Building Capacity to Manage Biodiversity, Food security, Trade and Regulation –

Annual report of the ITP-programmes GRIP 12a and b 2012-2013

Report compiled by

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List of Abbreviations

ABS Access and Benefit Sharing
CBD Convention on Biological Diversity
CGIAR Consultative Group on International Agricultural Research
CGRFA Commission on Genetic Resources for Food and Agriculture
CO Country/certificate of origin
COP-CBD Conference of the Parties to the CBD
DNA Deoxyribonucleic acid
DRIPs Development Related Intellectual Property Rights
EIARD European Initiative for Agricultural Research for Development
ELSA Ethical, Legal and Social Aspects (Human Genome Programme)
EU European Union
FDI Foreign Direct Investment
FTO Freedom to Operate
GR Genetic Resources
GMO Genetically Modified Organisms
GRIP Genetic Resources and Intellectual Property Rights
GURT Genetic Use Restriction Technology
FAO Food and Agriculture Organization of the United Nations
IARC International Agricultural Research Centre
IGC Inter Governmental Committee on GRTKF (WIPO)
IPR Intellectual Property Rights
ISAAA International Service for the Acquisition of Agri-Biotech Applications
IT on PGRFA FAO International Treaty on Plant Genetic Resources for Food and Agriculture
KARI Kenya Agricultural Research Institute
LDC Least Developed Countries
MAT Mutually Agreed Terms
MTA Material Transfer Agreement
NDUS New, Distinct, Uniform, Stable
OAU Organization of African Unity
PIC Prior Informed Consent
PoC Personal project of Change
PVP Plant Variety Protection
R&D Research and Development
SLU Swedish University of Agricultural Sciences
TK Traditional knowledge
TRIPs Trade-Related Intellectual Property Rights
TWN Third World Network
UPOV International Union for the Protection of New Varieties of Plants
USTPO United States Trademark and Patent Office
VCU Value in Cultivation and Use
WHO World Health Organization
WIPO World Intellectual Property Organization
WTO World Trade Organization
SNL Subject to National Legislation
SLU Swedish University of Agricultural Sciences
PVP Plant Variety Protection
PIC Prior Informed Consent
MAT Mutually Agreed Terms
ABS Access and Benefit Sharing
AnGR Animal Genetic Resources
TK Traditional Knowledge
IP Intellectual Property
MTA Material Transfer Agreement
CO/DO Certificate/Disclosure of origin
LDC Least Developed Countries

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1. Foreword

We have entitled this report covering GRIP-12 a and b: **Building Capacity to Manage Biodiversity, Food security, Trade and Regulation –** because, since its start in 2003 the GRIP-program is located in the "**eye of the storm"** especially as regards international trade and development cooperation: for example environment, water issues, biodiversity, climate change, food security, gender-issues, renewable energy, land management, genetic resources, traditional knowledge, biosciences and innovation, patents, global trade and public-private-partnerships and economic development. This is dealt with in section 5 of this report: entitled "*Summary of GRIP-issues in a broader development perspective*" (see table of content on previous page).

All these issues above relate in reality to three extremely important basics challenges/issues: changing rules for Access (not least as regards biological matter), Knowledge (not always any longer in the public domain) and Innovation (not just in the private sector). The social and public interpretation of these three basic issues is at the base of confusion and stall mates in many international negotiations on trade, biodiversity, genetic resources, environment and so forth. A main objective of the GRIP-program is to try to provide less prejudiced eyes on what may be "right/wrong", what is realistically achievable when internationally agreed policies and ideas are confronted with basic biological and technical realities and societal costs in many developing countries. The recent Rio+20- , the CBD-Nagoya-protocol and WTO/TRIPS meetings illustrate two of the arenas that GRIP is covering.

The program cycles comprises three phases: a three weeks training in Sweden followed by phase 2 working on a personal project of change/PoC in the home country followed by phase 3 –a regional follow up seminar, where participants present their reports. These project reports are -after personal revision by the participants- put together in a full report with results analysis comments, Annexes etc. and published at the GRIP website (www.slu.se/grip). As of January 2013 the GRIP-programme has trained in total **281 people** (2003-2012) including presiding judges; patent- and plant variety examiners ; trade negotiators; government officials, gene bank curators and plant breeders; IP-managers and research leaders in academic institutions and biodiversity managers. The PoC:s are published with written consent from the respective participants before publishing this report. For further details about GRIP please visit our website.

Emerging meta conclusions in the **Building Capacity to Manage Biodiversity, Food security, Trade and Regulation-**arena are to be further specified in our forthcoming report from GRIP-13a and b which will also summarize our more than 11 years experience with GRIP-issues.

Uppsala January 15, 2014

Carl-Gustaf Thornström,
Executive Director

2. Introduction and Background

Genetic resources represent the basic building blocks for the development of improved agricultural and industrial crops, trees and livestock and the agro-processing sector. The growing global demand for food, feed, fiber and bio-based renewable materials, such as bio-fuels, is changing the conditions for genetic resources development and bio-resource production worldwide, not least for developing countries.

Many developing countries are to a large degree agrarian, with the agricultural sector contributing over 40 % of GDP. To feed a growing population will be a formidable challenge in many parts of the world, but the problems are without doubt worst in sub-Saharan Africa, where there has been stagnation and even decline in the agricultural productivity of small-scale farmers. Supporting small scale farming systems and indigenous communities, improving their agricultural productivity and livelihood base is crucial in this context. Development and utilisation of the genetic resource (GR) base and the connected knowledge are central in such efforts.

International conventions and treaties together with the rapid bio-science development have led to new conditions for the access of genetic resource and knowledge. The Convention of Biological Diversity (CBD) and the requirements under of WTO/TRIPS have led to stricter mechanisms for access to and control of genetic resources as well as new regimes for protection of biological innovations. Through the CBD, access to genetic resources is under the sovereign control of states, forcing corporations to negotiate with the gene-rich developing countries directly for access to biological resources. At the same time the use of genetic engineering in the production of novel organisms (e.g. GMO crops) connects IPRs more tightly to the development of genetic resources. As national capabilities for IPR intensive areas like biotechnology increase, the tendency for harmonisation with the global efforts for stronger IPR (e.g. TRIPS) will be more prevalent. The Cartagena Protocol on Biosafety has also led to new conditions for advanced information exchange for trade of Living Modified Organisms (LMOs). Gene-rich countries in the South must therefore have a clear understanding of the development and its implications with a view of understanding both threats and opportunities[1].

Recent developments related to Intellectual Property Rights (IPRs) for genetic resources have created both threats and opportunities for developing countries. With the advent of genetic engineering and novel multilateral IPR agreements a new chapter in the history of gene hunting has started While genetic resources have been important raw materials in agriculture and in the natural products industry, biotechnology, the information technology and novel IPR regimes are opening new frontiers.
The demand for genetic resources is likely to grow rapidly with the improved techniques for rapid genetic characterisation and screening of valuable genetic traits and the possibilities to improve, modify and add value to genetic resources. Thus, the era of bioinformatics and genetic engineering will have a major impact on the trade of plant genetic resources and the development of natural products industries world-wide. This includes trade of genetic resources between patent-rich, but, in several cases, gene-poor Northern countries with countries in the South rich in genetic resources. This involves trade of plants, micro-organisms and algae generating commercially attractive compounds[3] and industrial crops for biofuels and biodegradable polymers[4]. For many developing countries the development offers both risks[5] and opportunities[6].

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[1] Strategic issues in relation to new regimes for plant genetic resources (Crucible group, Seeding solutions, II and III).

[3] e.g. cosmetics, fragrances and flavours based on natural products

[4] Fibres, starch products, oils, lubricants and detergents. Companies such as Du Pont and Dow Chemicals are in the process of developing a base for industrial production of niche crops. Hence agriculture is converted to industry.

Intellectual Property Rights (IPRs) controlling access and transfer of genetic resources, knowledge and information will be an increasingly important issue for actors[7] in developing countries involved in the use and development of genetic resources. IPRs can provide incentives for private R&D, not least in the development of new crop varieties. IPRs can also encourage access to inventions produced elsewhere, but they also impose a cost burden. Concerns have been voiced over private sector monopolies of technologies and seeds. A controversial issue is how to compensate indigenous communities and small-scale farmers in developing countries for their work in developing and maintaining plant genetic diversity. Considering that a local absence of IPR systems might deter investments in research and development, there are no easy answers to this problem. It is however clear that more awareness, knowledge and strategic planning is needed in most developing countries.

For actors in developing countries, there are many questions:

- How can developing countries rich in genetic resources best manage transfer of genetic resources, knowledge and information, making optimal use of IPR regulations?
- How can the various sectors[8] in developing countries be strengthened in the process of safeguarding national interests[9] and securing access to genetic resources, knowledge and innovations?
- How can developing countries optimise benefits from trade with valuable genetic resources[10] and be part of value adding processes[11]?
- How can public R&D institutions (e.g. universities and national agricultural research institutions) involved in proprietary science[12] strengthen internal IPR policies, guidelines and practices[13]?
- How could countries in the South optimise their IPR systems[14] to suit their agro-economy in the context of TRIPS? This involves patents of genes and crops and the protection of traditional varieties.
- How can countries deal with issues like TK/small scale farming linked to food security, poverty reduction, livelihoods, democracy, sustainable development etc?
- How can national and institutional IP management, access and benefit regimes for genetic resources be developed that supports agricultural productivity and the livelihood base for small scale farming systems and indigenous communities?

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[5] Such as limited access to technologies and specific genetic resources which may have social effects on farming systems

[6] Access to new technology and new markets, and possible export of value added products.

[7] Authorities, private sector, universities

[8] Public/ private/communities

[9] e.g. indigenous communities and small scale farmers

[10] Providing valuable raw material for the natural-products industry

[11] How can developing countries access technology in return for genetic resources as in various bioprospecting agreements.

[12] In the context of use and development of genetic resources.

[13] This may for example involve University guidelines /code of conducts for R& D agreements with or private sector in other institutions in the North.

[14] What type of *Sui generis* systems and plant variety protection systems should be developed.

3. The GRIP Program

3.1 Program overview

Most of the work in the development of appropriate institutional and national IPR policies and regulatory frameworks has to be done by the various developing country actors themselves. However, the process can be greatly facilitated by sharing experiences world-wide and through the assistance of well experienced international resource persons. There is a great need for awareness raising of opportunities and obligations in the context of the new regimes for access and development of genetic resources.

Recognising this fact, the Swedish University of Agricultural Sciences (SLU) and the Stockholm Environment Institute (SEI) are organising a Sida supported ITP Programme, the GRIP program. The aim of the GRIP program which started in 2003 is to assist policy makers, researchers and practitioners from developing countries in understanding, the background and the implications of the recent developments related to IPR's and exchange of genetic resources. This will be done with a view toward assisting country participants to catalyse discussion and actions on how intellectual property regimes could assist the sustainable use of natural resources in their home countries. The GRIP course will also facilitate the understanding of how to develop appropriate IPR instruments for beneficial partnerships (win–win situations) between various actors in regional or in international settings.

3.2 Program Objectives

The objectives of the training program are:

- To assist participants to understand the background and the implications of the recent developments related to intellectual property rights (IPRs) and exchange of genetic resources.
- To enable participants to find, use and draw conclusions from sources of information and expertise world-wide, related to IPRs and exchange of genetic resources.
- To enhance participants' managerial efficiency to handle, address and deal with genetic resources and intellectual property rights issues. This will be done with a view on how to facilitate participants' understanding on how to develop appropriate IPR instruments for beneficial partnerships between various actors in regional or international settings.
- To improve participants' ability to catalyse the development of intellectual property rights policies and corresponding implementation frameworks on genetic resources at the national and institutional level.

These objectives comprise different instruments to implement for example more overriding objectives like food security, climate change, biodiversity conservation, securing of ecosystem service, reducing agricultures ecological footprint etc. The objectives also include to give participants exposure to new challenges posed by break throughs in advanced bioscience, the emerging bio-economy etc.

3.3 Program Description

3.3.1 The Target Group

The Course is directed to individuals at senior commanding level from the government sector and from national R&D institutions in charge of managing and defining regulatory/policy IPR frameworks on genetic resources.

GRIP-12a comprised 24 participants of which 11 were women. The represented countries were; Peru, Chile, China, DPR Korea, India, Nepal, Pakistan, Jordan, Kenya, Malawi, Sudan, Uganda and Zimbabwe.

GRIP-12b comprised 23 participants of which 11 were women. The represented countries were; Bosnia-Herzegovina, Cameroon, Colombia, Ecuador, Kenya, Mexico, Montenegro, Serbia, South Africa, Tanzania, Thailand, Tunisia, Turkey, Uganda and Vietnam.

3.3.2 The Program Content

The course comprises of lectures/presentation in the following areas:

- ***Presentation of PoC.*** Participants asked to choose a subject for PoC studies prior to the course and present this to course participants for input.

- ***Fundamentals of intellectual property.*** The new regimes for trade and exchange of GR/GMOs/ and the exchange knowledge and information. Examples of agreements. Basic IP-concepts: product by process, prior art, novelty, innovative step, ordre public/morality, industrial application, research exception, infringement, compulsory licensing, disclosure; new, distinct, uniform, stable, breeder´s exception, farmer´s privilege; extant varieties, common knowledge; Value in Cultivation and Use etc. Public vs private domain. "More than incidental use of traditional knowledge". *Sui generis*-protection, Geographical indication/ Nom d´origin.

- ***The scene of proprietary science*** The prospects/problems/risks for developing countries. This includes technology status, opportunities and landscape for the development of genetic resources (e.g. markets for functional food), why the need for IPRs, The confusing scene of proprietary science (e.g Golden Rice patents).

- ***Global conventions/International Agreements/ patent regimes/organisations/actors*** CBD: Access to genetic resources/benefit sharing, Nagoya ABS Protocol; protection of traditional knowledge (ethnobiology); WTO/TRIPS, WIPO: traditional knowledge/folklore under TRIPS, CO and filing for patents ;UPOV, Plant variety protection (NDUS-criteria) including breeder´s exemption and farmer´s privilege), FAO/IT: Multilateral system for PGRFA, Farmers´ rights including protection of landraces/farmer varieties, Cartagena Biosafety protocol, CGIAR: International public goods under bilateral regimes, The African Agricultural Technology Foundation/AATF. PGRFA vs CBD and territorial IPRs (later under TRIPS) for parts and components in improved germplasm and finished varieties.

- ***Indigenous/traditional knowledge and benefit sharing systems*** WIPO: traditional knowledge/folklore under TRIPS, CO and filing for patents Institutional and national intellectual property policy and management issues, Proprietary science and public domain/genetic commons. Use of Material Transfer Agreements (MTA) Proprietary knowledge management in the EU and the US. (Private actors and universities) "Hands on" training dealing with practical issues such as disclosure of research information, legal implications of various IPR agreements (e.g. MTAs), impact of IPR on research (e.g. laboratory protocols, publication strategies etc.). Institutional and national IPR policy development including marketing, using and management of IPR licensing, public distributions and sales, IPR-protected biological matter[15]/related information and technologies that condition freedom to operate (FTO) in research, training, trials.

- ***Current policy issues regarding ownership, technology, biosafety and sustainability*** Key issues and options in national genetic resources and IP policy development implementation. Interesting examples of public-private partnerships where technology is reaching various groups in developing countries through private-public farmer partnerships, WIPOs intergovernmental work on Country of origin/CO and traditional knowledge. County of Origin (CO) as a requirement for patent filing. Multiple patents/IPs in transgenic plant varieties (e.g Golden Rice) and FTO under territorial and global IP-regimes respectively. Farmer´s rights vs Sui generis protection of plant varieties under TRIPS and UPOV-91 respectively. Seed certification under NDUS-criteria and expanded agro-biodiversity.

- ***Key issues and options in national genetic resources and IP policy development implementation*** Interesting examples of public-private partnerships where technology is reaching various groups in developing countries through private-public farmer partnerships, (e.g. INBio/Merck, ISAAA small-scale farmer collaboration on pathogen-free banana, KARI/Monsanto/sweet potato, The African Agricultural Technology Foundation/AATF. Studies on case studies of successful IPR partnerships (e.g. technology transfers, benefit sharing, successful bioprospecting agreements) supporting the sustainable use of genetic resources in developed and in developing countries. Basic elements of a national strategy on access to genetic resources and benefit sharing policies, strategies and frameworks to support development of IPR regimes for exchange of genetic resources. Examples from Andean Pact, OAU-model, Bolivia/Philippines, IARCs, universities and research institutions. Development of strategies/Future actions.

4. Activities carried out during GRIP 12a and b

4.1 The Program Phase 1 –in Sweden

Out of 63 applications received upon the GRIP 12a training call 31 persons were selected based on personal qualifications and country/institutional profile. Finally 24 participants attended the Phase 1 training in Sweden between May 7 and 25, 2012. With GRIP 12b at hand 87 applications were received. 34 of these were approved based on the same criteria as for 12a and 23 out of these attended Phase 1 in Sweden between September 24 and October 12, 2012. (See list of participants and their affiliation page 20).

[15] Isolated DNA sequences that code for certain proteins; isolated and purified proteins; seeds; plant cells and plants; plant varieties, including parent lines; hybrids; processes to obtain hybrids; processes to genetically modify plants (vectors, bio-ballistics etc); gene promoters; other proprietary genomics information; ethnobiological information

The programme includes lectures, group discussions, workshops, negotiating exercises, practical training and study visits. During the first three weeks in Sweden the 12a and 12b participants attended a program consisting of scheduled lessons and lectures, group discussions, negotiation exercises and study visits. The Phase 1 programme is presented in detail in Chapter 7.

Lecturers were drawn from Swedish government- and academic institutions involved in regulation, policy and management within the field of Access and Benefit Sharing (ABS)/ IP management and exchange of genetic resources in the context of institutional, national and international regulatory frameworks as well as representatives of the user community of genetic resources. International renowned resource persons were also invited to share their experiences on important aspect of the international and national implementation of ABS/IP/GR regulatory regimes.

A substantial amount of time was devoted to the participants' Project of Change (PoC). Each participant made a short presentation of their plans during the initial part of the training. The project plans were continuously discussed and polished with mentors and fellow participants throughout Phase 1 in order to be ready for realization during Phase 2 of the training programme.

