity, sustainable use of its components, and fair and equitable sharing of benefits arising from the use of genetic resources, including by appropriate access to them. The CBD requires each member state to take legislative, administrative and policy measures so that biological resources, their diversity and associated indigenous knowledge, technologies, skills and values are protected. At the same time, property

rights and any benefit arising from the commercial and other uses of genetic resources belonging to local communities, breeders and the CBD member states are ensured through the legal registration of such resources.

Since becoming a party to the CBD, the Ministry of Forests and Soil Conservation (MoFSC) has been designated as the national focal point for the CBD. In order to effectively implement the CBD, Nepal has initiated various policy measures and many of them are also being implemented. Accordingly, the National Biodiversity Steering Committee (NBSC) was formed in 1997 under the Chairmanship of the Secretary of MoFSC. Representatives from various ministries [including Ministry of Agriculture and Cooperatives (MoAC), Ministry of Population and Environment, National Planning Commission (NPC), international non-governmental organisations (INGOs) such as The World Conservation Union (IUCN), World Wildlife Fund (WWF)] are among the members of this Committee. National Biodiversity Unit (NBU) was formed within the MoFSC as the Secretariat to the NBSC. A total of six meetings for NBSC were recorded until the end of 2001 and Nepal participated in six meetings of the Conference of Parties (COP) to the CBD until 2002.

Similarly, the MoAC has established the National Agro-biodiversity Conservation Committee (NACC); the NPC has formed the National Coordination Committee for Biodiversity Conservation (NCCBC) and leading to the eventual formation of Biodiversity Registration Coordination Committee (BRCC) (Ghimire *et.al.*, 2000). As an outcome of these efforts, NBS has been prepared, which has been recently approved by the government; a draft bill and policy on *Access to Genetic Resources and Benefit Sharing* has been prepared; and an Implementation Plan for the NBS is being prepared.

Documentation and registration of biological resources and traditional knowledge

In a literal sense, documentation refers to an act or instance of authenticating with documents. It is essentially a process of ensuring conformity to historical or objective facts. But registration is an entry in a register, a book or a system of public recording. These two words are often found to have been used interchangeably. For our purpose, the former refers to systematic recording of all form of biological resources, their products, variability in them and associated indigenous knowledge, skill and technology (IKST) and the latter means the process and an act of legal protection of the former. Documentation of biodiversity, thus, becomes a prerequisite for biodiversity registration. Documentation of biological resources and associated IKST is important in order to:

- create awareness and ensure conservation of biological resources, protection of IKST and sustainable use of their component, so that the local people feel both responsibility and get the ownership over their resources;
- prepare an inventory of bio-resources so that the most potential resources are identified and promoted for economic benefits (bio-prospecting);
- protect biological resources and IKST from piracy; and
- monitor the changes over period once a benchmark is established.

Moreover, it is also important that the knowledge and skills of the elderly people (e.g., traditional seed conservation and exchange mechanisms, health care systems, farming practices etc.) are recorded and transferred to new generations before they disappear. Translation of farmers' knowledge into scientific language opens avenues for broader understandings of the ecological and social systems. If buttressed by newer interventions, it may add value to farmers' products, thereby providing them new livelihood options.

Various attempts have been made in the past in Nepal by several researchers and institutions to document biological resources and associated IKST in the field of agriculture, forestry, ethnobotany, traditional health care practices etc. However, they were not systematically carried out to cover all aspects of biological diversity available in the country.

Over 500 Community Biodiversity Registers (CBRs) are reported to have been prepared in India during the last few years. Similar works have been initiated in other neighbouring countries like Bangladesh and Pakistan but the approaches taken are different in different countries. In Nepal, the Nepal Agricultural Research Council (NARC) through its In-situ Crop Conservation Project has started preparing CBRs but it is limited to a few cereals and vegetable crops in three agro-ecological sites (Rana *et al.*, 2000).

A national workshop on biodiversity registration was organised jointly by the MoFSC and the NPC in 2000 (Ghimire *et al.*, 2000). Since no progress at the field level was made in documentation process until the end of 2001, the MoFSC organised a consultation workshop on biodiversity registration in March 2002. The idea was to develop and agree upon a practical format for biodiversity documentation (Paudel, 2002). Thereafter, the MoFSC started fieldwork on the pilot phase documentation programme of biological diversity in four representative sites during the year 2001/2002 and the work is now under progress.