4.2 Project of Change –Phase 2

During 12a the participants were divided into the following groups based on the subject of their PoC:

1. Access Benefit Sharing/Genetic Resources and the Convention on Biological Diversity (5)
2. Plant Variety Protection and Genetic Resources (8)
3. Intellectual Property Policy (6)
4. Public Private Partnerships (5)

During 12b the participants were divided into the following groups:

1 IP-strategies related to PGR (5)
2 UPOV/FAO-IT/PBR/PVP (6)
3 IP/TK databases (5)
4 Univ/Public institutions and IP/Commercialization (7)

During GRIP 12a and b these respective four subgroups during Phase 1 worked during scheduled non-plenary sessions and over weekends to upgrade/refine each participants PoC-plan in light of new input from lectures, group work and field visits. This was made in order to clarify the aim of each PoC into a more realistic layout and to overcome the major obstacles for its implementation. At the end of Phase 1 (third week) each participant presented a refined ToR for their PoC. Over the last 4-5 years with GRIP-scholars there is a clear trend that dominating themes for PoCs are moving from overregulated applications of the CBD and the FAO-Treaty respectively onto issues in the fast emerging global bio-economy, intellectual innovation in public and private sectors (like PVP) and recognition of the use of TK in such innovations.

The PoC project continued after the participants' return to their home countries and the Course management gaves Programme participants individual feedback and advice in their final development of Project of Change report. During a period of approximately four months the participants carried out their project work in their home country. A mid-term report was thereafter sent to the GRIP management as a preparation for the follow-up seminar which initiated Phase 3 of the training programme. Before the follow-up seminar the participants were individually supervised by the GRIP management on how to finalize their project work.

4.3 Regional follow up seminar -Phase 3

The main purpose of the regional follow up seminar, was to give participants a possibility to present their PoCs and to get feedback and suggestions for further work by participants and course management. The Regional follow up seminar also included some lectures by the GRIP management team on current IP/GR issues and some relevant study visits.

The GRIP 12a follow up seminar was held at ILRI in Nairobi, Kenya, November 19 -23, 2012 and attended by 21 participants. The GRIP 12b follow up seminar which took place at Novotel Hotel in Bangkok, Thailand 18-22 March, 2013 was attended by 22 participants.

During the seminars the participants presented their mid-term PoC reports which were thoroughly discussed and commented upon by the GRIP management and fellow participants.

While in Nairobi a study visit to ICIPE (International Centre of Insect Physiology and Ecology) was organized during which the participants were introduced to the activities of the Centre and discussed IP issues related to ICIPE's projects and innovations. The participants in the Bangkok meeting were taken on an agricultural tour during which local markets, orchid, lotus and fruit farms were visited.

The follow-up seminar programs included also group work with focus on key issues on the Genetic Resource and Intellectual Property policy arena (for detailed follow-up seminar programs see Annex 2).

After the follow-up seminar the participants continued to work on their PoC and submitted after additional two months their final PoC report. An overview of the PoCs and participants achievements is given below. The final PoC reports for GRIP 12a and b are compiled in Annex 3.
The Projects of Change - an overview of issues and achievements

5. Summary of GRIP issues in a broader development perspective

5.1 Sharing benefits from the use and exchange of genetic resources. Implementing the Convention on Biological Diversity

The Convention on Biological Diversity (CBD), known as the Biodiversity Convention, is an international legally binding treaty signed and ratified by most countries[16] which entered into force 1993. The Convention has three main goals:

1. Conservation of biological diversity
2. Sustainable use of its components; and
3. Fair and equitable sharing of benefits arising from genetic resources

The Biodiversity Convention (CBD) changed the situation regarding access and utilization of genetic resources in fundamental ways. Before the Convention, access of genetic resource was not regulated internationally, but subject to national legislation. In reality, it meant that many countries, particularly those in the South did not regulate access or exchange of genetic resources. In the negotiating work leading up to the CBD, countries recognized the value of genetic resources, both for agriculture and crop breeding purposes, ecosystem services, but also for biological prospecting finding new biological

[16] One notable exception is that the convention is not yet ratified by United States.

compounds with valuable medicinal properties[17]. The CBD sets principles for the fair and equitable sharing of the benefits arising from the use of genetic resources, notably those destined for commercial use. The development of these principles was partly driven by the discussion of what many saw as bio-piracy, where it was argued that genetic resources where extracted from the South to the North[18], without sufficient agreements of benefit sharing. Through the CBD, a new fundamental regime was established in that all genetic resource was the property of individual countries and that the right to use these resources would only be made through a negotiated access with nationally recognized institutions. Many countries, not least those in the South viewed CBD as a tool to ensure that countries, and communities within these countries, would be benefitted for the use made of their genetic resources. An important access and benefit sharing (ABS) instrument of the CBD is the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity.

The new, more complicated and stricter international conditions for the access and use of genetic resource adapted through the CBD have led to a dramatic change in how germplasm is exchanged between countries and institutions worldwide. As one of the consequences, it has become more cumbersome for many of the global public good institutions, not least the CGIAR[19] centers, to access, improve and make available genetic resources such as new improved crop cultivars. The principle of negotiated access to genetic resource and equitable sharing of benefits arising from their utilization has not been easy to implement in reality. The CBD is a framework convention and an important process is to domesticate the CBD into functioning national regulatory regimes. Some countries, such as those in the Andean Pact, have imposed very strict access regulations making it very difficult for scientists at public institutions and private companies, both within and outside the Andean pact to use, explore and add value to genetic resources. Other countries struggle to develop and implement the complex regulatory machinery needed to comply with the principles of the CBD. Countries also struggle to harmonize the national CBD regulatory framework with other, sometimes conflicting, international regimes, such as the international patent regimes, WTO-TRIPS[20], and the FAO International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA).

As a principle it is vital for countries in the South[21], which have economies largely based on agriculture and large communities of small scale farmers, to continuously monitor, conserve, develop and add value to its genetic resources. The knowledge to do so is often developed through capacity building and collaboration with institutions in other countries. It is therefore crucial to develop national CDB/ABS regulatory regimes that do not stifle development, innovation and collaboration, often designed to benefit resource poor farmers. At the same time, it is also important for these countries to develop regimes which safeguard national interests, protect biodiversity and are implementable under conditions of limited financial resource and governance challenges.

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[17] Potentially leading to new drugs and treatments of high commercial value.

[18] Where it was argued that countries and companies in the North benefited massively from the genetic resource found in the South, without sharing the benefits with the counties and/or communities which were custodians of the resources.

[19] Consultative Group on International Agricultural Research.

[20] The Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS) is an international agreement administered by the World Trade Organization (WTO) that sets down minimum standards for many forms of intellectual property (IP) regulation as applied to nationals of other WTO Members.[2] It was negotiated at the end of the Uruguay Round of the General Agreement on Tariffs and Trade (GATT) in 1994

[21] But also for countries in the North with large bioresources and agroprocessing sectors

The GRIP projects of change under the heading- *Sharing benefits from the use and exchange of genetic* resources have dealt with the following issues:

- How to develop more efficient national CBD/ ABS regimes
- Awareness on implementation of Access and Benefit Sharing (ABS) legislation at national and institutional level
- Designing access and benefit sharing mechanisms at national and institutional level
- Documenting traditional knowledge and mechanisms for ensuring that such knowledge are protected from unregulated use or without prior consent.

The PoCs under this theme are listed in the table below.

Table 1. PoCs on Sharing benefits from the use and exchange of genetic resources.

Name	Country	Institution	PoC title
Regis Mafuratidze Manager Policy and advocacy department	Zimbabwe	Community Technology Development Trust, Harare,	Awareness on Implementation of Access and Benefit Sharing (ABS) legislation in Zimbabwe
Patricia Valdez Castro	Peru	Union for Ethical BioTrade	A proposal of implementation of legal framework on access and benefit sharing with respect to the Nagoya Protocol in Peru
Banshi Sharma,	Nepal	Directorate of Livestock Services,	Documentation of Traditional Knowledge (TK) and farming practices of oat *(Avena sativa)* as important forage crop in mid hills of Nepal
Huang Yuanyuan	China	Institute of Scientific and Technical Information	Designing an Accessing and Benefit Sharing Mechanism for the Germplasm Nurseries of MOA Built by Chinese Academy of Tropical Agriculture and Science
Rodrigo Sara	Mexico	Centro Internacional de Mejoramiento de Maize y Trigo (CIMMYT),	Harmonization between CBD and ITPGRFA: How does the ABS regime established under the Nagoya Protocol impact CGIAR Centers operating under the MLS of the ITPGRFA
Kutlwano Hutamo	South Africa	Agricultural Research Council	Protection of genetic resources and traditional/indigenous knowledge in South Africa: A look at international treaties and national compliance therewith
Nataša Pašalić Expert Associate	Bosnia and Herzego-vina	University of Banja Luka,	Strategy development of IPR related to PGR
Kien Nguyen Researcher of gene bank management	Vietnam	Plant Resources Center (PRC),	Strengthening awareness and action of the stakeholders as implementing Intel' agreements/conventions on genetic resources (GR) and intellectual properties (IPs) in Vietnam

Kacem Chammakhi Head of registration, PVP and external relations	Tunisia	Ministry of Agriculture	Strength and Weakness of GR management and use in Tunisia
Zoran Jovović Professor	Monte-negro	University of Montenegro, Biotechnical Faculty	Creation of the legal frame for sustainable use of agricultural genetic resources
Milena Savic Ivanov Head of Gene Bank department	Republic of Serbia	Ministry of Agriculture, Trade, Forestry and Water Management,	Revision of existing national and international legislation in Serbia related to PGRFA
Emre Öcalan, Turkey Patent Examiner	Turkey	Turkish Patent Institute	Documentation of Existing Knowledge in Turkey
Maria Virginia Jaramillo Navarro Legal Counsellor	Colombia	International Center for Tropical Agriculture-CIAT	Construction of a Comprehensive Database of National, Regional and International Laws Applicable in Colombia about IPR's, Genetic Resources and Biosafety, under the Regional LAC Agricultural Biosciences Platform
Natalia Lamprea Patent examiner	Colombia		Technical application of disclosure of origin in patents applications

5.2 Regimes and Regulations for developing Crops and Livestock

The value and importance of genetic resources for sustainable food production has been a central issue in both the Biodiversity Convention and in the FAO led International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA). People all over the world are dependent on the continuous protection, but also development of new crop cultivars and animal products able to sustain a rapidly growing population. With climate change and pronounced resource scarcity, the development of more productive crops and livestock is a vital issue for the 21th century. Breeding of new crops and animals are done by farmers themselves (informal breeding), international or national public institutions and small or multinational seed companies. To regulate and promote breeding, countries and the intentional community have developed seed and breeding regulations. The first International Convention for the Protection of New Varieties of Plants (the UPOV Convention) was adopted in 1961. Seed regulations in general aim to encourage breeding, promote varietal and seed quality, thereby 'protecting' farmers from planting seeds and cultivars of low quality generating low and unstable yields. At the same time, they are meant to set the rules of the market for different seed developers and suppliers, thus intending to create a "level playground".

Smallholders manage over 80 per cent of the world's estimated 500 million small farms and provide over 80 per cent of the food consumed in a large part of the developing world, contributing significantly to poverty reduction and food security. In many developing countries, most farmers reuse or exchange and multiply their own seed in an informal way, at times supported by a public breeding sector producing new crop varieties and distributing them at low cost[22].This is in contrast to many OECD countries where farmers buy most of their seeds developed and commercialized by the private sector. Within the agricultural community there has been a longstanding discussion on the value for poor famers of farm saved, free seed in relation to the need to have a commercial seed sector developing improved crop varieties. With the advent of the new biosciences, larger multinational seed companies and a declining public breeding sector, countries in the South are struggling to reform their seed and breeding regulatory regimes. The aim has been to try to develop regulatory systems creating incentives for both the commercial and public breeding sector to developing new improved varieties[23]- At the same time and as a balance[24], these regimes also need to ensure that small scale and poor farmers have access to cheap seed and are able to reuse and exchange seed freely. Farmer seed systems and formal seed systems have complementary tasks in supporting agricultural development and the management of plant genetic resources. Seed regulatory frameworks[25] provide legal boundaries in which both systems operate even though in most countries these have been designed to regulate the formal system only.

In addition to the UPOV and national seed regimes, there is also the newly and by most countries adapted, International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA). This Treaty establishes a Multilateral System (MLS) for facilitated access to a specified list of plant genetic resources for food and agriculture (PGRFA, including 35 food crops and 29 forages). The Treaty balances this access with benefit-sharing in the areas of information exchange, technology transfer, capacity building and commercial development. For these genetic resources, which are listed in Annex 1 of the ITPGRFA, the contracting Parties have agreed on standard terms and conditions that will govern their transfer for the purpose of research, breeding and training. The Treaty also contains sections on general parts that include; Farmers' Rights, supporting components, and financial and institutional provisions. Many countries in the South are struggling hard to implement the Treaty, harmonizing national and institutional regimes and administrative routines to benefit from the multilateral system for facilitated access of important crops and forages.

The GRIP projects of change under the heading- *regimes and regulations for the developing crops and livestock resources* have dealt with the following issues:

- How to develop policy regimes and programmes to promote conservation and sustainable use of plant genetic resources.
- How to implement the ITPGRFA, nationally and institutionally.
- Developing a legislative and policy framework of the informal seed system
- Improving the breeding policy framework, including Plant Breeders Right for public breeding.
- Institutions improving efficiency and ability to develop modern cultivars for small scale farmers.

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[22] or no cost at all.

[23] Developing modern cultivars with higher commercial value for farmers, improving productivity , value addition opportunities and income generation opportunities for the agricultural sector as a whole

[24] Very strong PBR regimes favor the breeding industry but may make it more difficult for small scale farmers to exchange protected seeds freely. Weak PBR regimes stifling the development of private sector seed companies giving farmers less improved varieties to choose from.

[25] The scope of these laws determines, to a large extent, the degree of freedom farmers have in handling their own seed, i.e. the crops for which the laws apply and the types of seed that are regulated. In addition, the level of implementation of the laws differs significantly between countries, sometimes providing NGOs, and even official institutions (such as those which certify seed), the space to support diverse ways to produce seeds.

Table 2. PoCs on regimes and regulations for the developing crops and livestock resources

Name	Country	Institution	PoC title
Rudo Musango Research Technician	Zimbabwe	Institute of Genetic Resource and Biotechnology, Harare	Documentation of Common Beans Grown at the Genetic Resources and Biotechnology Institute
Muhammad Sajjad Ali Assistant professor	Pakistan		Guidelines for the Harmonization of Existing IPR Regulations with International Agreements for the Facilitated Adoption of GM Crops in Pakistan
Sobhia Mohammed Saifan Head of plant genetic resources department	Jordan	National Center for Agricultural(NCARE), Biodiversity directorate	Implementation of ITPGRFA through usage of the SMTA in exchanging Jordanian barley
Diaeldin Ahmed Hassan Assistant professor	Sudan	Animal Resources Research Corporation, Veterinary Research Institute, Khartoum,	Risk assessment: Vaccination against *Theileria parva* in Southern Sudan
Nampeera Esther Lugwana Research assistant scientist	Uganda	National Crops Resources Research Institute, NaCRRI, Kampala	Evaluation and Conservation of Indigenous Vegetable Seeds for Improved Utilization in Central Uganda
Laura Karanja Senior Research officer	Kenya	Agricultural Research Institute, KAR	Developing a Legislative and Policy framework for conservation based informal seed system
Martin Orawu Plant Breeder/Geneticist	Uganda	National Semi-Arid Resources Research Institute (NASARRI),	Determination of approaches for licensing of crop varieties in National Research Institutes in Uganda
So Myong-Chol	DPR Korea	Kim Il Sung University	Promoting Rice Breeding under PVP Acts in DPR of Korea
Li Sok-Jun Researcher	DPR Korea	Kim Il Sung University	Promoting Rice Breeding under PVP Acts in DPR of Korea
Jared Onsando Plant examiners Service	Kenya	Kenya Plan Health Inspectorate	Development of Maize Reference Collection in Kenya
Augustine Mulandi David Plant examiners	Kenya	Kenya Plan Health Inspectorate	Development of Maize Reference Collection in Kenya

Geoffrey Kananji Assistant director of agricultural research and legumes breeder	Malawi	Department of Agricultural Research Services	Towards a functioning Plant Breeders Rights in Malawi
Yuanchun Zhou Assistant Professor	China	China Center for Intellectual Property in Agriculture, Chinese Academy of Agricultural Sciences	The Role of Geographical Indications(GIs) in the Conservation and Benefit-sharing of Genetic Resources (GRs) in China: A Case Study from Laiyang Wulong Goose
Sreten Terzić Research associate	Serbia	Institute of Field and Vegetable Crops, Department for oil crops, rapeseed section, Novi Sad	IP rights and prebreeding material
Joyce Eligi Mosile	Tanzania	The office of Plant Breeders Rights Ministry of Agriculture Food Security and Cooperatives	Potential benefits for Tanzania's membership to UPOV while implementing mutually compatible Intellectual Treaty on Plant Genetic Resources for Food and Agriculture (IT-PGRFA)
David Ombalo Otieno Principal Agricultural officer	Kenya	Ministry of Agriculture, Livestock and Fisheries	Domestication of the International Treaty on Plant Genetic resources for Food and Agriculture
Walter Reyes Borja PhD	Ecuador	Department of Biotechnology EELS-INIAP	Are the inventors benefiting from IPR's in Ecuador
Jasmin Grahić	Bosnia and Herzegovina	Faculty of Agriculture and Food Sciences, University of Sarajevo	Operative Program for Plant Genetic Resources in Agriculture in the Federation of Bosnia and Herzegovina
Arnela Okić	Bosnia and Herzegovina	Faculty of Agriculture and Food Sciences, University of Sarajevo	Operative Program for Plant Genetic Resources in Agriculture in the Federation of Bosnia and Herzegovina – raising of public awareness
Pratibha Brahmi Principal Scientist	India	National Bureau of Plant Genetic Resources, New Delhi	Formulate Material Transfer Agreements for germplasm exchange with private and non-government organization
Joseph Kengue Senior research officer in charge of PGRFA and IPR		Institute of Agricultural Research for Development	Sensitisation and introduction to IPR and plant variety protection in Cameroon

5.3 Polices for ownership of genetic resources and public private partnerships

Smallholders in the developing world have a crucial role providing food and bio-resources for a rapidly growing and more urbanized population. For these smallholders it is of crucial importance to have access to improved genetic resource, be it seeds, livestock, trees and fish producing systems.

The food and agriculture market situation in many parts of the developing world makes it possible to make rough distinction between two different supply systems for improved genetic resources (e.g seeds, livestock etc). One market driven system serving the larger and the medium scale commercially oriented farming sector, and one public goods driven system serving the small-scale and more subsistence oriented farming sector.