This paper is an outcome of the biodiversity documentation of pilot phase programme, initiated by the MoFSC and discusses the methodology adopted, key findings obtained and experience gained during the documentation process that was run in three different agro-ecological sites (two in middle mountains and one in high altitude) in Nepal.

Objectives of the pilot phase documentation programme

The purpose of the pilot phase documentation programme was to contribute towards the conservation and sustainable utilisation of biodiversity through the development and demonstration of a workable methodology on biodiversity registration process.

The specific objectives were to:

- record and document biological diversity along with associated IKST in selected settlements of the representative VDCs;
- devise an appropriate methodology for biodiversity registration in Nepal;
- prepare field manual (draft) for biodiversity registration; and
- strengthen institutional capability on biodiversity registration

Methodology

The details of the methodology adopted to accomplish the biodiversity documentation are described in following headings and the diagrammatic presentation of the process is presented in Figure 16.1.

Preparation of biodiversity documentation format

Biodiversity documentation format was developed through a participatory consultation process among key stakeholders. A group of multidisciplinary scientists, experts, high level representatives from various relevant government organisations, civil society groups, donors and policymakers gathered in a half day consultation workshop in Kathmandu on 5 March 2002 to prepare a practicable format for biodiversity documentation and registration in Nepal. The workshop recommended a set of format (Paudel, 2002) and suggested for pre-testing and finalisation as needed. The workshop participants also suggested few representative sites in Kaski, Bara and Mustang districts to begin with for the pilot phase documentation programme.

Site selection

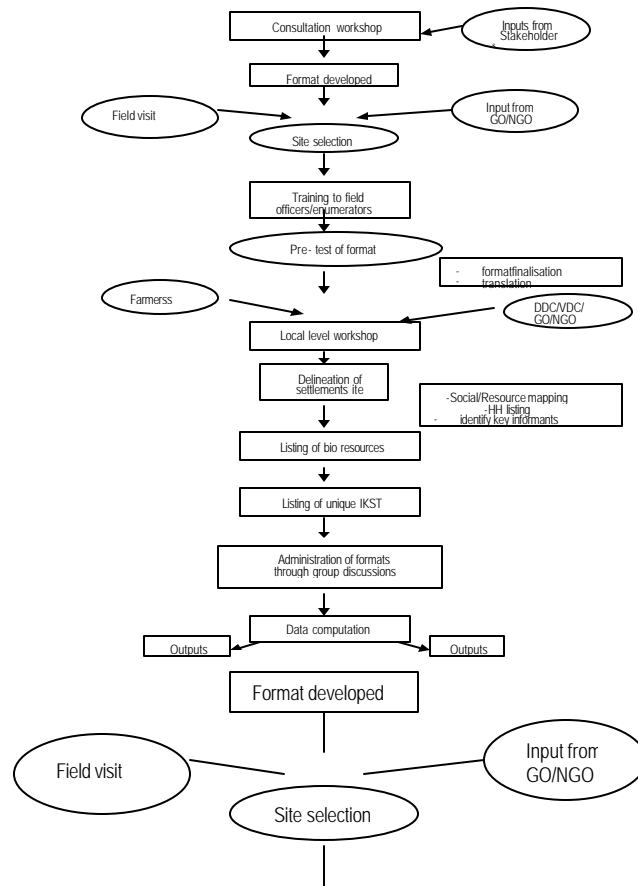
Representative settlements in the middle hills and high hills were purposively selected using available information, field visits and consultation with district line agencies and NGOs in concerned districts (Paudel, 2002b). Care was taken to incorporate as many categories of

ecosystems as possible to capture wider range of life forms and variability in them. Accordingly, Chaur village (<900m) in Lekhanath Municipality - 11 and Maramche village (1,100 -1,800m) in Dhikurpokhari-7 of Kaski district were selected to represent lower and higher mid-hill agro-ecosites respectively. Kobang VDC (2,500 m) in Mustang district was selected to represent the high altitude agro -ecosystem.

Training to field enumerators

A two day training workshop was organised in Pokhara, western Nepal on 10-11 April 2002. A group of seven participants including a field officer, a forest ranger, a junior technician (agriculture), two local enumerators (a local school teacher and a literate farmer leader) from Kaski sites and two local NGO staff were trained on the basics of biodiversity, participatory rural appraisal techniques and administering biodiversity formats for documentation at the village level. Biodiversity experts and national consultants provided the training. Formats earlier prepared in Kathmandu workshop were discussed during the training sessions and were also translated in Nepali language.

Figure: 16.1 Biodiversity documentation process followed at the field level



Pre-testing of the formats

After the conclusion of the training, a set of formats were pre-tested for the structure and clarity at Lewade village in Kaski district on 12 April. Necessary amendments were made at the site in consultation with local farmers. They were then mass produced.

Local level interaction workshops

Prior to entering the selected sites, local level workshops were organised to create awareness of the local people. A half day workshop was organised at Fisheries Research Centre, Begnas Tal on 13 April 2002 for the first site of Chaur in Kaski district. Second workshop was organised at Lumle Agricultural Centre, Lumle on 5 May 2002 for the second site of Maramche in Kaski district and the third workshop was organised on 2 July 2002 at the DDC Office at Jomsom for the third site in Mustang district. Among the participants in such workshops were the Chairpersons of the District Development Committees (DDC), Chief District Officer (CDO), Mayor, District Forest Officers (DFOs), Agriculture Development Officers (ADOs), livestock and fisheries officers and local farmers. In the third site at Jomsom, a district level meeting was organised where all the heads/representatives of district offices, politicians and local *Amchi* were present to discuss about the future plan of biodiversity registration.

Delineation of the settlement sites

In each of the study sites, actual territory of the village areas including forests, farms, grazing land, water bodies and settlement areas was identified and marked as agreed by the villagers using participatory methods. Social and resource maps were prepared and list of households as well as names of the household heads were noted. Key informants were identified and consulted when necessary. They represented different ethnicity, gender, occupations and other important persons like traditional healers and experts. These very key informants helped the team in identifying various plants, animals and other organisms.

Listing of biological resources and IKST

A detailed list of all the biological resources that were both in use and existed in and around the study site was prepared using a guided checklist in a systematic manner. This task was completed taking adequate time (one to two days) and the list was put in a public place so that people could go through the same and make necessary addition to the list. As many village people as possible were invited to participate in this exercise so that the maximum number of resources could be noted down. Up to 50 villagers were present on each such occasions. Similarly, during the subsequent meetings,

unique and traditional knowledge, skills, practices, processes and products related to biodiversity were listed through similar group discussions. These lists were then verified with local experts/key individuals wherever possible.

Collection of seeds/samples/products

Following the listing exercise, local farmers were requested to collect samples of agricultural and forestry resources and their products. Seeds of cereals, vegetables and fruits; and plants/parts of medicinal and other agricultural commodities were also collected. Local farmers/experts were hired to collect samples of rare and lesser known plant species/varieties from forest/farm areas. The process of sample collection continued as long as the team remained in a village. Sample collection was used as a tool for species/variety identification. Herbarium was prepared for some species while others were photographed.

Documentation and field administration of the formats

Series of group discussions were organised in each of the study villages and the formats for each of the listed resources and IKST were filled. Care was taken in each meeting to ensure participation of adequate and relevant farmer representatives during the discussion. Local experts such as *Kabiraj*, *Baidya*, agricultural and forestry professionals were consulted during the process. The team of enumerators consisted of a Team Leader, a Biodiversity Field Officer, an agricultural Junior Technician, a Forest Ranger, and a local school teacher or a farmer leader. All the enumerators were trained. The documentation process was administered between 16 April to 12 May 2002 at Chaur village, 15-31 May 2002 at Maramche and from 26 June to 4 July 2002 at Kobang.

The documentation work was completed in the first two sites whereas it continues in the third site. At the end of the pilot phase study, a second consultation workshop on biodiversity registration was organised on 18 December 2002 in Kathmandu, where after presentation of the pilot phase study findings, the formats for biodiversity documentation were finalised (Paudel, 2003). These formats were approved by HMG/N MFSC in April 2003 for wider implementation.

Compilation of information and preparation of biodiversity register

Collected information was checked by the enumerators themselves, and often cross checked with different group of farmers and experts wherever possible. For some of the resources the team revisited the farmers. After the collection of field information, computer entry of the same was carried out to prepare Biodiversity Register using standard word processing and

spreadsheet packages. Data entry and other possible analyses are in progress.