In terms of seeds, the commercially oriented system holds substantial opportunities for a market driven agricultural innovation process and a high adoption of modern technologies for seed development, diffusion and plant propagation. The commercial seed sector is largely dominated by transnational companies (TNCs). In simple terms, their primary interest is in developing and marketing elite seeds of a group of "global crops" (e.g. maize, soybean, oilseed rape/canola, cotton etc.) of importance to the farmers in those industrialized countries. The TNCs are, however, less interested in the low profit, country-specific and local-specific crops of crucial importance to small-scale farmers in developing countries. It is thus unlikely that the private sector will play the leading role in the development of high quality varieties most relevant to the needs of the poor and vulnerable farmers, at least in the foreseeable future. Thus, the development and commercialization of improved local varieties of crops such as sorghum, millet cooking banana, cassava, yams, sweet potato, chickpea, cowpea, beans, etc. will depend heavily on public sector based systems. Strengthening public institutions in their ability to develop improved new locally adapted varieties with a higher frequency would therefore be of great value. The new biosciences and other new breeding technologies are revolutionizing breeding, making it more precise and effective. The problem for the public sector is that many of these new technologies are under strong proprietary regimes in the private sector. Thus, if public institutions want to be part of the biology revolution and be more efficient in serving poor famers with improved varieties they have to collaborate with the private sector and other more advance public institutions in the North.

Ownership, management of Intellectual Property (IP), including institutional IP polices are an increasingly important part of public-private collaboration, technology transfer, technology dissemination and commercialisation. Public R&D institutions need to raise awareness of opportunities and obligations in the context of management of Intellectual Property (IP). However, the regulatory IP/GR frameworks controlling access and transfers of genetic resources/ and technology are complex, the literature is vast and incomprehensive, models and options are many. Thus, policy makers, scientists and other practitioners in public R&D institutions face a considerable challenge in negotiating appropriate agreement, formulating IP polices, and managing exchange of genetic resources, IP and knowledge.

Thus, to be able to serve the smallholders and poor famers and providing them with improved genetic resources enabling them to increase their productivity and improve their livelihoods, public institutions need to develop, polices and capacity to manage IP of genetic resources and public private partnerships.

The GRIP projects of change under the heading- *Polices for ownership of genetic resources and public private partnership*s have dealt with the following issues:

- The development of national and institutional IP policies
- Establishment of IP/tech transfer offices at public institutions
- Evaluating key issues for functional private-public partnerships

Table 3. PoCs on Polices for ownership of genetic resources and public private partnerships

Name	Country	Institution	PoC title
Patricia Anguita	Chile	Fundacion para la Innovacion Agraria, Santiago,	Facilitating the comprehension of the protection of GR and IPR in Chile
Luis Carlos Medina Mejia Assistant Negotiator in Intellectual Property	Peru	Ministry of Foreign Trade and Tourism,	Awareness of the Legal Framework on Access to Peruvian Genetic Resources for Investigations in a Peruvian University
Maureen Wangui Thuo Advocate of the High Court of Kenya	Kenya	Guram & Company advocates	Awareness of Intellectual Property Rights within the Informal Sector in Kenya
Nontuthuzelo Hobololo Consultant	South Africa	Daffodils Trading, Port Elisabeth	Development of IP policy for the University of Walter Sisulu (Eastern Cape, South Africa)
Hamisi M. Malebo Principal Researcher	Tanzania	scientist National Institute for Medical, Dar es Salaam,	Establishment of an IPR office at the National Institute for Medical Research (NIMR) in Tanzania
Goddy Muhanguzi Muhumuza	Uganda	Makerere University	Implementing Intellectual Property (IP) at Makerere University
Magdalena Hall Trade officer	Tanzania	Ministry of Industry and Trade, Dar Es Salaam,	National Intellectual Property Policy Formulation
Jhon Carlos Rios External patent examiner	Peru	National Institute for the Defense of Competition and Intellectual Property (INDECOPI), Lima,	Competitive Intelligence Based on Patent Analysis for Phytogenetics Resources of Peruvian Origin
Jane Achando Associate legal officer	Kenya	African Agricultural Technology Foundatio	Evaluating the Public-Private Partnerships at AATF
Pauline Mbuthu Masila Legal officer	Kenya	Kenya Agricultural Research, Nairobi,	National Intellectual Property Policy Formulation

6. List of participants

PARTICIPANTS LIST GRIP 12a
7th OF MAY – 25th OF MAY 2012

Name	Nationality	Position	Organization	Address
Patricia Anguita	Chile	Intellectual Property Program Coordinator	Fundacion para la Innovacion Agraria	Loreley 1582, La Reina Santiago Chile
Yuanyuan Huang	China	Assistant researcher	Institute of Scientific and Technical Information	Baodao Xincun, Danzhou, Hainan, China
Yuanchun Zhou	China	Assistant Professor	China Center for Intellectual Property in Agriculture	Soil Fertility Technology Labrotary Buildning Rom 512 No 12 Zhongguancun south street, Beijing P.R. China, 10081
Li Xuan	China	Program Officer	International Treaty of Plant Genetic Resources for food and agriculture	Wale delle Terme di Caraculla, Rome, Italy
Pratibha Brahmi	India	Principal Scientist	National Bureau of Plant Genetic Resources	Pusa Campus, New Delhi 110012
Sobhia Mohammed Saifan	Jordan	Head of plant genetic resources department	National Center for Agricultural Research and Extension (NCARE)	Biodiversity directorate, P.O. Box 639-Baqa'19381 Jordan
Augustine Mulandi David	Kenya	Plant examiner	Kenya plant health inspectorate service	P. O. Box 49592 – 00100 Nairobi, Kenya
Maureen Wangui Thuo	Kenya	Advocate of the high court of Kenya	Guram & Company advocates	P.O. Box 47765 – 00100 Nairobi, Kenya
Jane Akinyi Achando	Kenya	Associate legal officer	African agricultural technology foundation	ILII Campus P. O. Box 30709 – 00100 Nairobi, Kenya
Jared Onsando	Kenya	Plant examiner	Kenya plant health inspectorate service	P. O. Box 49592 – 00100 Nairobi, Kenya

Laura Shali Karanja	Kenya	Senior Research officer	Kenya agricultural research institute	Kari-Njoro P. O. Njoro – 20107, Kenya
Myong-Chol So	Korea, DPR	Researcher	Kim Il Sung University	Ryongnam-Dong, Daesong District, Pyongyan, DPR Korea
Sok-Jun Li	Korea, DPR	Researcher	Kim Il Sung University	Ryongnam-Dong, Daesong District, Pyongyan, DPR Korea
Geoffrey Acrey Duncan Kananji	Malawi	Assistant director of agricultural research and legumes breeder	Department of agricultural research	Chitedze Research Station P. O. Box 158 Lilongwe, Malawi
Banshi Sharma	Nepal	Regional director	Regional directorate of livestock services	Pokhara, Nepal
Sajjad Ali Muhammad	Pakistan	Assistant professor	Institute of Molecular Biology and Biotechnology	The University of Lahore, Lahore, 1-km Defence Road, Lahore, Pakistan
Luis Carlos Medina Mejia	Peru	Assistant Negotiator in intellectual property	Ministry of Foreign Trade and Tourism	Calle Uno Oeste N 050 Urb. Corpac – San Isidro – Lima Peru
Jhon Emerson Carlos Rios	Peru	External patent examiner	Instituo nacional de defensa de la competencia	Calle De La Po0sa No 104 San Popja – Lima 41, Peru
Patricia Valdez Castro	Peru	Researcher		
Diaeldin Ahmed Hassan	Sudan	Assistant professor	Animal Resources Research Corporation Veterinary Research Institute	Khartoum, Sudan
Esther Lugwana Nampeera	Uganda	Research assistant scientist	National crops resources Research Institute	NaCRRI, P. O. Box 7084, Kampala, Uganda
Martin Orawu	Uganda	Research officer, head of cotton program	National semi-arid Resources research institute (NASARRI)	c/o National agricultural research organization, Plot 11-13, Lugard Avenue P.O. Box 295, Entebbe, Uganda

Regis Mafuratidze	Zimbabwe	Manager Policy and advocacy department	Community Technology Development Trust	286 Northway, Prospect Waterfalls, Harare, Zimbabwe
Rudo Musango	Zimbabwe	Research Technician	Genetic Resource and Biotechnology Institute	P.O. Box CY 550, Causeway Harare, Zimbabwe

GRIP 12a Phase 1 SLU/Sweden May 2012

PARTICIPANTS LIST GRIP 12b
24th OF SEPTEMBER – 12th OF OCTOBER 2012

Name	Nationality	Position	Organization	Address
Jasmin Grahic	Bosnia and Herzegovina		Faculty of Agriculture and food sciences in Sarajevo	Zmaja Od Bosne, Br 8 Sarajevo
Arnela Okic	Bosnia and Herzegovina		Faculty of Agriculture and Food Sciences Sarajevo	
Natasa Pasalic	Bosnia and Herzegovina	Expert Associate	University of Banja Luka	Buleva vojvode Bojovica 1A 78000 Banja Luka
Joseph Kengue	Cameroon	Senior research officer in charge of PGRFA and IPR	Institute of Agricultural Research for Development	P.O BOX 02067 or 02123, Yaoundé
Maria Virginia Jaramillo Navarro	Colombia	Intellectual Property Officer	International Center for Tropical Agriculture-CIAT	KM 17 Recta Cali - Palmira
Natalia Lamprea Bermúdez	Colombia	Patent examiner-biotechnology		Carrera 45 # 22-44 Bloque F, apto 404 Bogota D.C
Walter Oswaldo Reyes Borja	Ecuador	Responsible of the Biotechnology Laboratory in the "Litoral Sur" Research Center of INIAP	Instituto Nacional Autónomo de Investigaciones Agropecuarias (INIAP)	Estación Experimental del Litoral Sur, Km 26, Duran-Tambo road, Virgen de Fátima, Yaguachi, Province of Guayas
Pauline Mbuthu Masila	Kenya	Legal officer	Kenya Agricultural Research Institute	P.O. Box 57811-00200 Nairobi
David Ombalo Otieno	Kenya	Principal Agricultural officer	Ministry of Agriculture	PO Box 30028-00200 Nairobi
Rodrigo Sara	Mexico	Legal Counsel and Acting IP Manager	Centro Internacional de Mejoramiento de Maiz y Trigo (CIMMYT)	Km 45, Carretera Mexio-Veracruz CP56130, Col El Batan Texococo
Zoran Jovovic	Montenegro	Professor	University of Montenegro, Biotechnical faculty	Mihaila Lalica 1 81000 Podgorica

Milena Savic-Ivanov	Serbia	Head of gene bank department	Ministry of Agriculture, Trade, Forestry and water management	Batajnicki put bb 11080 Belgrade - Zemun
Sreten Terzic	Serbia	Research assistant	Institute of Field and vegetable crops	Maksima Gorkog 30 21000 Novi Sad
Nontuthuzelo Hilda Hobololo	South Africa	Consultant	Daffodils Trading	26 Brian Crescent Bluewark Bay Port Elisabeth, 6212
Kutlwano Aggrineth Hutamo	South Africa	Candidate Attorney	Agricultural Research Council	1134 Park Street, Hatfield Pretoria, 0083
Magdalena Anthony Hall	Tanzania	Trade officer	Ministry of Industry and Trade	P.O. Box 9503 Dar Es Salaam
Hamisi Masanja Malebo	Tanzania	Principal Research scientist	National Institute for medical research	2448 Ocean Road/Luthuli Street P.O. Box 9653 Dar Es Salaam
Joyce Eligi Mosile	Tanzania	Agriculture officer, the office of plant breeders rights	Ministry of Agriculture food security and cooperatives	P.O. Box 9192 Dar-Es-Salaam
Ruethairat Boonsombat	Thailand	Lecturer	Institute of Biotechnology and Genetic Engineering Chulongkorn University	Institute bldg 3 Phayathai Rd. Pathumwan Bangkok 10800
Kacem Chammakhi	Tunisia	Head of registration, PVP and external relations	Ministry of Agriculture	D.G.P.C.Q.P.A. 30, Rue Alain Savary 1002 Tunis
Emre Öcalan	Turkey	Jr. Patent Examiner	Turkish Patent Institute	Hipodrom Cd. no: 115 Yenimahalle Ankara
Goddy Muhanguzi Muhumuza	Uganda	Senior legal officer Member common wealth Lawyers Association Member EALS & ULS	Makerere University	P O Box 7062 Kampaga
Kien Van Nguyen	Vietnam	Master of applied biology, A researcher of gene bank management	Plant Resources Center (PRC)	An Khanh- Hoai Duc- Ha Noi- Vietnam

GRIP 12b Phase 1 SLU/Uppsala Sep/Oct 2012

7. Programs

Genetic Resources and Intellectual Property Rights 2012a
Phase 1 Programme
May 7 – 25, 2012

Date	Time	Subject	Resource Person
First week			
May 7, Monday	0945-1000	Welcome by Vice chancellor and/or Dean of NL-faculty	**Kristina Glimelius -Dean of Faculty**
		GRIP Executive Programme Director	**Carl-Gustaf Thornström/Eva Thörn/Maria Ericsson**
	1000-1300	Introduction of participants, Course presentation, logistics	**Course management**
	1300-1400	Lunch	
	1400-1630	The genetic policy landscape. An overview	**Carl-Gustaf Thornström**

Date	Time	Subject	Resource Person
	1900-2100	Group work on Project of Change. Participants to discuss commonalities, discrepancies, and three common outstanding core issues from their PoC-drafts	**Course Participants**
May 8, Tuesday	0900-1215	UPOV: Introduction to and impact of plant variety protection (with group work)	**Fuminori Aihara/UPOV**
	1215-1330	Lunch	
	1330-1630	UPOV: Introduction… Continued	**Fuminori Aihara**
May 9, Wednesday	0900-1215	Presentation of participant´s draft Projects of Change	**Course management**
	1215-1330	Lunch	
	1330-1600 1600-1630	Presentation of participant´s draft Projects of Change Introducing: IBEA/Galapagos ABS Negotiation	**Course management** **Carl-Gustaf Thornström**
May 10, Thursday	0900-1215	FAO -ITPGR	**Eva Thörn**
	1215-1330	Lunch	
	1330-1500 1500-1630	WIPO TK/ Nagoya Int. regime Group work	**Carl-Gustaf Thornström**
May 11, Friday	0900-1215	International ABS regimes and the pharmaceutical industry	**Eva Talve (former CIP-Chalmers)**
	1215-1330	Lunch	
	1330-1630	PGR and biotechnology	**Rodomiro Ortiz/SLU**
Second week			
May 14, Monday	0900-1215	CBD/ABS	**Morten Walløe Tvedt/FNI**
	1215-1330	Lunch	
	1330-1630	Legal Aspects of Exchange, Use and Conservation of Farm Animal Genetic Resources	**Morten Walløe Tvedt/ Sipke Joost Hiemstra**

Date	Time	Subject	Resource Person
May 15, Tuesday	0900-1030	Group work	
	1030-1215	IP and ABS from business sector perspective	**Ivan Hjertman**
	1215-1330	Lunch	
	1330-1500 1500-1630	Bio-prospecting IP and development	**Håkan Tunon/SLU** **Patrick Andersson/ Swedish Patent Offic**
May 16, Wednesday	0900-10.30 10.30-1215	Agri-research and commercialisation Innovation and dev coop/INNOBIS	**Lars Eling/ SLU-holding** **Johan Åkerblom/Sida**
	1215-1330	Lunch	
	1330-1630	The pendulum keeps swinging: Present trends and developments in global IPR policy	**Marianne Levin /Stockholm University**
May 17, Thursday	0900-1215	Development of institutional IP policies/management practices including group work	**Fred Erbisch**
	1215-1330	Lunch	
	1330-1600	Development of institutional IP policies/management practices including group work	**Fred Erbisch**
May 18, Friday	0900-1215	Development of institutional IP policies/management practices including group work	**Fred Erbisch**
	1215-1330	Lunch	
	1330-1630	Group/individual work PoC	
Third week			
May 21, Monday	0900-1215	SEI IP issues in the Emerging Bio-economy	**Ivar Virgin/SEI**
	1215-1330	Lunch	
	1330-1630	SEI GMO and risk assessment	**Jens Sundström/SLU**

Date	Time	Subject	Resource Person
May 22, Tuesday	0900-1215	Patent on seeds and plants – an NGO perspective	**Christoph Then/ Greenpeace**
	1215-1330	Lunch	
	1330-1630	GMO-issues	**Kristofer Vamling/ Plant Science Ltd**
May 23, Wednesday	0900-1215	Group/individual work PoC	
	1215-1330	Lunch	
	1330-1630	Group/individual work PoC	
May 24, Thursday	0900-1215	Crop breeding ABS and IP issues	**Anke van den Hurk**
	1215-1330	Lunch	
	1330-1445	Project of Change work/presentations continued	**Course Management**
	1445-1600	IBEA/Galapagos ABS Negotiation exercise Follow up/conclusions	**Carl-Gustaf Thornström**
	1900	**Graduation Dinner**	
May 25, Friday	0900-1000	Project of Change work/presentations continued	**Course Management**
	1030-1215	Course Evaluation in groups	
	1215-1330	Lunch	
	1330-1400	Practical information about departures	**Maria Ericsson**

Programme for GRIP-12a Phase 3: - PoC Regional follow up seminar; ILRI/Nairobi, Kenya 19-23 November, 2012

Monday November 19

08.30 Introduction and Welcome
- Statement by ILRI- Director General Dr Jimmy Smith
- Statement by Carl-Gustaf Thornström, GRIP Executive director/SLU
- Practical information

Presentations and Discussions of PoCs

ABS/CBD/GR
09.30 Rudo Musango, Zimbabwe and Sobhia Saifan, Jordan
10.30 Coffee and tea
11.00 Regis Mafuratidze, Zimbabwe and Patricia Valdez Castro, Peru
12.00 Diaeldin A.S. Hassan (comments by Augustine Mulandi)

13.00 - 14.00 Lunch

PVP/GR
14.00 Nampeera Esther Lugwana, Uganda and Laura Karanja, Kenya
15.00 Martin Orawu, Uganda and So Myong-Chol, Li Sok-Jun, Korea DPR
16.00 Coffee and tea
16.30 Jared Onsando and Augustine Mulandi David, Kenya and Geoffrey Kananji, Malawi (comments by Jared Onsando)
17.30 End of day

Tuesday November 20

08.30 Reflections about day 1

IP policy
09.00 Patricia Anguita, Chile and Luis Medina Mejia, Peru
10.00 Coffee and tea
10.30 Banshi Sharma, Nepal and Huang Yuanyuan, China
12.25 – GROUP PHOTO

12.30 - 13.30 Lunch

13.30 YuanChun Zhou, China and Maureen Wangui Thuo, Kenya

PP-partnership
14.30 Sajjad Muhammad, Pakistan and Pratibha Brahmi, India
15.30 Coffee and tea
16.00 Jhon Carlos, Peru and Jane Achando, Kenya
17.00 General discussion of all presentations made. Preliminary take home messages
17.30 End of day

Wednesday November 21
08.00 Departure for ICIPE
Arrival and visit at ICIPE

12.00 Lunch

16.00 Departure
17.00 Travel back to Hotel

Thursday November 22
08.30 Reflections about day 1, 2&3
10.00 Coffee/tea
10.30 - 12.30 incl. Lunch 12.30 - 14.00 Group Work:
Participants divided into 3-4-5 groups and discuss PoC work/conclusions and way forward both in general terms and but also on their specific PoC work. Each group to agree on: 3-5
Summary conclusions/"take home" messages from all PoC presentations:

-The three most important conclusions/"take home" messages from individual PoC presentations. Each group work on the PoCs presented by each of the group members (say 5 in each group would give 15 key conclusion in total/group). At least two summary recommendations for way forward for each of the PoC work and for all the individuals within say 5 in each of the group which would give 10 key summary recommendations in total/group.
13.30 – 14.45 Visit BecA, Bio-repository, BioInnovate
15.00 – 16.30 Reports from group discussions
16.30 End of day

19.00 FAREWELL DINNER AT **FOGO GAUCHO**

Friday November 23
08.30 Reflections day 4
09.00 Group Work from day 4 continued.
11.00 - 12.30 Presentation discussion of group work

12.30 - 14.00 Lunch

14.00 - 15.00 Presentation discussion of group work continued
15.00 Coffee/tea
15.30 Genetic Policy landscape update (CG Thornström –Eva Thörn –Ivar Virgin)
16.30 Discussion of way forward , follow up and evaluation of week
17.00 Farewell and End of day

GRIP 12 a Phase 3 Nairobi Nov 2012

Field visit to ICIPE 12 a –Duduville/Nairobi

Genetic Resources and Intellectual Property Rights 2012b
Phase 1 Programme
September 24 – October 12, 2012

Date	Time	Subject	Resource Person	Lecture hall
First week				
Sept 24, Monday	0930-0945 1000-1300	Welcome by SLU Vice chancellor **GRIP Executive Programme Director** Introduction of participants, Course presentation, logistics	**SLU Vice Chancellor Lisa Sennerby Forsse** **Carl-Gustaf Thornström/Eva Thörn/Maria Ericsson** **Course management**	**Hall A241** BioCentrum
	1300-1400	Lunch		
	1400-1630	The genetic policy landscape. An overview	**Carl-Gustaf Thornström/SLU**	**Hall A241** BioCentrum
	1900-2100	Group work on Project of Change. Participants to discuss commonalities, discrepancies, and three common outstanding core issues from their PoC-drafts	**Course Participants**	

Date	Time	Subject	Resource Person	Lecture hall
Sept 25, Tuesday	0900-1215	Presentation of participant´s draft Projects of Change	**Course management**	**Hall A241** BioCentrum
	1215-1330	Lunch		
	1330-1600 1600-1630	Presentation of participant´s draft Projects of Change Introducing: IBEA/Galapagos ABS Negotiation	**Course management** **Carl-Gustaf Thornström/SLU**	**Hall A241** BioCentrum
Sept 26, Wednesday	0900-1215	UPOV: Introduction to and impact of plant variety protection (with group work)	**Fuminori Aihara/ UPOV**	**Hall A281** BioCentrum
	1215-1330	Lunch		
	1330-1630	UPOV: Introduction… Continued	**Fuminori Aihara/ UPOV**	**Hall A281** BioCentrum
Sept 27, Thursday	0900-1215	FAO -ITPGR	**Eva Thörn/SLU**	**Hall N**
	1215-1330	Lunch		
	1330-1500 1500-1630	WIPO TK/ Nagoya Int. regime IP and development	**Carl-Gustaf Thornström/SLU** **Patrik Andersson/PRV**	**Hall N** Downstairs Main Lecture Building
Sept 28, Friday	0900-1215	Shaping IP Based Business: Eye on Pharmaceutical and Agri-biotech Industries	**Eva Talve (former CIP-Chalmers)**	**Hall A281** BioCentrum
	1215-1330	Lunch		
	1330-1630	CBD/Nagoya Protocol/ABS	**CG Thornström/SLU**	**Hall A281** BioCentrum
Second week				
Oct 1, Monday	0900-1215	PGR and biotechnology	**Rodomiro Ortiz/SLU**	**Hall G**
	1215-1330	Lunch		
	1330-1630	Legal Aspects of Exchange, Use and Conservation of Farm Animal Genetic Resources	**Sipke Joost Hiemstra/CGN**	**Hall G** Ground floor Main Lecture Building

Date	Time	Subject	Resource Person	Lecture hall
Oct 2, Tuesday	0900-1100	IP and ABS from business sector perspective	**Ivan Hjertman/IP Interface AB**	**Hall N**
	1100-1230	Biodiversity, climate change and eco-system services	**Karin Gerhard/SLU**	**Hall N**
	1230-1330	Lunch		
	1330-1500 1500-1630	Bio-prospecting Group work	**Håkan Tunon/SLU**	**Hall N** Downstairs Main Lecture Building
Oct 3, Wednesday	0900-10.30 10.30-1215	Agri-research and commercialisation Innovation and dev coop/INNOBIS	**Björn Ingemarsson/ SLU-holding** **Johan Åkerblom/Sida**	**Hall A281** BioCentrum
	1215-1330	Lunch		
	1330-1630	The pendulum keeps swinging: Present trends and developments in global IPR policy	**Marianne Levin /Stockholm University**	**Hall A281** BioCentrum
Oct 4, Thursday	0900-1215	Development of institutional IP policies/management practices including group work	**Fred Erbisch**	**Hall A281** BioCentrum
	1215-1330	Lunch		
	1330-1630	Development of institutional IP policies/management practices including group work	**Fred Erbisch**	**Hall A281** BioCentrum
Oct 5, Friday	0900-1215	Development of institutional IP policies/management practices including group work	**Fred Erbisch**	**Hall A281** BioCentrum
	1215-1330	Lunch		
	1330-1630	Innovation with biotechnology in plant breeding	**Kristofer Vamling/ BASF**	**Hall A281** BioCentrum

Third week				
Oct 8, Monday	0900-1215	IP issues in the Emerging Bio-economy	**Ivar Virgin/SEI**	**Hall A241** BioCentrum
	1215-1330	Lunch		
	1330-1630	GMO and risk assessment	**Jens Sundström/SLU**	**Hall A241** BioCentrum
Oct 9, Tuesday	0900-1215	Patent on seeds and plants – an NGO perspective	**Christoph Then/ Greenpeace**	**Hall A281** BioCentrum
	1215-1330	Lunch		
	1330-1630	Animal breeding	**Jan Philipsson/ Birgitta Malmfors/SLU**	**Hall A281** BioCentrum
Oct 10, Wednesday	0900-1215	Access to genetic resources and plant breeding	**Anke van den Hurk/ Plantum**	**Hall A281** BioCentrum
	1215-1330	Lunch		
	1330-1630	Group/individual work PoC		
Oct 11, Thursday	0900-1215	Project of Change work/presentations continued	**Course Management**	**Hall A281** BioCentrum
	1215-1330	Lunch		
	1330-1445	Project of Change work/presentations continued	**Course Management**	**Hall A281** BioCentrum
	1445-1600	IBEA/Galapagos ABS Negotiation exercise Follow up/conclusions	**Carl-Gustaf Thornström**	**Hall A281** BioCentrum
	1900	**Graduation Dinner**		
Oct 12, Friday	1000-1215	Course evaluation	**Course Management**	**Hall A281** BioCentrum
	1215-1330	Lunch		
	1330-1400	Practical information about departures	**Maria Ericsson**	**Hall A281** BioCentrum

Programme for GRIP-12b Phase 3: - PoC Regional follow up seminar; Novotel Hotel Bangkok, Thailand, 18-22 March, 2013.

Monday March 18

08.30 Introduction and Welcome
- Statement by GRIP management
- Practical information

Presentations and Discussions of PoCs

FAO-IT TK/GR
09.30 Natasa Pasalic, Bosnia and Herzegovina and Sreten Terzic, Serbia
10.30 Coffee and tea
11.00 Jasmin Grahic, Bosnia and Herzegovina and Kien Nguygen, Vietnam
12.00 Arnela Okic, Bosnia and Herzegovina commented by Walter Reyes Borja, Ecuador
12.30 Lunch

PBR/PVP-UPOV, FAO-IT
13.30 Joyce Mosile, Tanzania and David Otieno, Kenya
14.30 Rodrigo Sara, Mexico and Kacem Chammakhi, Tunisia
15.30 Coffee and tea
16.00 Walter Reyes Borja, Ecuador commented by Arnela Okic, Bosnia and Herzegovina

IP-TK databases National legal frameworks databases
16.30 Zoran Jovovic, Montenegro and Emre Öcalan, Turkey
17.30 End of day

Tuesday March 19

08.30 Reflections about day 1

IP-TK databases National legal frameworks databases cont.
09.00 Maria Jaramillo, Colombia commented by Milena Savic-Ivanov, Serbia
09.30 Coffee and tea
10.00 Milena Savic-Ivanov, Serbia and Kutlwano Hutamo, South Africa

Publ univ-IP and commercialization
11.00 Nontuthuzeloa Hobololo, South Africa and Joseph Kengue, Cameroon
12.00 GROUP PHOTO
12.30 Lunch
13.30 Goddy Muhanguzi Muhumuza, Uganda and Ruethairat Boonsombat, Thailand
14.30 Magdalena Hall, Tanzania and Hamisi Malebo, Tanzania
15.30 Coffee and tea
16.00 Natalia Lamprea Bermundez, Colombia and Pauline Masila, Kenya
17.00 General discussion of all presentations made. Preliminary take home messages
17.30 End of day

Wednesday March 20

Amazing One Day Damnern Saduak & Agro @ Mahasawat Trip
07.30 Departure from hotel
12.00 Lunch
16.00 Arrival back to hotel

Thursday March 21

08.30 Reflections about day 1, 2&3
09.00 SEI Asian challenges with focus on agricultural issue
10.30 Coffee/tea
11.00 Open space - Group work
12.30 Lunch
13.30 Group work continued, presentation and discussion
16.00 End of day
19.00 FAREWELL DINNER on the river

Friday March 22

08.30 Reflections day 4
09.00 Group work
11.00 Presentation and discussion of group work
13.00 Lunch
14.00 Course evaluation
15.00 Coffee/tea
15.30 Any other issues
~ 16.00 Farewell and End of day

GRIP 12b Phase 3 Bangkok March 2013

Plenary session

8. List of delivered reports

8.1 GRIP 12a not finalized PoCs

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Muhammad Sajjad Ali	Pakistan	PP-partnership	Guidelines for the Harmonization of Existing IPR Regulations with International Agreements for the Facilitated Adoption of GM Crops in Pakistan	43
Jhon Carlos Rios	Peru	PP-partnership	Competitive Intelligence Based on Patent Analysis for Phytogenetics Resources of Peruvian Origin	47
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Regis Mafuratidze	Zimbabwe	ABS/CBD/GR	Awareness on Implementation of Acess and Benefit Sharing (ABS) legislation in Zimbabwe	63
Patricia Valdez Castro	Peru	ABS/CBD/GR	A proposal of implementation of legal framework on access and benefit sharing with respect to the Nagoya Protocol in Peru	66
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Nampeera Esther Lugwana	Uganda	PVP/GR	Evaluation and Conservation of Indigenous Vegetable Seeds for Improved Utilization in Central Uganda	70
Laura Karanja	Kenya	PVP/GR	Developing a Legislative and Policy framework for conservation based informal seed system model for vegetative propagated material in Kenya	74
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Luis Carlos Medina Mejia	Peru	IP-policy	Awareness of the Legal Framework on Access to Peruvian Genetic Resources for Investigations in a Peruvian University	94
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Yuanchun Zhou	China	IP-policy	The Role of Geographical Indications(GIs) in the Conservation and Benefit-sharing of Genetic Resources (GRs) in China: A Case Study from Laiyang Wulong Goose	105
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8.4 GRIP 12 Final reports

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9. Delivered PoCs

GRIP 12a not finalized PoCs

IP-policy

Patricia Anguita

Intellectual Property Program Coordinator
Fundacion para la Innovacion Agraria, Loreley 1582, La Reina, Santiago, Chile

Facilitating the comprehension of the protection of GR and IPR in Chile

1. Background and objectives

Chile is rich in natural resources and it has been identified among the 34 places in the world more valuable to preserve, called hot spots. It is estimated that at least Chile has 30,000 species of plants and animals. Records have indicated the existence of around 6,000 vascular plant taxa and flora in Chile, which 46% are endemic and 43% native.
Chile under the protection systems of intellectual property rights has established a number of commitments under various international agreements, both multilateral and bilateral. Chile has implemented a series laws, regulations and procedures, as well as creation of new institutions, generating high standards of protection of intellectual property, in order to comply to the international commitments. Chile is a member of CBD and has implemented UPOV'78 system. However, in relation to the protection of genetic resources, there is still more discussion on appropriate legislation. Although there have been several attempts to develop a legislation in this regard, it has not reached the consensus needed to advance in the field. This is a complex situation, because as mentioned before, Chile's genetic resources are highly endemic. From the regional perspective, Latin America is one of the biggest promoters of the genetic resource protection, which constitutes an integral part of the issues that Chile is negotiating at regional level, leading to new commitments.
Meanwhile, the policy makers and the congressmen do not know enough about what is the meaning of the international treaties and multilateral conventions related with IP issues. Many of these people confuse the information and think that the breeder's law goes against of genetic resources protection. Currently, IP rights are beginning to be discussed more openly so there is an opportunity to introduce information about this issue among the authorities.
The objective of the P of C is to improve the understanding and awareness regarding the importance of genetic resources protection and the Intellectual Property Rights in the public and policy makers related with the Agricultural sector. Also, another goal is to achieve that Ministry of Agriculture prioritizes a draft bill on GR protection in the legislative agenda.

2. Activities so far

I gathered the information to prepare a reference document about the situation in Chile related with the genetic resource protection and IPR from May to October. This report is ready to be edited and aims to provide an overview of current legislation on intellectual property rigths. Specifically, the document reviews the regulation on categories related to agriculture, protection of new plant varieties, genetic resources and geographical indications. Also the document analyzes the international negotiations and comparative law on the matters, in order to foresee the current trends in each category of rights.

We have done the first of the two proposed workshops targeting the stakeholders in the Ministry of Agriculture, during June. We presented and discussed the following topics in the workshop: international treaties, international negotiations, geographical indications, genetic resource protection, new varieties of plants and undisclosed information. I prepared that lecture with the collaboration of an international treaties lawyer and we had an audience of 20 people.
Finally, I had two meetings with the Ministry of Agriculture legal advisors, who were working in the design and developing the draft of new laws, including the genetic resource protection. The meeting results were not as good as we expected because the Ministry of Agriculture's priorities have changed. Now, the authority is more concerned about biosecurity laws and goes further to approve the new breeder's law to comply our commitment to sign the UPOV'91 convention.

3. Activities to be done before submission of report

Until now, we were doing as much as we could. The reference document and the first workshop were done.

4. Problems/obstacles/support needed

During the last 3 months, the work with the Ministry of Agriculture became complicated because the priorities to work in the genetic resource protection were changing; focusing in the political issues like biosecurity law, plant protection law to go to UPOV'91 convention, agrochemical proof database and others matters. The genetic resource protection and the traditional knowledge protection are part of the work of the inter-ministerial group, including Environmental Ministry, Finance Ministry and Ministry of Agriculture, among others. They are working with the genetic resource protection and traditional knowledge protection like a whole matter, without consider the specificity of each issue. This situation is a problem because the government has to solve the law of the indigenous people of Chile, delaying the advance of the genetic resource protection.
While the Ministry of Agriculture does not drive the issue of genetic resource protection, the timing will depend on the priorities of the inter-ministerial group. Nevertheless, there is a big involvement about improving the Chilean germplasm bank system, which could open the possibilities to access to a new genetic material from other countries, in order to enhance our plant genetic improvement system, but the Ministry of Agriculture have not engaged in the plant resource protection, because the authority doesn´t see that this is necessary.
I think the genetic resource protection should be a main matter inside the Fundation for Agrarian Innovation, where I work, because is a long term project and it requires to be driven all the entire time. In that sense, we should do more workshops to different audiences in order to explain and clarify this important matter. Probably, it would be very useful to know the experience of others countries about this.

5. Planned and preliminary deliverables within the PoC

In order to fulfill the main objective of this project, I have to review and edit the reference document about the situation in Chile related with the genetic resource protection and IPR to be published on the first months of 2013. In the other hand the second goal is to materialize the second workshop proposed, although it will be very difficult to reach it before November 16th.
The third objective will not be possibly to achieve since the Ministry of Agriculture doesn't want to work with genetic resources protection law at the moment.

6. Preliminary conclusion of work done so far

When I presented the final proposal of PoC, I supposed that some things could affect the results. One of them was that the people working on the genetic plant protection at the Ministry of Agriculture would not

realize the importance for Chile to cope with this issue. Also, the Ministry of Agriculture would not progress with these matters owing to political interests related to the upcoming elections.
Currently, both problems that I guessed happened and now I am stuck and this issue won't go any further between this and the next year. Anyway, I realize that we put the issue on the table and we believe that this matter will be very important soon. Probably, a PoC more realistic could have been to do workshops with breeders or people working in plant genetic improvement. This could allow them to learn more about this important matter, so critical mass can be formed to influence the government to work more consciously in this issue.

PP-partnership

Muhammad Sajjad Ali

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Guidelines for the Harmonization of Existing IPR Regulations with International Agreements for the Facilitated Adoption of GM Crops in Pakistan

Background
The appearance of Pakistan as 5th largest GM crop growing country in the report by International Service for the Acquisition of Agricultural Biotechnology Applications (ISAAA) in 2011 is testimony to the successful cultivation of GM cotton crop in the country. At present (2012-13) an area of nearly 3 million hectares is under Bt cotton.
Bt cotton (MON 531) was NOT patented in Pakistan till 2011, however, it was widely cross bred with Pakistani varieties by public as well as private seed companies. During 2012, eight Bt cotton and six conventional varieties are approved by the Punjab Seed Council (PSC) for cultivation in Punjab. Because these are Open Pollinated Varieties (OPVs), thus seed is also utilized for the next season's planting.
Pakistan ratified the Cartagena Protocol of Biosafety (CPB) and maintains a framework for handling GMO's. However, the capacity in terms of infrastructure and human resources is lacking. Last year's devolution of Federal Ministries of Environment, Food and Agriculture, and Health, among others, have shattered the existing set up. Regulatory guidelines are prepared and approved by the National Biosafety Committee who works in co ordination with a Technical Advisory Committee (TAC); and Institutional Biosafety Committees (IBC).
The three monitoring and implementing bodies administer enforcement of the National Biosafety Guidelines.
The current Seed Act is outdated and limited to public sector seed companies only. Proposed amendments to the Seed Act would allow Research and Development (R&D) in national centres to transfer genetic material to private companies. Punitive measures and fines have been proposed to deter the illegal sale of seed.
The Plant Breeders' Rights (PBR) Bill would allow for the registration of varieties and the payment of royalties bringing Pakistan into compliance of its WTO commitments under the Trade Related Intellectual Property Rights (TRIPS – IPR).The delay in seed and plant breeder legislation is perceived as a major impediment to investment in Pakistan by multinational seed companies. Reluctance to finalize this

legislation is due in part to the desire of Pakistan's public seed facilities to dominate the seed market. Moreover, potential investors are wary that their proprietary rights will not be fully protected under the current proposals.

Objective

- An evaluation of the procedure rules, acts, drafts and regulations enacted and adopted for the introduction and management of GMCs in Pakistan;
- Identification of hindrances and problem areas which delay the delivery of products of plant biotechnology in the country;
- Formulation of guidelines for the rapid and facilitated introduction of GMCs in accordance with international legislations;

Activities undertaken so far before submission of report (10 November 2012)

A comprehensive literature review was carried out. Libraries of concerned departments and institutions were consulted for a thorough understanding of the enacted laws.

Official meetings with concerned personnel proved a useful tool of gaining the perspectives of Govt. officials, farmers, dealers in agricultural commodities and work force of seed/pesticide companies.

Activities to be done before submission of the second report in November 2012

The organization and compilation of the data about the case study of MON531 will be carried out.

Problems /obstacles /support needed

Visits to officials of the agriculture department took a longer time although the information and data obtained was not satisfactory. It was due to lack of interest shown by the concerned by the respective personnel in IP policy related aspects. Secondly the offices being far and few, the travel incurred a financial burden.

The set limit of number of pages and style has forced the report to be cut short although much could have been reported owing to a large set of information and conclusions/guidelines.

Planned and preliminary deliverables within the PoC

Pakistan being signatory to WTO, has to comply with the TRIPs Agreement w.e.f. Jan.1, 2000. Pakistan is also party to other multinational Agreements such as the Convention establishing WIPO since 1977, and the Bern Convention since 1970. According to GATT /WTO jurisprudence a domestic law is deemed to be in conformity with the international treaty unless it mandates a measure, which is repugnant to the treaty. With this in view there is a need to modernize and revamp National IPR System.

Under the current system of approval of new GM events in the country, the IBC may make recommendations to the NBC regarding the awarding of exemptions for laboratory and fieldwork related to products of bioengineering. These recommendations may be accepted, and formal approval granted, if sufficient information and grounds exist to consider the risk as being minimal or non-existent. After permission for the deregulation is granted by the NBC, approval can still be withdrawn in case sufficient technical data and other evidence later becomes available that warrants a review. The consultation data and regulatory framework includes the Plant Breeders Rights Act, Biosafety Rules and Guidelines and Amendments in the Seed Act 1976.A general mechanism of regulatory approval is presented below (figure 1).

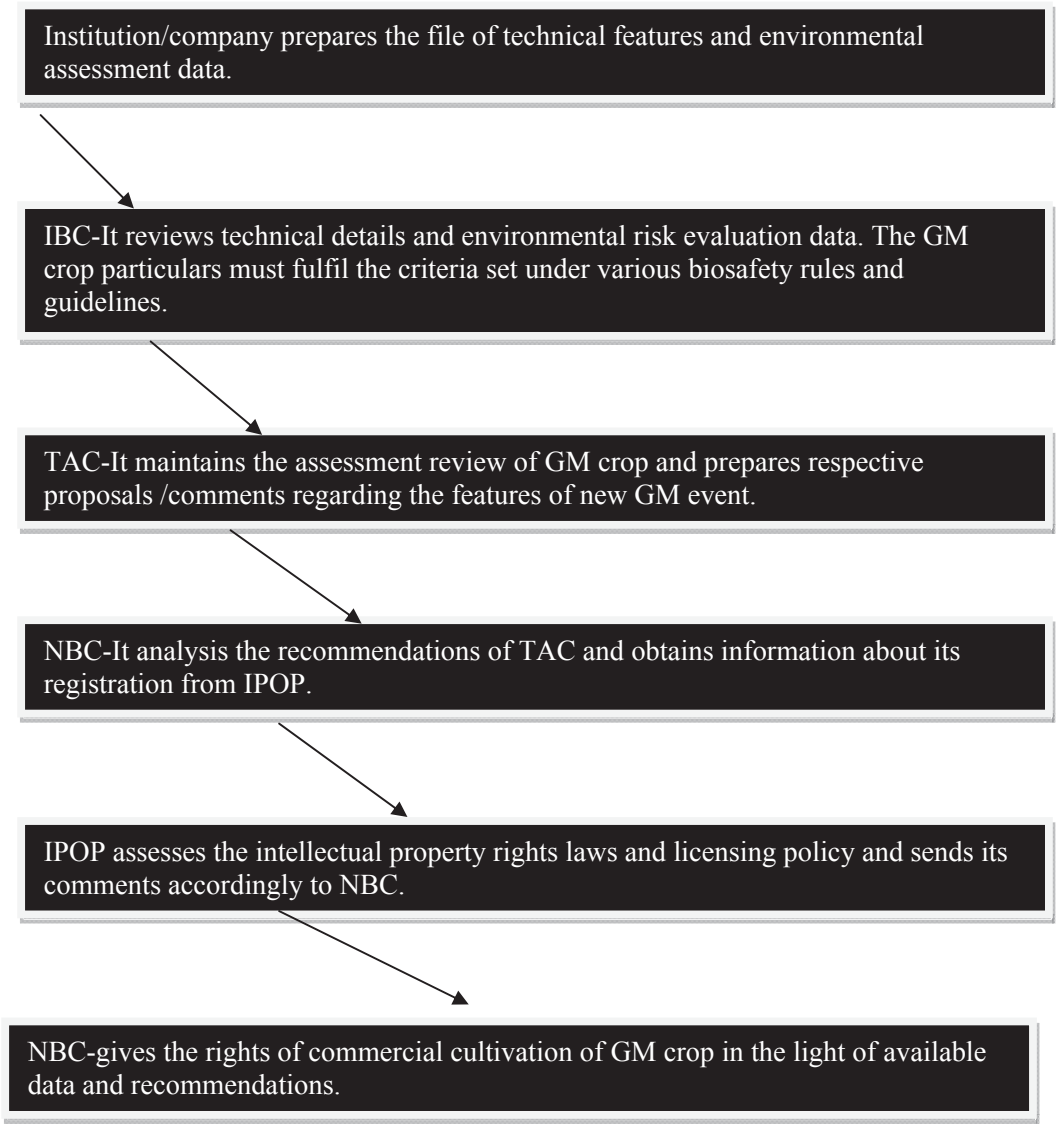

Figure 1: Procedure for obtaining authorization for commercial cultivation of a newly developed GM crop
Source: Personal contribution

In Pakistan, the lack of awareness about biotechnology laws is a major factor for the delay in adoption of biotech crops. A careful analysis of the current situation indicates an extremely slow process for drafting biotechnology legislation in Pakistan. Pakistan Biosafety Guidelines was submitted to the Ministry of Environment in January 2000. However, enactment of these guidelines only came into force after the approval of the Pakistan Biosafety Rules in 2005. The Plant Breeders' Rights Bill 2008 and the Seed (Amendment) Bill 2008 were approved by the parliament recently. The lack of political will and the slow legislative process are the major reasons for delay in the commercial adoption of biotech crops in Pakistan.

A useful indicator to gauge the overall situation of IPR in a country is the composition and trend in the fees its offices would receive under IPR. Two-thirds of revenue collected by IPO office-Pakistan is by trade mark registry and only 1.3% by copyrights office and a 21% by the patents‟ office. Moreover, Pakistan has experienced a *decrease* of 66% in IP registrations during 2005-08.

The current study has identified the following major issues relevant to adoption and spread of GM events in Pakistan.

1. In the National Seed Policy:
   - Importance of indigenous crop varieties should not be ignored and attempts be made to retreat and conserve them.
   - Importance should be given to research on strengthening fecundity of seed of local crop varieties.
2. District-wise community seed banks should be made possible to save local seed and encourage farmer's traditional saving, sharing and exchanging system.
3. Conformity with TRIPS
4. Consolidation of the sui generis System
5. Counterbalancing TRIPS with CBD [with in its framework]
6. Documentation [protection] of national gene pool
7. Risk assessment and safe-guards against GMOs
8. Strengthening of [bio-tech] research capacity
9. Free but fair [shared] access to PGRs
10. Technology transfer
11. Investment in genetic resource development
12. Technical and financial assistance [TRIPS provision] by industrialized world
13. The PBR Act should be;
    - Made in accordance with the Convention on Biological Diversity (CBD).
    - Farmers friendly and protective of their rights.
    - Limited IPRs may be given to breeders, enacted after proper consultation with all the interest groups, especially the farmers.
14. In our country, farmers' union, especially of small farmers, is lacking due to which they are losing their inherited traditional knowledge and have become dependent on a few companies. Attempts should be made to get farmers organized and local knowledge based Agricultural Systems encouraged for sustainable agriculture in Pakistan.

Preliminary conclusion of work done so far

In the following segment of the current study the emphasis will be on the case study of MON531 cotton event in Pakistan covering the questions about IPR and royalty fee between Monsanto officials and the Govt of Pakistan.The less number of registered biotech events (rice, sugarcane) along with the delay in enactment of laws slows down the extension of GM technology to the farming community.

Jhon Carlos Rios

External patent examiner
National Institute for the Defense of Competition and Intellectual Property (INDECOPI) -Lima, Peru

Competitive Intelligence Based on Patent Analysis for Phytogenetics Resources of Peruvian Origin

Background and Objectives

Peru is one of the world's most megadiverse countries, with a great concentration and variety of plant resources, species found nowhere else on Earth. Many of these plants have different nutritional and pharmacological properties; which have also been used for many years by natives of Andes and Amazon Peruvians. For a long time these plant resources have been marketed in bulk with little or no added value.

The importance of natural products as a source for the development of new products with value-added is supported by statistical data, being observed a tendency towards increasing of consumption of products related to natural origin and mostly avoiding artificial or synthetic products. On the other hand, there is a strong tendency worldwide in achieving a better quality of life, so it has increased consumption of dietary products, nutraceuticals and pharmaceuticals derived from natural sources, especially in major international markets, such as Europe, United States, Japan, and other countries. (WIPO, 2006)

In this regard, the development of products or new products based on plant resources is a great alternative to provide value to our plant resources and to obtain major profitability for its commercialization. To guide research in this field, the patent information is a useful tool for the guidance and support of projects for the development of new products due to their intrinsic characteristics: high level of update, technical content clearly described, among other things, to do it a source must be consulted and an indispensable element of technological watch (Amaral, 2008).

Thus, in the present work, will examine patent applications and patents granted in the main patent offices in the world (Europe EPO, United States USPTO, Japan JPO, WIPO PCT) that are related to the main plant resources of Peruvian origin with potential for commercial use; they are: Maca (Lepidium meyenii), Camu-Camu (Myrciaria dubia) and Yacon (Smallantus sonchifolius) (WIPO, 2005).

The main objectives of the present work are:

a) To recover patent applications of product based on plant resources of Peruvian origin with potential of commercial exploitation,

b) To identify from the plant resources proposed for the study, which of them has the largest number of products with potential of commercial exploitation and

c) To determine the total number of patent applications, that claim or protect products derived from plant resources proposed to investigate.

Activities so far

The following activities have so far been undertaken:

i) Selection of phytogenetics resources with which to work in the present study.
ii) Selection of keywords properly for use in patent search.
iii) Access to the database delphion with which there was obtained the information of the patents related to the phytogenetics resources used for the present study.
iv) Compilation of the information in the database of patents in relation with the phytogenetics resources proposed for the study.
v) Collecting appropriate bibliography for interpreting analyzing patents.

Activities to be done before submission of report

To realize the analysis of patents, with the purpose of discovering what types of products have been manufactured from the phytogenetics resources proposed.

To elaborate technological tables or maps that clearly show each of the products with potential commercial value produced from the proposed phytogenetics resources.

Problems/Obstacles/support needed

One of the problems was to obtain the database Delphion, since it is a paid database. I had to realize the necessary negotiations in my institution for the purchase of the software. That software allows us to compile in an alone digital environment, different requests of patents of diverse countries such as Europe EPO, United States USPTO, Japan JPO, WIPO PCT.

For the preparation of the tables and/or technological maps it is not possible to use the software Delphion, since it does not have this function, so I probably will use other software, which can be Excel or SPSS.

Planned and preliminary deliverables within the PoC

The main result of the present work will be to show to any interested party (businessman or public in general) the opportunities of production of diverse potentially marketable products from Phytogenetics Resources of Peruvian Origin. It will depend on each one of them if this information can use it directly or to carry out further research in the development of new products.

The present work also will contribute in encouraging the use of information contained in the patents, for the search of new opportunities of potentially marketable products from other Phytogenetics Resources of Peruvian Origin or another place.

The present work also will contribute in encouraging the innovation in Peru, since it is expected that new research that could be realized from the utilization of the information of patents, also new patents could be generated.

Preliminary conclusion of work done so far

As a preliminary conclusion can be stated that in recent years there has been an increase in patent applications relating to plant phytogenetics resources proposed for this study.

It has been observed that there is a wide variety of potentially marketable products from the proposed plant phytogenetic resources, making commercial application can be given in the following fields: food, cosmetic, pharmaceutical, etc.

Jane Achando

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Evaluating the Public-Private Partnerships at AATF

BACK GROUND AND OBJECTIVES
Sub-Saharan Africa (SSA) is the only region in the globe today where poverty and malnutrion continue to increase both as a percentage of the population and in absolute numbers (Sachs, 2005). Over half of the hungry people are subsistence farmers who cannot grow enough food on a consistent basis to feed their families and escape poverty. With this realization, the African Agricultural Technology Foundation (AATF) was formed in 2003 to facilitate Public-Private Partnerships for the access and delivery of appropriate technologies to the resource-poor smallholder farmers in Sub-Saharan Africa. Thus, the quest to increase Africa's agricultural productivity and reduce rural poverty has been at the centre of AATF objectives and strategic vision.
Reversing the productivity gap in African agriculture requires not only an understanding of the ensuing constraints but most importantly access to solutions to such constraints. AATF's experience from the projects it works on shows that with appropriate agricultural technologies coupled with good policies and approaching agriculture from a value chain perspective, smallholder African farmers can quickly increase their productivity, increase food security and reduce poverty

Public-private partnerships, is defined as "any research collaboration between public- and private-sector entities in which partners jointly plan and execute activities with a view to accomplishing agreed-upon objectives while sharing the costs, risks, and benefits incurred in the process". It combines the efficiency of private firms with the "trustworthiness" related to a public enterprise.

AATF is currently involved in the following 6 projects:

1) Water Efficient Maize for Africa (WEMA)
2) Maruca Virtara Cowpea
3) Nitrogen Use Water Use and Salt Tolerance Rice (NEWEST)
4) Banana *xanthonomas* wilt
5) Striga control in Maize
6) Aflatoxin control in maize and peanuts

The objectives of my Project of change are as follows:

a) Read the project Business Plans and concept notes of the AATF Partnerships
b) Compare what was in the proposals with the current status of the projects
c) Find out areas that can be improved in the partnerships
d) Make recommendations to AATF

ACTIVITIES SO FAR

a) I briefed my supervisor on the POC who has been supportive
b) Consulted with our business development Unit which is the custodian of project Business plans and proposals
c) I have so far managed to read the business plans that were sent out to donors together with the project proposals that were drafted at the inception of the project.
d) I have also managed to read the project progress reports to evaluate whether AATF is achieving the targets set out in the proposals using these three indicators:
    i) timeline
    ii) budget
    iii) product delivery

ACTIVITIES TO BE DONE BEFORE SUBMISSION OF REPORT

These are the outstanding planned activities:

a) Compare AATF partnership's with others in the Agricultural sector
b) Find out areas of improvement in the Partnerships
c) Make recommendations to AATF on the areas of improvements

PROBLEMS / OBSTACLES

The issue of confidentiality is taken very seriously at AATF and thus acquiring some of the materials to be evaluated seemed to be a challenge. This is because some of them emanate from donors who have very stringent requirements on confidentiality. I also encountered the issue again when asking for data from other institutions to be used to compare with the situation at AATF. In some of the cases I had to only rely on the information that is in the public domain while in others I had to sign a non-disclosure Agreement prior to receiving the data.

AATF has been inception since 2003 and so far so many reports have been generated in the product delivery pipeline, it was also a challenge on narrowing down on the specific progress reports to settle on. I had to seek guidance from the project Managers as to what is considered relevant progress data.

As AATF is in the Agricultural sector, most of the progress reports are prepared by Scientists and some of them are quite technical and so I took a lot of time to understand some of them. I worked closely with the people in the Business Development Unit who agreed to help in interpreting some of the data that were too technical for a layman.

PLANNED AND PRELIMINARY DELIVERABLES WITHIN THE PROJECT OF CHANGE

a) A comparison of the project business plans with the progress reports:
    Herein, I will try and evaluate if AATF partnerships have been on track using the 3 aforementioned indicators which were budget, timeline and product delivery. The importance of this comparison will be to see if there is proper planning in AATF. This is because for any project to be successful it must deliver what it promised (product delivery), in time (timeline) and within the allocated funds (budget)

b) Compare AATF with other partnerships in the Agricultural Sector:
I will collect relevant data from other Institutions and see how they operate as compared to AATF. There are several Institutions in the CGIAR that are involved in the same operations as AATF and I can obtain information from them to compare with the current situation at AATF.

c) Find Out Areas of Improvement:
After collecting the data, I will be able to come up with a list of areas that AATF that can focus on in order to improve the working relationships of the Partnerships.

d) Make Recommendations to AATF:
The last deliverable in my Project of Change will be to make recommendations based on my study of the internal documents and data collected from other Institutions. I will do this by preparing a report and submitting a copy of the same to the relevant AATF department that deals with Partnerships.

However, this information will also be shared with persons who are involved in making strategic decisions for AATF.

Currently I have managed to do a comparison based on the three indicators. I have also received information from 5 institutions and I shall use this to compare with the situation at AATF.

A lot of research and discussions have been done on this topic and several meetings have also been held on how to improve working relationships of Private Public Partnerships not only in Agriculture but also in areas such as Health.

The Project of Change will be useful as I will be able to make a list of recommendations to the Institution from a different perspective (from a non-scientist.

PRELIMINARY CONCLUSION OF WORK DONE SO FAR

Public-private partnerships (PPPs) are essential for advancing agriculture to meet global challenges in food security. They help widen access to technology and link farmers to markets. By combining strengths, the partners can all make better progress than on their own. (*Syngenta Foundation 2012)*

The *niche* of AATF is and will always be Technology Transfer using the Public Private Partnerships. The process of developing, negotiating, and establishing viable partnerships is not easy. Some partnerships start well but then never deliver their true potential in spite of major investments by the partners. However, AATF has continuously delivered the objectives of its projects.