Results

Biological resources

Forest based bio-resources

Diversity in all categories of forests, pastureland, fallow community land, uncultivated land, water-bodies and any other unclassified areas were listed and categorised under forest based bio-resources. However, some degree of overlapping was obvious as certain species/crops existed both in forests and farmland and they are of multiple value. Over a thousand of forest based species known to farmers in the study area were recorded (Table 16.1). Most of these species were used for certain purpose while others were just existing or their utility was not known. Higher form of life (both plant and animals), common in occurrence and frequent in use were easily remembered and listed whereas the lower forms such as insects, herbs, orchids, soil flora and fauna and hydrobiological flora and fauna were difficult to list down and to identify. The under utilised species needed more probing and forest visits. Diversity of forest based resources and their documentation were subjective to the type of ecosystem, the composition of the farmer groups, the seasonality of the enumeration/survey, the skill of the documentation team members and several other factors. Effect of altitude and climate was noticed significant in the diversity of life form and understanding about these resources. A large number of forest based resources being utilised for some kind of traditional medicine in all three sites was recorded. This number varied from 22 (Kobang) to 89 (Chaur). It was found that the lower altitude site has highest number of forest species compared to the high altitude settlement sites. Summary of the list of forest based bio-resource is given in Table 16.1. The details of the listed species are available in Paudel *et al.*, (2002) and in the respective Biodiversity Registers.

Table 16.1: Summary of the listing of forest based bio-resources in study sites

S.N.	No. of species recorded	Sites		
		Chaur (700- 1000m)	Maramche (1100- 1700m)	Kobang, (2500- 3000m)
1	Timber	41	23	12
2	Fuel wood	22 (+41)*	15 (+23)*	8 (+12)*
3	Fodder trees	57	24	6
4	Forage grass	40	21	2
5	Medicinal plants	89	45	22
6	Parts of animal/birds used in medicine	34	-	-
7	Wild fruits	19	10	10
8	Wild vegetables	10	5	9
9	<i>Kadamul</i>	8	3	-
10	Spices and condiments	4	3	3
11	Bambo o/ <i>Nigalo</i>	4 +1	?	4
12	Aromatic plants	?	4	5
13	Wild flowers	3	3	9
14	Orchids (identified only)	3	4	
15	Leaf litter (<i>Sottar</i>)	?	5	7
16	Green manuring plants	5		
17	Spp. for mulching	3	4	-
18	Spp. for fence/ rope	11 +16	8+3	6
19	Climbers	6	2	
20	Spp. of religious value	22	13	12
21	Spp. for leaf/plates	2	1	-
22	Dyes			5
23	Toxic plants/animal	13+2	6+2	8
24	Wild animals	13	14	19
25	Wild birds	43	39	29
26	Insects	55	44	22
27	Reptiles	4	3	3
28	Amphibians	2	2	2
29	Others			
	TOTAL	568	306	203

* (+) indicates that the parts of all the species that are used as timber are also used for fuel wood.

Agro-biodiversity

All forms of cultivated crops, livestock, fish and their products and other resources that are either grown or occurring naturally in and around farm premises were listed under agro-biodiversity category. Resources such as fodder trees, forage grasses, agricultural weeds, insects, and medicinal and aromatic plants, which were found in farmland, were also categorised as agro-biodiversity. Listing of agro-biodiversity was completed in two levels. Crops such as cereals, vegetables, fruits, oil seed, pulses were first listed at commodity level and then further details were documented at the variety/breed/type level using the documentation format. Whereas other resources such as fodder trees, farm grown plants of medicinal value, fish and some birds were largely documented at species level. Like forest based resources, diversity in agricultural resources was also higher in low altitude site 353 (Chaur) compared to the high altitude 137 (Kobang).

A total of 15 varieties of rice were recorded in Chaur village whereas it was totally absent in the high altitude site of Kobang (Table 16.3). Diversity in fruits and vegetable crops, spices and condiments, medicinal plants and livestock feed crops followed similar pattern. Summary of list of agro-biodiversity is presented in Table 16.2 and the details of the variability are available in Paudel *et al.*, (2002) and the respective Biodiversity Registers.

Table 16.2: Summary of the listing of agriculture based bio-resources in three study sites

S.No	No. of commodity/crops recorded	Study sites		
		Chaur (700-1000m)	Maramche (1100-1700m)	Kobang, (2500-3000m)
1	Cereals	7	7	7
2	Vegetables	36	30	27
3	Fruits	22	16	11
4	Oil seed	3	3	3
5	Pulses	7	5	3
6	Medicinal plants - farmland	75	23	9
7	Spices and condiments	17	2	10
8	Spp. for pickle making	32	13	8
9	Potato	1	1	1
10	Cash crops	6	9	-
11	Livestock	7	8	10

S.No	No. of commodity/crops recorded	Study sites		
		Chaur (700-1000m)	Maramche (1100-1700m)	Kobang, (2500-3000m)
12	Fodder trees - farmland	20	21	3
13	Forage grass- <i>bariland</i>	32	19	11
14	Forage grass - <i>khetland</i>	22	-	-
15	Poultry/birds	3	2	3
16	Fishes	32	3	2
17	Honey bee	1	1	1
18	Garden flowers	31	19	13
19	Agricultural weeds	see forage	see forage	8
20	Fungus/ <i>Joran</i>	-	-	8
21	Others			
	TOTAL	354	182	138
	Grand total (Table:16.1 +16.2)	922	487	341

*All total: 1750

Table 16.3: No of variety of some of the main cereal crops in study sites

Crops	Sites		
	Chaur	Maramche	Kobang
Rice	15	9	-
Wheat	2	2	1
Maize	4	6	4
Millet	7	4	-

IKST and processes

Results of listing of IKST in study villages are presented in Table 16.4. Listing of IKST has reflected the wealth of traditional knowledge that the local people have possessed. There lies massive accumulation of knowledge in human health and medicinal use of local resources in different communities. Most of the local treatment practices were based on the use of locally available plant materials. Some of the common treatment farmers used to do at local level included fever, gastritis, common cold, cut and burns, maternity and child health care, pains, eye and dental problems and animal health care, etc.

However, due to the growth of modern medical facilities reliance on traditional practices is declining. Other types of knowledge that local people have include agricultural technologies, grain storage, fishing, preparation of typical foods, pickling, making agricultural implements/tools/equipment and building construction. Over 100 different IKST were documented in a low altitude village of Chaur, of which 70 were related to health care.

Table 1 6.4: Summary of the number of unique IKST and processes recorded in study villages

Category of IKST	Sites			Total
	Chaur	Maramche	Kobang	
Health care and medicinal	71	37	32	140
Food and beverage	13	13	7	33
Agricultural technologies/skills	12	19	2	33
Others (tools, equipment etc.)	7	12	-	19
Total	103	81	41	225

Experience gained

Two way approach to documentation

Basically two approaches were tested to document bio-resources and associated IKST. First, systematic listing of all the resources and then seeking detailed information, as per the format, for each individual resource and secondly, enquiry from the IKST perspective and identifying biological resources as attribute to various IKST. Although there are merits and demerits of both approaches, the latter provided more holistic and realistic picture on the use of various combination of different biological resources (often in combination with synthetic products and exotic materials) to form useful products or get different satisfaction.

Hence, a combination of both approaches is more comprehensive than using either of them alone. It is important to note that the documentation task can be completed in a phase wise basis as complete information of all the resources in each of the villages/communities may be difficult to manage within short time period and with limited resources. However, it does not mean compromising with the quality of necessary information collected.

Time and season for documentation

The process of biodiversity registration is a complex and time-consuming task. There is no fixed boundary as to where to stop the job. Experience shows that continuous working on documentation process in a village having 55 household covering 600-1000 ha of village territory took about a month for a team of four persons. This duration of time was not felt sufficient to cover all the possible resources existing in the area.

Season of documentation has strong influence on the quality and quantity of information collected as the phenology and appearance of many lower forms of plants, animal and agricultural crops was much seasonal. Listing and identification of species in off-season may become subjective. Therefore, the duration of the documentation process should be spread over a year. Availability of time of local farmers influences the level of participation, hence, the effectiveness of the whole exercise. Care should be taken to engage farmers for such an exercise with their prior consent.