So far I can conclude that the continued support from the donors proves that AATF is managing its Partnerships effectively. This is also coupled with the fact that most of AATF projects are now at the product delivery stage and this is on course without any difficulties.

GRIP 12a Final reports

ABS/CBD/GR

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Documentation of Common Beans Grown at the Genetic Resources and Biotechnology Institute

Background and rationale to the *Project of Change*

Common beans are one of the most important food legumes for direct consumption in the world (Madamba and Pombi, 2004). With over 25% proteins in seeds, common bean is a major source of protein in cereal-based diets of smallholder famers (Pierce, 1987). Beans are also one of the best non-meat sources of iron, providing 23-30% of daily –recommended levels from a single serving (Madamba and Pombi, 2004).Common beans also associate with Rhizobium and fixes atmospheric nitrogen improving the soil (Hikwa and Jiri, 2000). Fixation of atmospheric nitrogen in the soil level benefiting the following crop, which reduces production costs. If common bean residues are left in the field, they improve both the soil structure and texture (Raemekers, 2001).

Common beans play a major role in the Zimbabwean agricultural sector. Smallholder farmers in Zimbabwe contribute more than 80% of the total annual beans production strictly under rainfed conditions since the farmers cannot afford supplementary irrigation (Madamba and Pombi, 2004). Smallholder farmers achieve an average yield of 240kg hectare, which is too low compared to between 1500 to 4000kg per hectare achieved by commercial farmers (Hikwa and Jiri, 2000). Common bean is cultivated all year round in Zimbabwe. Summer production is concentrated in the Highveld and Middleveld where rainfall is reliable, normally distributed averagely above 400mm per season. Winter planting is more common in Lowveld under irrigation (2003). The market prices for common beans are more attractive compared to cereals and other legumes (Makunde, 2010). Common beans play an integral role in cropping systems since the domestication of plants and have prominently featured in rotations and intercropping systems, as alley crops, in pasture systems as green manures, in agro forestry, and cover crops (Raemekers, 2001).

Characterization of available germplasm is a necessary first step to facilitate breeding efforts and its benefits to plant breeders in choosing proper parental materials (Cilliers and Swanevelder, 2000; Sarutayophat *et al.,* 2007). In Zimbabwe the utilization of common bean accessions by plant breeders in their breeding programs is limited due to lack of background genetic information, thus the need for its characterization. Therefore it will help in trying to address the constraints that limit breeding efforts such as climate, consumer preferences, biotic and abiotic stress. Biotic and abiotic traits are associated with drought, pest attack in field, storage places, different diseases, parasitic weeds, low soil fertility, low yields and lack of improved varieties. The whole world is experiencing some changes in the energy balances between the earth and sun, global warming is a reality and the farming lands are receiving little rainfall that does not meet most crops' requirements. This necessitates the need for plant breeding research to try and addresses the above production constraints.

There are a considerable number of common bean accessions conserved at the Genetic Resources and Biotechnology Institute in Zimbabwe. However, most of these accessions have not been characterized. Characterization can be either morphological or molecular. This work focuses on phenotypic method. This allows the breeder to identify valuable traits or potentially valuable genotypes quickly. This project

proved the foundation for comprehensive identification and use of common bean genetic diversity, thus contributing both to bean improvement and its integration into the legume comparative genetics community. It also facilitates the identification of duplicates in the Gene bank collections and establishment of Gene bank core collections, thus genotypes with good breeding potential or desirable traits can be identified and conserving duplicate collections can be avoided. Information generated from characterization is also applied in collection management and this encompasses verifying that an accession has not been mislabeled during harvesting and collection, monitoring of contamination through seed and determining future handling procedures.

Objective with *Project of Change*
The objective of this study was to assess variability within the local landraces of common bean conserved at the Genetic Resources and Biotechnology Institute. In this study it was hypothesized that the local landraces of common beans do not differ significantly with respect to qualitative and quantitative characteristics.

Activities and Methods.
Site description
Morphological characterization of the common bean accessions was conducted at the Crop Breeding Institute's farm. CBI is situated at the Department of Research and Specialist Services (Latitude 18^{o} 11 South, longitude 31^{o} 28 East), mean annual rainfall ranges from 700 mm to 950 mm and average summer temperatures are between 24^{o}C to 26^{o}C. The soils are well-drained, red with clay loamy texture.
Source of Germplasm
Eleven common bean accessions as shown were obtained from the Genetic Resources and Biotechnology Institute's collection of landrace accessions. These accessions were collected in the South East lowveld and Eastern parts of Zimbabwe in 2007 in collaboration with the bean breeding programme of the Crop Breeding Institute.
Experimental Design and procedure
The experiment was established on 11 January 2011. The eleven common bean accessions were planted in a Randomized Complete Block Design with three replicates. Compound L was applied as a basal fertilizer at the rate of 300 kg per hectare. Each accession was sown on a four rows, three meter long plot. Inter-plant spacing of 0.15 m and inter-row row spacing of 0.45 m were used. Ammonium Nitrate was applied four weeks after planting at a rate of 80 kg per hectare. The crop was rain fed. The crop experienced drought spells for three weeks during the month of February. No crop pest and disease control measures were applied throughout the season.
Data collection
Data for morphological characterization was collected using the International Plant Genetic Resources Institute (IPGRI) descriptor list for common bean. Data for qualitative and quantitative characteristics was recorded on individual plant basis using ten randomly selected plants per plot. The ten plants were selected from the two inner rows using the systematic random sampling method per plot, tagged and scored consistently over all characters. As from the fifth week after sowing, the following quantitative and qualitative traits were recorded on a data collection form according to the IBPGRI descriptor list for common beans: cotyledon colour, hypocotyls colour, germination period, growth habit, terminal leaflet shape, days to flowering, colour of flowers standard, days to 95% pod maturity, immature pod pigmentation, pod length, number of pods per plants, number of seeds per pod, seed size, seed shape, 100 seeds weight, seed texture, seed colour and seed pattern. Information on how each character was scored is found in the descriptor state for common beans. Also the information on the acronyms used to represent various characters is found in the descriptor states for common beans. The photos of the distinct accessions were taken for the different seed shapes, seed colour, and growth habit.

Data analysis

Data for quantitative characteristics such as plant height, number of seed per pod, number of pods per plant, days to 50% percent flowering, pod length, plant height, number of days to 95% pod maturity, seed weight per hundred seed, number of days to germination and seed weight per ten plants were subjected to an analysis of variance using the Gens tat Discovery Version 8.0. The Least significant difference (LSD) was used for mean separation. Variation in both qualitative and quantitative characteristics was analyzed using hierarchical cluster analysis Minitab Release 12.22 versions (Minitab, 1998).

Outcome and deliverables

Cluster Analysis

The dendrogram was used to display the results of the hierarchical clustering of common bean accessions using their phenotypic characteristics (Figure 4.1). A dendrogram is an abinary tree over the common bean accessions being clustered, with each branch indicating the distance between the two accessions. The nodes of the hierarchical tree (dendrogram) indicated the levels of similarities that had occurred.

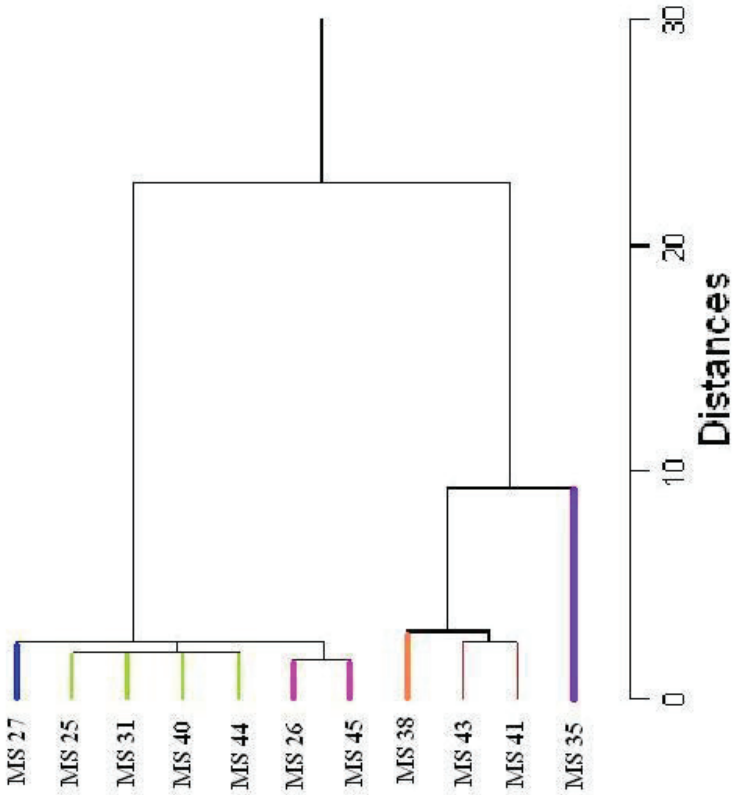

Figure 4.1:Dendrogram for hierachical clustering of evelen Common Bean Accessions

Table 4.1:Cluster of Common Bean Accessions

Group	Characteristics	Accession numbers
Major group A	This group consist of large and small seeds which belong to Andean South American and Mesoamerican genotype based on the seed size and 100 seed weight. Number of days to maturity (range of 81 to 83 days) and seed shape (kidney shaped), lodging susceptibility (0%).	MS 38, MS43, MS41, MS35
Subgroup I	This group consist of small seeds which belong to the Mesoamerican genotype based on the seed size, 100 seed weight (9.54g). Number of days to 50 % to flowering (33 days), number of days maturity 83. Lodging susceptibility (0%).	MS 35
Subgroup II	This group consist of large seeds which belong to Andean South American genotype based on the seed size, 100 seed weight (41.22g and 42.8g). Number of days to 50 % to flowering (33 to 37 days) and number of days to maturity (range of 73 to 82 days), lodging susceptibility (0%).	MS 41, MS 43
Subgroup III	This group consist of large seeds which belong to Andean South American genotype based on the seed size and 100 seed weight (54.14g). Number of days to maturity (81 days) and lodging susceptibility (0%).	MS 38
Major Group B	This group consist of large seeds which belong to Andean South American genotype based on the seed size, 100 seed weight. Number of days to 50 % to flowering and number of days to maturity, lodging susceptibility is very high.	MS 25, MS 26, MS 27, MS 31, MS 40, MS 44, MS 45
Subgroup I	This group consist of large seeds which belong to Andean South American genotype based on the seed size, 100 seed weight (range from 47.55g to 50.22g). Number of days to 50 % to flowering (37 days) and number of days to maturity (74 and 75days), lodging susceptibility is very high (between 74 and 76%).	MS 26, MS 45
Subgroup II	This group consist of large seeds which belong to Andean South American genotype based on the seed size, 100 seed weight. Number of days to 50 % to flowering and number of days to maturity lodging susceptibility is very high.	MS 25, MS 31, MS 40, MS 44
Subgroup III	This group consist of large seeds which belong to Andean South American genotype based on the seed size, 100 seed weight. Number of days to 50 % to flowering and number of days to maturity (81 days) lodging susceptibility is very high (81%).	MS 27

The results displayed by the dendrogram showed that the eleven common bean accessions were grouped into two (major) groups. These two main groups A and B were partitioned at the 22.74, grouping influenced by the number of days to 50 % flowering, number of days to 50% germination, and number of days to maturity and lodging susceptibility exhibited by the accessions.
The dissimilarity distance level between the two major groups was 22.74 (Table 4.1). Accessions MS35, MS41, MS43 and MS38 were in group A. This group consist of large and small seeds which belong to Andean South American and Mesoamerican genotype based on the seed size and 100 seed weight. Number of days to maturity (range of 81 to 83 days), seed shape (kidney shaped), and lodging susceptibility (0%).
Accessions MS27, MS25, MS31, MS40, MS44, MS26 and MS45 were in group B. Similarities in this group consist of large seeds which belong to Andean South American genotype based on the seed size, 100 seed weight. Number of days to 50 % to flowering, number of days to maturity and, lodging susceptibility is very high

4.2 Analysis of Variance

Table 4.2: Mean separation for quantitative characteristics

Accessions	Days to 50% Flowering	Lodging %	Plant height	Pod length	No.of pod/plant	Number of Days to Maturity
MS35	30.00a	0.00a	24.17a	10.00def	12.33d	73.67[b]
MS44	33.00b	74.00b	24.13a	11.433g	10.13c	73.67b
MS27	35.67cd	82.00e	31.10bc	9.300bc	14.27e	74.00b
MS31	36.00d	82.00e	26.50ab	9.767de	11.70d	74.33b
MS25	32.33b	84.67f	31.63cd	8.700a	10.17c	74.67b
MS26	37.00d	75.67c	25.73ab	10.067ef	12.23d	74.67b
MS40	33.67b	80.00d	33.23d	9.600cd	8.90bc	78.00c
MS38	32.67b	0.00a	24.53a	9.933de	6.93a	80.33d
MS41	34.00bc	0.00a	25.87ab	10.400f	12.33d	81.33d
MS45	40.67e	75.33bc	24.70a	9.833de	12.23d	62.67a
MS43	34.00bc	0.00a	28.83bc	8.933ab	8.40b	83.33e
Min.	30.00	0.00	24.13	8.700	6.93	62.67
Max.	40.67	84.67	33.23	11.433	12.33	83.33
Mean	35.45	50.33	27.31	9.815	10.88	75.52
LSD 5%	1.049	1.494	3.554	0.4302	1.331	1.613
S.e	0.612	0.7	0.495	0.0688	0.111	0.052
P-value	**	**	**	**	**	**
CV%	0.5	0.7	1.8	0.7	1.0	0.1

Note: [a, b, c.] Within column, figures with the same letter of the alphabet within a column are not significantly different by Duncan's multiple-range test (P > 0.05). ns = not significant, * P<0.05, ** P<0.01, ***P<0.001

Summary statistics for quantitative characteristics are shown in (Table 4.2). Variability was noted in most of the different quantitative characteristics recorded as shown by the P values of less than 0.05 for the number of days to 50% flowering, and number of days to maturity (P<0.01). The accessions showed a highly significant variability for lodging susceptibility % (P<0.01).
The mean days to 50% flowering were significantly different among the accessions (P<0.01) (Table 4.2). The mean days to 50% flowering for MS 35 accession had 30 days, with accession MS45 recording the latest number of days to 50 % flowering (40 days). Accession MS35 and MS40 was the earliest flowering accession (32 days). The accessions MS25 MS40 and MS44 were significantly different from MS27, MS34 and MS43 with respect to means days to 50% flowering as shown in Table 4.2. MS27 had mean days to 50% flowering that were significantly different from accession MS45, MS43, MS35 and MS25.
The mean % lodging susceptibility were significantly different among the accessions (P<0.01). The accession MS35, MS38, MS41 and MS43 had 0% of lodging susceptibility whilst accessions MS25 had the highest % lodging susceptibility. Accession MS27 was significantly different from MS35, MS38, MS41 and MS43 with respect to % of lodging susceptibility. Accessions MS27 was significantly different from MS26, MS44 and MS45.
The mean number of days to pods maturity were significantly different among the accessions (P<0.01). The accession MS45 was the earliest maturing variety with 62 days whilst an accession MS43 was the latest maturing varieties with 83 days. Accession MS43 was significantly different from MS35, MS44, MS25, MS27 and MS31 with respect to pods maturity. Accession MS40 was significantly different from MS38, MS41 and MS45.
The mean pod length were significantly different among the accessions (P<0.01). The mean pod length ranged from 9.76 cm to 11.47 cm. Accession MS11 had the longest pods of 11.47 cm whilst accession MS20 had the shortest pods of 7.93 cm. Accession MS20 was significantly different from MS13, MS11, MS36 and MS28 (Table 4.2). Accession MS28 was significantly different from accessions MS30, MS32, MS16 and MS15.

Lesson learned -way forward.
From this research, it has been shown that great variability exist in qualitative and quantitative characteristics among the eleven common beans accessions conserved in the Genetic Resources and Biotechnology Institute. The eleven accessions showed variation in number of days to fifty percent flowering, number of seeds per pod, and pod length, number of days to maturity, 100 seed weight and plant height. These phenotypic differences could mean that the accessions are of different genetic makeup.
Although phenotypic variation was considered, observed and measured, it is more likely that this observed variation could be attributed to the genetic makeup of the accessions and therefore could be exploited, enhanced and or directly utilized in breeding programs. The present and future utilization of the genetic resources conserved, largely depends on what is known about the accessions. The generated information therefore will definitely contribute to a more effective utilization of the common bean germplasm collections. It can also be concluded that there are no duplicate accessions and the similarities are not absolute but relative.
Morphological characterization is limited to only phenotypic expressions and is not useful to genotypic evaluations therefore molecular techniques have to compliment field characterization to fully obtain variation in genetic make-up. This will allow users of plant genetic resource collection to benefit from information that allows them to identify valuable traits or potentially valuable types quickly. Molecular marker information may lead to further identification of genes in collections but it requires investment in equipment, reagents, and highly trained personnel.

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Implementation of ITPGRFA through usage of the SMTA in exchanging Jordanian barley

1. Background and Rational

Exploration, collection, conservation, characterization, evaluation, documentation, and utilization of plant genetic resources for food and agriculture are essential in meeting the world food security and for sustainable agricultural development for the current and future generations. The self- sufficient in plant genetic resources for a country is unfeasible and all depend on genetic diversity in crops from other countries and regions. The International Treaty on plant genetic resources for food and Agriculture (ITPGRFA) adopted by FAO conference in 3 November 2001, the main objectives are maintain PGRFA, sustainable utilization of PGRFA, and equitable and benefit sharing. The treaty established a multilateral system of access and benefit sharing (MLS) for PGRFA of most important crops. The PGRFA will be available under a standard material transfer agreement (SMTA). Jordan sign and ratify the treaty and enclose the MLS for crops conserved in the genebank of the National Center for Agricultural Research and extension (NCARE).

Jordan has diverse ecosystems which reflected high plant diversity. A description of Jordan's topography, biogeography and vegetation types and flora was written by S. Saifan, NCARE at http://www.kew.org/ucm/groups/public/documents/document/ppcont_013817.pdf. Jordan is located in Fertile Crescent region and it's the most likely center of domestication of wild barley *Hordeum vulgare* subsp. *Spontaneum* (Badr et al. 2000). Barley is one of major cereal crops grown in Jordan as food and for animal feed where both grains and straw are utilized, farmers grow barley in areas of low annual rainfall (below 300 mm) where variation in amount and distribution of rainfall is common. The production of Barley in Jordan has dramatically decreased during the past years. FAOSTAT reports an annual production of 10659 t for 2010, while production had reached a peak of 56772 during the preceding 10 years (Imke, 2012). The low productivity of barley referred to seasonal variability, low precipitation, poor soil moisture conservation, poor stand resulting from lack of weed control, and low yield potential genotypes (Al-Tabbal, 2012). In addition the impacts of climate change and drought has affected the production of barley landraces and even on diversity and distribution of wild barley.