Effectiveness of the formats

There have been some changes in the formats developed during the workshop in Kathmandu (Paudel, 2002). The format for documentation of IKST was developed during the documentation process in the field. It was experienced that each of the columns in the format needs to be clearly defined and a guideline provided to each of the enumerators to avoid inconsistencies in filling out the formats. However, certain flexibility has to be maintained so that the format should not impose restriction on information collection.

Problem in species identification and composition of the documentation team

One of the common problems that the team experienced in the field was on correct identification of species/breed/variety. In some cases, local people use same name for different species whereas in others they give different names to the same species. For example, the name "*Hadchur*" was given to a tree species at Chaur village and the same name was given to a herbaceous plant at Maramche. Similarly, a valuable medicinal plant was called as "*Chautajor*" at Chaur and "*Thulo-okhati*" at the adjoining village of Pachabhaiya in Kaski district. Local names varied with local language being spoken. Varieties of insects, birds and lesser-used plant species occurring in forest area were difficult to identify.

In order to correctly identify, name and enquire about the diverse resources, the team for biodiversity documentation should be

multidisciplinary with experts in - Agriculture (including weeds and insect), Forestry (including NTFPs, wild flora and fauna), Taxonomy, Ethnobotany, Aayurveda, Fisheries, Entomology, etc. The process requires expertise from many more disciplines depending upon the ecosystem/farming system under inventory. The team should be equipped with necessary tools for species identification. Attempts should be made to hire local experts (e.g., *Baidya*, *Amchi*, Fishermen, Hunters, food processors, key farmers and local GO/NGO staff) wherever possible to help identify the species.

Tools and equipment for documentation process

Field teams are often constrained with necessary tools and equipment. Some of the useful tools and equipment to facilitate the documentation process include - the list of local and regional flora, community forest operational plans, national parks and conservation area management plans, management plans of other natural resources of the local area, books on Ayurveda (*Nighantus*), occasional papers and survey reports, pictorials, relevant research publications/university dissertations, a camera, an altimeter, GPS, herbarium sheets, bags for sample/specimen collection, necessary format and stationery etc.

Collection and storage of samples/specimen/herbaria

Samples such as seeds of agricultural crops, specimen/part of medicinal plants, herbaria and photographs are useful tools for identification, documentation and monitoring purpose. However, it can be too bulky and time and space consuming process to collect and centralise them. It is advisable that specimens of rare and endangered plants/their parts/products are collected and maintained at district/VDC level until identification is completed and awareness about such resources created. Locally available human resources could be trained once such collection centres are identified. Lessons can be learnt from some of the decentralised museums maintained at district level (e.g., Eco museum in Jomsom).

Security of the biodiversity registers

Although it is not a matter of concern as yet, mechanism should be devised so that further bio-piracy does not occur. Documents containing traditional knowledge about the resources can be very important when the question of patenting the knowledge arise.

High priority task for the country

Looking into the nature of the task and the time frame to join the World Trade Organisation (WTO), biodiversity registration programme should be

launched as a national priority programme of special importance which should be supported by local institutions, various stakeholders, INGO/NGOs and donors and every efforts should be made to complete the task on time.

In order to meet the deadline and maintain the quality of work, the process of documentation can be organised in phase wise basis, beginning from ecosystem level (selected biodiversity hot pots) to species level then down to the genetic level using all modern genetic tools such as isoenzyme and DNA markers. This would require additional resources for institutional strengthening and capacity building of staff to cope with new responsibility. Knowledge of local personnel with appropriate training should be utilised wherever possible. Educated unemployed village youths, local school teachers and university/college students may contribute in the resource inventory and compilation of IKST. Care should be taken while choosing the local enumerators, so that they do not make these tasks profit-oriented.

Problems encountered

Lack of critical mass for guiding at central level on biodiversity documentation and registration, lack of awareness at various level, lack of contact agency at local level, insufficient time and resources were some of the key constraints faced by the team during the pilot phase documentation process. However, such constraints will be gradually minimised once the NBS is approved and implemented.

Opportunities for higher benefits and rural development

The process of biodiversity documentation has created awareness among the local farmers as they have reviewed the strength of their resources and realised the need for conservation and promotion of commercially important resources. The participatory process of biodiversity documentation has also contributed to the community passing on the traditional knowledge of the elderly people to the younger generation. It has helped in identifying the potential resources, the key knowledgeable persons in the community and the status of their resources. In fact, once the documentation process is completed, it can form the basis for better planning and management of natural resources in the future.