NCARE genebank was established in 1996 and barley had a priority among other cereal crops to be conserved, however, collection activities goes back to 1952 where old cultivars of durum wheat have been collected and deposited at USDA and in BARI gene banks (Saifan, 2012). Currently NCARE genebank hosted more than 400 accessions of barley landraces consisted of *H. vulgare disticum* and *H. hexasticum* and more than 250 accessions of wild barley (*Hordeum vulgare* subsp. *Spontaneum*). The Checklist of vascular plants of Jordan reported five wild barley species (http://www.odu.edu/~lmusselm/plant/jordan/index.php): *Hordeum bulbosum* L., *Hordeum geniculatum* All, *Hordeum glaucum* Steudel , *Hordeum leporinum* Link, *Hordeum marinum* Hudson, and *Hordeum vulgare* subsp. *spontaneum* C. Koch. The species *H. vulgare* subsp. *spontaneum* belongs to the primary genepool of *Hordeum* and is the progenitor of cultivated barley, hence it's expected to have potential to be integrated in breeding programs of cultivated barley. The oldest collection of wild barley *H. vulgare* subsp. Spontaneum in Jordan was conducted in 1981 by during a joint collection mission between

ICARDA and the MoA of Jordan. The collected materials deposited at ICARDA gene bank and the repatriated to NCARE genebank in 1996.

In 2011, NCARE genebank received a request from IPK genebank in Germany asking to provide them with *Hordeum vulgare* subsp. *Spontaneum* which was collected in 1981. The seeds requested will be used for research purposes within the project "Assessment of diversity of wild relatives of barley based on historical collections" in which IPK, Bioversity International and NCARE are partners. Within the context of this project, NCARE and Bioversity International have signed a letter of agreement to collect wild barley seeds in the same locations in Jordan from which originate, the seeds requested through a Material Transfer Agreement (MTA).

Exchanging procedure for seed materials conserved at NCARE genebank was usually carried out throughout utilizing a local developed agreement named National MTA. As Jordan is involved with applying the MLS and also considering that IPK genebank is already make use of the SMTA, we believed that it worth to start implementing the ITPGRFA through put into practice the SMTA in exchanging Jordanian barley. In parallel it's very important to do awareness of plant genetic resources stakeholders and breeders on better understanding of how SMTA operate which will show the way to effective utilization of the SMTA and in turn get benefit from the MLS pool. This paper presents the collection preparation and activities of wild barley *H. vulgare subsp. spontaneum* from diverse ecosystems in Jordan in particular from the historical sites where wild barley was collected during 1981 sites. Also we will discuss how the collected material was exchanged between NCARE genebank and IPK genebank in Germany, this off course take us to confer the MLS and how we practice the implementation of SMTA. On the other hand, this paper presents the importance of getting plant genetic resources stakeholders, genebanks curators and plant breeders for better understanding of the ITPGRFA from the part of MLS and the SMTA.

2. Objectives

The objectives of this project were: i) To assess genetic diversity of wild barley and enrich genetic diversity and conservation of wild barley at NCARE genebank through undertaking a collection mission to re-visit sites and to re-collect seeds from which wild barley (*Hordeum vulgare* subsp. *spontaneum*) and/or barley landraces (*H. vulgare*) have been collected during 1981. ii) To implement the ITPGRFA through utilizing the SMTA in exchanging wild barley between NCARE and IPK. iii) To make plant genetic resources stakeholders, breeders and legal representatives better understanding on how SMTA operate.

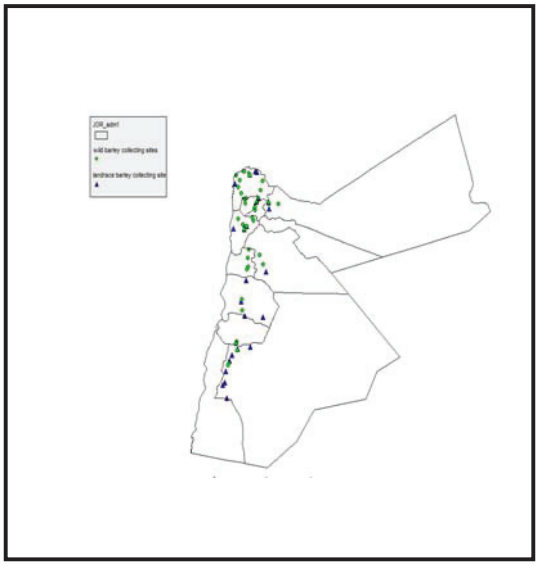
3. Activities and methods

Collecting activities

A plan was prepared to visit historical sites and collect wild barley (*Hordeum vulgare* subsp. *spontaneum*; here in after also referred to as *Spontaneum*) and barley landraces (*H. vulgare* var. distichon and *H. vulgare* var. *hexastichom*) that had been collected in 1981. The plan took account of: investigating sites of distribution of barley populations using available information documented by NCARE genebank database (coordinates and location description) and matching with Google Earth portal and relevant bibliography, conducting scouting trips to anticipate ripening stages in the various regions, and handling the collected material and preparing for exchanging seeds with IPK genebank. The collection conducted during late May and early June in 2012. During the collection process, the collection team almost relied on location description rather than coordinates because the coordinates in the original documentation provided only degrees and minutes while seconds were not recorded, so we assumed a precision of approximately 2450 m. During collecting wild barley, we tried to match as precisely as possible with the location of collecting sites but the case was not same for landraces collecting sites because we assumed that barley landraces had easy access to cross the country through seed exchange systems by farmers.

The collection started in south Jordan where seeds are expected to ripen earlier then we moved to north Jordan crossing the desert and covering sites located in the west and east of the country. Barley populations occurred in old collecting sites were represented through collection of their ripening spikes. A randomly bulk samples consisted of 50 spikes per population were collected in duplicate using paper bags for conservation at NCARE and IPK. Occasionally 12 individual plants of *H. spontaneum* were collected to carry out molecular analysis. Control samples of wild barley were collected from natural reserves.

Handling seeds and data
Passport data were recorded on collecting sheets prepared by NCARE on purpose for this collecting trip and coordinate readings were taken in each collecting site using GPS (Garmin emap device, datum: WGS84). A distribution map was developed in cooperation with GIS unit at NCARE. The collected materials of seeds and herbarium specimens were deposited at NCARE genebank for conservation and to prepare for exchanging seeds with IPK genebank.



Applying SMTA
The SMTA developed by the ITPGRFA was utilized in exchanging barley seeds between NCARE and IPK genebank. A hard copy of the agreement was downloaded from the treaty website (ftp.fao.org/ag/agp/planttreaty/agreements/smta/SMTAe.pdf). Parts relevant to information of NCARE and the IPK were fulfilled as indicated in *Article 1 – Parties to the Agreement*. As regards the acceptance part of the agreement (*Article 10 – Signature/Acceptance*) we used the *Option I – Signature* where the authorized persons from IPK and NCARE signed that they are accepting terms and conditions of the agreement and relevant to materials exchanged.

Awareness activity
Awareness on utilization of SMTA in Jordan was carried out through participating in the 6th International Conference of Intellectual Property Rights in Agriculture which was organized by the Technical Consultation Center in cooperation with the Intellectual property right office at NCARE during 18-19 Sep. 2012. Amman, Jordan. A major session was allocated for discussing international treaties and a lecture was presented on "Implementation of the International Treaty on plant genetic resources for food and Agriculture (ITPGRFA) through Utilization of Standard Material Transfer Agreement (SMTA)".

4. Outcome and deliverables
The collection mission of wild barley and barley landraces was promising and it happened as expected to enrich the diversity of *Hordeum spontaneum* and *H. vulgare* conserved at NCARE genebank. A total of 63 sites were visited, 51 were identified as historic collecting sites and 12 were new sites located in reserves. However, Spontaneum, Distichon or Hexastichon was not found in three old sites. These visits revealed a total of 73 barley samples, (45 Spontaneum, 4 Hexastichon, 24 Distichon) collected from 48 historic sites and from 12 sites located in reserves. The coordinates recorded were functional to develop a distribution map that showed geographic diversity of barley populations (Fig 1). The wild barley Spontaneum characterized by black awns was collected from two sites where black Distichon spikes were noticed in a couple of fields. In several Distichon fields some mixture of Hexastichon was found. The height of Spontaneum ranged from 15 to 120 cm and an exceptionally tall individual of 150 cm (including

awns) was noticed in the archeological site in Jerash. The height of barley landraces populations ranged from 10 to 90 cm.

During collection, there was a chance to meet farmers who said that they acquire their seeds from several sources: their own seeds production, from other farmers or purchase seed from the MoA. They grow seeds to feed their animals during dry seasons or sell their harvest to the governmental seed association. Farmers reported to have observed changes in climate, in particular decreases in rainfall, which is affecting their yield. Meeting with farmers showed that it's important to have a female local researcher in order to easily interact with women farmers not accompanied by a male relative.

Fig1. Map of landrace and wild barley collecting sites

Control samples of wild barley were collected from reserves to represen from undisturbed habitats and also from habitat where no barley landraces are cultivated so the wild barley populations can relatively be growing safe without any disturbances which in turn reduce possibility of genes introgression from cultivated barley to wild populations of barley. Hence, it was necessary to avoid collection from habitats close to farmer's fields and even from areas where grazing was observed to avoid the possibility of movement seeds of cultivated barley through animals. Collecting barley landraces was easy and the time window was contended so it was easy to collect harvested material in the field or with cooperation of farmers. On the contrary, collecting *H. spontaneum* was much harder as the time window was shorter and seed shattering from spikes caused real difficulty to collect complete spike.

NCARE genebank has been disclosed to MLS about hosting barley crop which is considered a major crop among the sixty four crops listed in Annex 1 of the ITPGRFA. Knowing that IPK genebank has experience in utilizing the SMTA agreement, it was appropriate to start utilizing the document of SMTA for the first time in exchanging the collected barley accessions with IPK genebank, hence, the SMTA was efficiently applied in exchanging procedures. Article 10 (Signature/Acceptance) of the agreement agreed three options for acceptance of agreement where the provider and the recipient may choose the method of acceptance unless either party requires this agreement, these options are: I) Signature: by the authorized persons, II) Shrink-wrap Standard Material Transfer Agreement: the Material is provided conditional on acceptance of the terms of this Agreement and the provision of the Material by the Provider and the Recipient's acceptance and use of the Material constitutes acceptance of the terms of this Agreement, III) Click-wrap Standard Material Transfer Agreement. In this project we chose the option (I) not (II) because the purpose of exchanging material is for conducting research not for developing commercial cultivar while option (III) is not accessible to NCARE. It's important to mention that an annex was jointed to the agreement between NCARE and IPK, this Annex contains a list of the material provided under the agreement, including the associated information referred to in Article 5b. On the other hand a Phytosanitary certificate was provided by the Ministry of Agriculture to make the seed voucher accessible to Germany. The remarkable collaboration between NCARE genebank and the IPK genebank in collecting and exchanging barley using the SMTA is considered a successful case study in implementing the ITPGRFA and benefit from the Access and benefit sharing coming from the MLS according to the SMTA. Also this collaboration pave the road for further collaboration with IPK genebank through developing a memorandum of scientific agreement between NCARE and IPK.

Awareness on utilization of the SMTA is vital in order to involve genetic resources stakeholders and plant breeders as well as legal representatives in the process of implementing the ITPGRFA in Jordan. Participation in the 6th International Conference of Intellectual Property Rights in Agriculture was a good opportunity to clarify that Plant Genetic Resources for Food and Agriculture (PGRFA) means any genetic material of plant origin of actual or potential value for food and agriculture and also a chance to elaborate the importance and special nature of PGRFA as they are different from medicinal plants, they are agricultural crops that are essentially man-made and indeed the value in agricultural genetic resources lies in diversity within a crop, not at a species level. The presentation undertook discussion on special needs

for access to PGRFA and how important to Exchange PGRFA like need allow access as easily as possible and to reduce transaction costs and need for easy and equitable system of benefit-sharing. Presenting the ITPGRFA background, objectives, articles relevant to the multilateral system of access and benefit-sharing and SMTA (Articles 10 -13), and operating the SMTA was essential to keep participants aware of the treaty and convinced on utilizing the MLS and implementing SMTA to have privilege of benefit-sharing that includes, among other thing: facilitated access, exchange of information, access to and transfer of technology, capacity building, sharing of monetary and other benefits of commercialization.

5. Lesson learned -way forward

Barley crop is a promising crop that has potential to mitigate the climate change impact, so managing barley genetic resources is important and it could be through collecting and conserving barley landraces as well as wild relatives particularly those of primary gene pole like *Hordeum spontaneum*. It's always good to collaborate with prestigious institutes like IPK genebank because they have long experience and they can share their scientific and technical knowledge with newly established genebanks.

Collection missions usually cost a lot of budget, so before conducting collection missions it's very important to put a comprehensive plan and a replacement plan so the cost will be organized well and the targets could be accomplished with little risk. In addition it's very useful when collecting from farmer fields to contribute female researcher in collection as women has ability to interact with women farmers better than male researchers.

At NCARE genebank level, the PoC encouraged us to start working on implementing the ITPGR and utilizing the SMTA and it was very good experience we gained where we could apply when exchanging materials with other institutes. Currently, the SMTA will be applied for exchanging materials with ICARDA and the UAE University, however, we are still not utilizing the SMTA when exchanging seed material within the country.

At the national level, the ITPGRFA is not known by genetic resources stakeholders and breeders or even by legal representative. A comprehensive awareness program is needed to publicize and mobilize the treaty and in particular the MLS and SMTA. On the other hand, the national efforts to get benefit from the MLS are weak and fragile, in this regard there is an urgent need to strengthening the national capacity through carrying out training and vital exercises to submit research proposals and have the privilege of the MLS.

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Awareness on Implementation of Acess and Benefit Sharing (ABS) legislation in Zimbabwe

Background and rationale

Zimbabwe is very rich in biological diversity and the biological resources are the primary source of livelihoods. Zimbabwe, like any other developing country with extensive biodiversity and associated traditional knowledge does not obtain a fair share of the benefits out of the utilization of genetic resources for the development of products and their derivatives, such as pharmaceuticals and cosmetics.

The biological resources instead of contributing to the country's socio-economic development are sometimes exported in an unprocessed state due to bio-piracy since the country has inadequate institutional capacity to effectively facilitate controlled access to biological and/or genetic resources and the equitable sharing of benefits therefrom.

Zimbabwe, having ratified the United Nations Convention on Biological Diversity (CBD) and also being a signatory to the Nagoya Protocol On Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising From their Utilization to the Convention on Biological Diversity (The Nagoya Protocol), is required to develop legislative frameworks which are "transparent" and which provide legal certainty to the conditions for access to genetic resources. Additionally both the CBD and the Nagoya Protocol encourage local communities to benefit from the use of their knowledge, innovations and practices associated with genetic resources.

The Government of Zimbabwe has put in place some policies and legislation to ensure protection of genetic resources from bio-piracy (an unlawful stealing of genetic resources from resource country) and to facilitate controlled access and equitable sharing of benefits arising from the utilization of genetic resource. These policies and legislations include the following: National Environmental Policy (2011); the Environmental Management Act [Chapter 20:27] and the Environmental Management (Access to Genetic resources and Indigenous Genetic Resource-based Knowledge) Regulations, 2009 (hereinafter called "Regulations") and other various sectoral laws.

Very little on effective implementation of the policies and legislation has taken place at community level. No study has been done to assess the impact of the laws and policies on ABS. As a response I took this initiative through the institution's Rural livelihoods improvement and sustainable agriculture management within an enabling policy environment (RULISA-MEPE) to address some of the above issues, in particular to raise awareness on how effective ABS legislation could be implemented in Zimbabwe for the benefit of our local communities. CTDO partnered with the Environmental Management Agency which is a Statutory Board mandated by law to implement the relevant legislation in relation to ABS. CTDO is a national registered development organisation implementing sustainable development initiatives related to biodiversity conservation and use, crop production and food security while advocating for pro-poor policies as well as other activities that seek to reduce poverty , hunger among the local communities. Thus CTDO, together with Government agencies, implement programmes that help to secure and empower communities to improve their lives , solve problems and define their own future.

The POC focus on raising awareness on existing legislation regulating ABS and capacity build the local communities on sustainable use of biological resources to reduce poverty.

Objective
The objective of this POC is to increase institutional, individual and systemic capacities of stakeholders to effectively implement ABS legislation to contribute to the conservation and sustainable use of biological resources and reduce poverty .

Activities and methods

This project of change undertook:

- desk-top literature review of existing legislation, policies and administrative arrangements for ABS to identify legal challenges or gaps on effective implementation of ABS legislation in Zimbabwe;
- carried out consultative workshops in three rural districts of Zimbabwe (Chipinge, Chimanimani and Tsholotsho) to find out if the Rural District Councils and the local Communities were aware of the existing legislation or policies regulating access to genetic resources and also to solicit their views on the current legal framework regulating access to genetic resources.
- Organized a national workshop on effective implementation of ABS legislation where Government Officials, national government agencies , local authorities, civil society organisations , higher institutions of learning , traditional leadership and local communities representatives took part. Papers were presented on such topical issues such as: promotion of community based enterprises on the production of medicines and related health products and linking such enterprises to market –based instruments such as supply contracts at community level; building and upscaling good practice of ethical and equitable agreements related to use of TK and natural resources for research for commercial purposes and IP and ABS from the business sector perspectives. Some recommendations were made for the appropriate Government authority to consider on how effective legislation regulating ABS could be implemented
- Produced reports on the various workshops held.
- translated and simplified some of the laws regulating ABS into two major local languages (Shona and Ndebele) and produced simplified publications for the benefit of the communities and local authorities during workshops and detailed presentations were done

Outcome and deliverables
Review of existing legislation has shown that Zimbabwe has no holistic enabling legal framework for effective implementation of the access and benefit sharing concept and there is no overall strategy on ABS. The sectoral approach on regulating ABS has resulted into having no authoritative institution for the implementation of ABS regime and the proposed institutional framework (the Genetic Resources and indigenous Genetic resource-based knowledge protection Committee) encourages a top-down approach and had been heavily criticised by various stakeholders who proposed a bottom up approach and a more simplified structure. The proposed institutional framework has not been even put in place four years down the line since the publication of the ABS regulation in the Government Gazette that clearly shows there is lack of realism in the proposed structures.
The POC has enabled us to establish that there is need to establish a clear institutional framework in Zimbabwe where there is a single point of entry for outsiders seeking to access genetic resources and a clear mechanism should be put in place to coordinate sector departments policies dealing with ABS issues. Furthermore there is need for guidelines for the equitable sharing of benefits arising out of the utilisation of genetic resources. There is also need for complete inventory of the genetic resources found in the districts and appropriate records (documentation) in any medium embodying the indigenous genetic resource- based knowledge of indigenous communities put in place with a view to provide a basis for the recognition of community ownership rights in that knowledge. It also became clear that

before documentation of TK and associated biological or genetic resources , there is need to consult widely and set a clear IP objective with a clear IPR strategy in place based on the set objective .
What came out particularly from local community assessment and awareness raising workshops from the three districts include the following :

- There is need to adequately resource traditional knowledge holders for them to effectively discuss mutually agreed terms.
- Difficulty to identify clear stakeholder communities. ABS regime seeks to balance competing interests of various contributions made by stakeholders towards certain pgr materials or products . These include local communities that has lived close to and could be considered custodians of pgr; the holders of TK who have specific knowledge for the utilization of pgr, but whose knowledge has been passed on from generation to generation ; the researchers and practitioners who access and utilize TK related to the use of pgr and go on to improve and develop materials or products which may be granted IPRs ; and the State which has the responsibility to provide policy guidance and regulate ABS issues. It is important to highlight that this is a complex issue which makes it very difficult to create or make an appropriate mechanism for a fair and equitable sharing of benefits arising out of the use of pgr . An integrated approach or mechanism to regulate the various issues raised above which will take into consideration the various representations from a wider consultation may help.