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Evolving *Sui Generis* Options for the Hindu-Kush Himalayas

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Resolution Adopted at the Regional Seminar on Evolving *Sui Generis* Options for the HKH Region

South Asia Watch on Trade, Economics & Environment (SAWTEE), together with International Centre for Integrated Mountain Development (ICIMOD), organised a three-day regional seminar on “Policies for the Protection of Farmers’ Rights in Mountain Regions: Evolving *Sui Generis* Options for the Hindu-Kush Himalayas (HKH)” in Kathmandu, Nepal from 24-26 March 2003. The objectives of the seminar were to:

- Help policy makers and civil society actors understand the contemporary debate on intellectual property protection and rights of the poor, marginalised and vulnerable farmers of the region in general and mountain farmers in particular.
- Explore various options available under the Trade Related Aspects of Intellectual Property Rights (TRIPS) Agreement of the World Trade Organisation (WTO) to prepare a balanced legislation that would protect the rights of commercial breeders without impairing the rights of farmers to save, exchange, reuse and sell seeds.
- Explore and evolve specific policy options, which would contribute to safeguarding the rights of mountain farmers.
- Provide trade negotiators with skills and knowledge necessary to negotiate during the on-going review of the TRIPS Agreement.

More than 80 delegates from 11 countries attended the seminar. At the end of the seminar, the participants adopted a resolution on farmers’ rights in order to make the policymakers aware about the imperatives to protect farmers’ rights in the context of globalisation and the WTO and ultimately help them in devising an effective mechanism for the protection of farmers’ rights.

Resolution Adopted in the Seminar

In the context of agriculture related international agreements including TRIPS, the United Nations (UN) Convention on Biological Diversity (CBD), International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA), and emerging awakening of the farmers on their rights, this seminar addressed by experts on farmers’ rights, representatives of

governments, civil society, media and academia from South Asia, East Asia, and Europe calls upon the governments and the international agencies to evolve a mechanism that respects the centuries old traditional practices of farmers of sharing plant genetic resources.

This seminar urges the governments of the Hindu-Kush Himalaya (HKH) and South Asia regions to enact the legislation that ensure protection of local knowledge of farming communities and plant varieties including the ones developed by farmers, following an effective *sui generis* system wherein:

- Law making process should be transparent and participatory, involving all stakeholders such as governments, civil society, farmers' groups etc.
- Issues of food security, food sovereignty and livelihood security should be addressed properly.
- Research, development policies and actions must take care of the livelihood interests of the least developed areas and the marginalised mountain farming communities.
- Improved access to inputs including sustainable technology, which must not endanger health safety and environment, should be ensured.

The seminar calls upon the governments to stop increasing corporatisation of basic resources such as land, water, bio-mass and forests so as to guarantee an enabling environment for small and marginalised farmers with special emphasis on gender issues in rural livelihood context. The seminar rejects patents on life forms and emphasises that bio-piracy should be stopped effectively. Legislation for this purpose must be enacted at local, provincial and federal levels, paying due attention to the vulnerability and threat of marginalisation faced by mountain farmers.

The farmers' rights that need to be addressed while drafting the *sui generis* legislation with their multi-dimensional aspects should include:

- The right of farmers to protect their traditional knowledge associated with plant genetic resources from being misappropriated.
- The rights of farmers over plant varieties and local knowledge over and above the corporate breeders' rights.
- The traditional rights of farmers to save, use, sow, re-sow, exchange, sell and improve farm saved seed of all plant varieties.

- The right to compensation from the right holders of plant varieties for under performance and loss from misleading claims.
- The right of farmers to receive equitable benefit sharing, both monetary and non-monetary, for the use of plant genetic resources created and conserved by them for the development of new commercial varieties, with due regards being given to the economic valuation of the plant and seed varieties developed by them during the process of evolution since centuries.
- The right of farmers to be informed of the market opportunities so that they could better assess the marketing options for their produce.
- The right of farmers to get protected against bio-piracy and theft of their traditional knowledge.
- The right of farmers to be aware of national and international agreements affecting their livelihoods directly or indirectly.