Lessons learnt-way forward

Effective implementation of ABS at national level can only be successful if supported by appropriate programmes for human resources development, advocacy and awareness. There is need to have a critical mass of experts knowledgeable to handle issues on IPR, TK and ABS related to the use of pgr As an NGO working with communities , there is need to have training programmes for community institutions and TK holders on IP, TK and ABS issues and also develop community protocols . Training is important in key areas such as ABS law and policy, monitoring and evaluation; the principles of PIC and procedures for granting it ; negotiations of MAT ; research methods; documentation and value edition chains.
On advocacy and awareness there is need to encourage a wider outreach of information by using local languages. Furthermore there is need to develop a database on IPR, TK to facilitate access to information and develop mechanism for the exchange of information among communities and relevant stakeholders .
Effective implementation of ABS legislation require strengthening of community structures such as traditional leadership as the first point of contact with communities and also establish monitoring and managing structures for implementation purposes, including appointing and facilitating and empowering national focal points as required by international instruments. A well structured institutional framework for implementing ABS is required so as to avoid overlap and duplication of duties and bureaucratic processes which bring unnecessary delay in implementation of ABS legislation. There may be need to establish a multi-sectoral committee which will manage and monitor the structures for implementing purposes .
When implementing ABS at local level there is power relations issue at play between local communities and local authorities. While communities are encouraged to control access to genetic resources, the capacity of local communities to organize themselves is very weak. They lack capacity to develop and apply economic tools which could promote sustainable use of genetic resources. The communities lack ability to negotiate for their rights and protect their indigenous knowledge and the State through the local authorities has retained rights and control over resources as its source of income.
The work done so far has shown that implementation of ABS legislation is:

- complex and there is need to address issues on IPR, TK and ABS related to genetic resources . The local communities need to be aware of their IPRs.
- when addressing ABS issues there is need to take into consideration the sensitivity to cultural norms such as traditional access to acquired knowledge of local communities.

The project made a significant impact at national level since the activities at national level catalysed multi-stakeholder dialogues and raised awareness on implementation of ABS legislation at national level. Since the project was implemented, the Environment Management Board have now started the process of appointing appropriate personnel to institutions which regulate ABS . The University of Zimbabwe (School of Pharmacy) has proposed collaboration with CTDO and the Traditional Medicine Practitioners' Council in introducing a course to train traditional medical practitioners on business approach to project management for sustainable community development and herbal medicinal plants . This brings into play business perspectives and practicalities to ABS implementation where the business sector is also involved.
The stakeholder workshops presented an opportunity to discuss emerging ABS issues following the signing of the Nagoya Protocol. The analysis of institutional arrangements made the government aware of the existence of institutional overlaps. It became clear that it is not possible to remove all constrains related to effective implementation of ABS legislation and much time is required and it will depend largely on regional and international demands.
As a way forward , there is need to establish appropriate institutions, build necessary capacities to undertake research and exchange information and also build awareness , understanding and the capacity to implement ABS legislation .

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A proposal of implementation of legal framework on access and benefit sharing with respect to the Nagoya Protocol in Peru

Background and Rationale

Convention on Biological Diversity is an international agreement which aims at sharing the benefits arising from the utilization of genetic resources in a fair and equitable way.

The Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity (NP) is an international

agreement which aims at sharing the benefits arising from the utilization of genetic resources in a fair and equitable way

In decision X/2, the tenth meeting of the Conference of the Parties, held from 18 to 29 October 2010, in Nagoya, Aichi Prefecture, Japan, adopted a revised and updated Strategic Plan for Biodiversity 2011-2020, including the Aichi Biodiversity Targets,. The Strategic Plan serves as a flexible framework for the establishment of national and regional targets and it promotes the coherent and effective implementation of the three objectives of the Convention on Biological Diversity. The Target 16 indicate, by 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from Their Utilization is in force and operational, consistent with national legislation

Perú signed the Nagoya Protocol in may, 2011, Peru was the sixth Latin American country in signed this agreement, Peru is part of the Intergovernmental Committee for the Nagoya Protocol on Access and Benefit Sharing.

While Peru has considerably progressed on the access to genetic resources issue and the fair and equitable sharing of benefits arising from their utilization at the policies, laws and projects; the impact of these developments in the practice has not been the same, with respect to generating more benefits and promote research and development in the biodiversity and its components

It´s necessary the review of the current existing legislation and recommendations on how they can be effectively implemented taking into account the provisions of the Nagoya Protocol and the Aichi Target (16)

Objectives

- To Identify through review the legal gaps and bottlenecks in the Peruvian regulation relating to genetic resources and access and benefit sharing for implementation of the Nagoya Protocol in order to enhance the capability of the National Competent Authority on Genetic Resources (Ministry of Environment).

- Understanding of the applicability and enforcement on access and benefit sharing in the national legislation.

- A proposal of implementation of legal framework on access and benefit sharing with respect to the Nagoya Protocol and the Aichi Target 16 (about the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from Their Utilization)

Activities and methods

Having reviewed the documents for COP 11 on the topic of the Nagoya Protocol, we can say that there is some key issues to be addressed from the context of a proposed plan for the Nagoya Protocol.

In this sense, capacity building, creating an ABS Clearing House Mechanism, awareness and financial cooperation procedures play an important role in the effective implementation of the Nagoya Protocol.

The creation, development and capacity building support will be essential for the entry into force and subsequent implementation of the Nagoya Protocol and to maintain at the national level.

The activities that have done can be summarized in:

- International Legislation review: including CDB documents and Decisions about Aichi Targets and Nagoya Protocol

- Peruvian Legislation review: including all the existing Peruvian laws, regulations, policies, guidelines regarding the ABS, genetics resources and traditional knowledge

- Identify legal gaps and bottlenecks in the Peruvian law on the access to genetic resources issue and the fair and equitable sharing of benefits arising from their utilization should be regulated at the national level for the implementation of the Nagoya Protocol

- Identify and analyze national targets contained in the National Environmental Action Plan (PLANAA Peru), using the Strategic Plan for Biodiversity 2011-2020, in specific the Aichi Biodiversity Targets in relation to the Nagoya Protocol (target 16)

- Assisted to the Regional Workshop on perspectives and outstanding on access to genetic resources, traditional knowledge and intellectual property, held in Lima on August 16, 2012

- Interviews with some professionals of the government and specialist and some representatives of academic and research national sectors, in order to determinate gaps and bottlenecks in the national policy and regulation regarding on the access to genetic resources issue and the fair and equitable sharing of benefits arising from their utilization and to identify those issues that could be enhanced.

- Reading documents: Decisions for the Eleventh Meeting of the Conference of the Parties to the Convention on Biological Diversity about Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from Their Utilization and the Strategic Plan for Biodiversity 2011-2020 and the Aichi Biodiversity Targets.

- Drafting the final policy

Outcome and deliverables

Issues of access to genetic resources and fair and equitable benefit sharing, protection of traditional knowledge of indigenous peoples and intellectual property are present in the Peruvian National environmental agenda. An example of this is the process of negotiation of the Andean Decision 391 of the Andean Community on a Common Regime on Access to Genetic Resources.

Under the Regulation of Access to Genetic Resources, there have been two applications for contracts for commercial access to patents in Indecopi (for maca and yacon, information provided by Indecopi) for domesticated species, under the authority of INIA. But such applications are still pending regularization suspended until the issue of access, because the regulation can not be applied even for the lack of clarity of the rule in that there is no such formats for access contracts

Current there isn´t signed contract to access to commercial end, , these contracts are pending
At the moment, at the country level, has not yet thinking in implementing the Nagoya Protocol, perhaps due to the existence of regulations governing the issue of access to genetic resources and which in the practice suffers from some impasses.

Look for the current implementation of the Supreme Decree N° 003-MINAM-2009 of Genetic Resources Regulations which energizes the theme of the forms to access contracts and will not exist bottleneck, current situation for contracts for research and trade. Currently doesn´t exist access agreement signed with the competent authority, despite the existence of Regulation of Genetic Resources.

Competent authorities have to implement administrative procedures (for example flowcharts) regarding requests for access contracts are concerned, so that the user knows which authority use and how to proceed. This is something that should work on an interagency basis across sectors.

Lesson learned

Nagoya Protocol is compatible with Decision 391, but will require internal regulatory adjustments (and capacity building) to achieve its eventual implementation (once ratified),

Lack of clear rules and procedures in the implementation of the Supreme Decree N° 003-MINAM-2009, Regulation of the Andean Decision 391 on the Common Regime for Access to Genetic Resources.

One thing to consider in relation to Supreme Decree N° 003-MINAM-2009, is that national authorities have procedures for collection or biological resources but not associated with genetic resources by the lack of implementation of the standard indicated.

Lack of clarity of the scope of the legal regime in Abs from a practical view point. The problem for the National Competent Authorities and the lack of regulations in the current law, case of the lack of format for access contract.

It is important training or capacity building of technicians who may know of the real problems, not only with the legal issue but also technical.

At the country level, has not yet thinking in implementing the Nagoya Protocol, perhaps due to the existence of regulations governing the issue of access to genetic resources and in practice suffers from some impasses.

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Risk assessment: Vaccination against *Theileria parva* in Southern Sudan

East Coast fever (ECF) is a serious tick-borne disease of cattle in eastern, central and southern Africa caused by the parasite *Theileria parva*. An effective method of ECF control is immunization with a live sporozoite vaccine, but this has not yet been deployed in South Sudan. In an attempt to characterize strain's' of *Theileria parva* circulating in South Sudan, polymerase chain reaction (PCR)-based assays detecting polymorphism within four single copy loci encoding antigen genes, p104, PIM and p150 and p67 in addition to one microsatellite MS32.1 was carried out. A total of 20 strains from cattle in two locations in South Sudan, in addition to two references strain, Muguga and Katete strains were included in the study.

Activities in the project include PCR and sequencing of two *T. parva* CD8 cytotoxic T-cell antigen genes (Tp1 and Tp2) and genotyping using microsatellite markers.

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Evaluation and Conservation of Indigenous Vegetable Seeds for Improved Utilization in Central Uganda

In Uganda, traditional vegetables have been identified as a critical nutritional resource (especially in children) by a study carried out at Mwanamugimu Nutrition Services, Ministry of Health in collaboration with the Biochemistry Department, Makerere University and the Department of Home Economics, Ministry of Agriculture.
Uganda is endowed with agro climatic conditions suitable for the cultivation of a wide range of African indigenous vegetables. However, few of these plants are domesticated, the majority being wild or volunteer plants. They are abundant in the rainy seasons but scarce during the dry season, except a few grown mainly for selling in trading centers and urban markets.
These vegetables make a substantial, though rarely appreciated, contribution to food security of the rural poor. As increasing numbers of resource-poor farmers (especially women) are being marginalized by ecological, social and demographic forces, the value of traditional vegetables should be emphasized and their cultivation for home consumption encouraged.

The most important traditional vegetables in Uganda are *Amaranthus* spp., *Phaseolus lunatus, Vigna unguiculata, Sesamum indicum, Corchorus* spp., *Cucurbita* spp. and *Solarium aethiopicum.* They contain protein, calcium, phosphorus, potassium, iron and vitamins A, B and C in important quantities and are either curative or preventive of a number of diseases.

Most of the germplasm collected in 1980-84 has been lost. No collecting and documentation has been done since 1993. However, the National Agricultural Research Organization (NARO) is planning to revive conservation of traditional vegetables as a priority. The major aim of my project was to evaluate and conserve the most important indigenous vegetables for better utilization by farmers.

Objective
Evaluate and conserve the most important indigenous vegetables (IV)
In order to achieve the proposed above objective and identify, collect, document and conserve indigenous vegetables for better utilization in central Uganda, it was planned to carry out the following activities;

1. Identify collection gaps with plant working groups,
2. Document the existing vegetable collections,
3. Collect and maintain the most important traditional vegetables in Central Uganda

Activity 1:
Identify collection gaps with plant working groups;
Methodology

- Interviewed Technical people from NaCRRI;
- Meeting
- Focus Group Discussion
- Case study

Interview: I made personal Communication with Mrs. Phyllis Kasambula and Mrs. Midrid Alanyo Technicians of the National Horticultural Program, NaCRRI who gave me the following reasons for the loss of germplasm previously collected at NaCRRI;

- Death of the Head of Horticultural Program in 2003
- Wars
- Seeds left in store and lost variability

Meeting: I met with the Farm Manager of Makerere University Agricultural Research Institute, Kabanyoro(MUARIK) Mrs. Nakubuza Nalongo Getrude Wokulira in her office and briefed her about my Project of Change (PoC) and she was very happy about the project. She told me one of the reasons for the loss of germplasm was the end of the MSc. Project which was being carried out by an Italian lady and she was working on indigenous vegetables.

Focus Group Discussion: On 21st August 2012, I completed a focus group discussion with MUARIK Women's farmers group at Kabanyoro University farm. I interviewed nine farmers who plant indigenous vegetables in the swamp and upland. Eight of them were casual workers within the University farm and the ninth was the Farm Manager of the University farm. We discussed on the crops grown, more especially, the indigenous vegetables being grown, among others and why some of the germplasm previously collected was lost; they said that when the MSc. Project ended the germplasm was abandoned (See Focus Group Discussion Questionnaire which was used on Page 3 and 4).

Case Study: I visited the group vegetable garden located within the University Farm, where each member is allocated a block of four plots measuring 4 x 5 meters each. By the time I visited the garden there was sukuma wiki, okra, cowpeas, pumpkins and cot mill, some of the crops in different plots in the garden were mature and being harvested while others were still young. I was impressed with the practice of access and benefit sharing of the little germplasm available in the garden, with the members of the group in the vegetable gardens, even though most of the germplasm was lost because even on that day they accessed the garden and shared cot mill seeds among themselves.

Activity 2:
Document the existing vegetable collections
Methodology;

- Same as in activity 1 above

The two technical people consulted at NaCRRI, said that, no documentation was left for the lost accessions. Mrs. Rubyayihayo by that time the head of the National Horticultural program in Kawanda whatever she was writing was keeping them at her home and when she passed away in 2003 it was very difficult to get the write up from her home. The MSc. Student didn't also send copy of her thesis to MUARIK Women's farmers group at Kabanyoro University farm.

Remaining germplasm in the collection;
They were no remaining accessions as mentioned above by Madam Phyllis Kasambula and Midrid Alanyo , however, when Dr. Akemo succeeded Mrs. Rubyayihayo in 2004 with the Indigenous Vegetables (IV) Project funded by Germany through Asian Vegetable Research and Development Centre (AVRDC) now World Vegetable Centre (WVC) in Arusha, Tanzania the responsible personnel in Horticulture program in Kawanda started collecting IV germplasm from 7 Districts in Uganda, namely; Mbale, Mayunge, Soroti, Wakiso, Kasese, Rakai and Kisoro. The collections included; Spider plants, cowpeas, Okra, Jute marrow, Amaranthus spp., African Night Shades and Cherry tomatoes. They got also various IV accessions from AVDRC to multiply and give to farmers for production of seeds. Akemo died in 2005 and was succeeded by Dr. Tereza Sengoba, Phylis Kasambula and Midrid as Technicians. After Akemo's death they continued working in the above Districts; Midrid and Phylis, started training farmers on production and marketing, carried out also demonstrations for utilization and consumption of IV.

By the time I visited MUARIK Women's farmers group in Kabanyoro University farm, there was sukuma wiki, okra, cowpeas, pumpkins and cot mill in their garden which was collected from nearby farmers. Some of the crops in different plots in the garden were mature and being harvested while others were still young.

Activity 3:
Maintenance of the IV accessions

No maintenance is being done in NaCRRI due to lack of funds. Some of the collections collected from the above Districts were sent to AVDRC for them to multiply and do their own research. Various accessions of spider plants, cowpeas, Okra, Jute marrow, Amaranthus spp., African Night Shades and Cherry tomatoes which were multiplied in 2008 - 2009 at NaCRRI were taken to the gene bank in Entebbe for maintenance. Two accessions from nearby farmers at MUARIK are maintained at Kabanyoro University farm (Farmers Group).

Outcome and deliverables of the POC work
Despite the time and transport, the PoC has gone on very well. The project received a lot of support from the technical personnel of NaCRRI, the Farm Manager and casual workers of MUARIK. So far, I have been able to finalize the three activities planned with my PoC as stated above in activities with NaCRRI technical personnel and MUARIK farmer groups in Central Uganda. The preliminary conclusion drawn from my PoC is that maintenance of indigenous vegetables at household level will be promoted by group members and this will increase utilization of indigenous vegetables at household level in Central Uganda.

Lesson learned -way forward
The dangers resulting from lack of documentations of IV accessions were reviewed and safer alternatives for future custody such as planting with another gene bank and signing an agreement with them, keeping the information in the safe custody at the place of work, keeping the documentations as soft copies and distributing the copies as attachments to concerned parties, among others were discussed.

There is a need to establish on farm conservation for IV to ensure their long survival and easy access to farmers and this should be linked to the National gene bank in Entebbe:

The Ministry of Agriculture in Uganda should prepare a strategy document including the terms of exchange of material for IV.

FOCUS GROUP DISCUSSION QUESTIONNAIRE USED

Approach: FOCUS GROUP DISCUSSION TO BE USED WITH THREE VEGETABLE GROUPS IN CENTRAL UGANDA

No. of Members; Separate them according to where they grow the crop; Swamp and upland

The Focus group should have a maximum of 9 and minimum of 7 members (people who will give useful information), Control age, education and experience

1. Which crops are you growing as a group?
2. What indigenous vegetables do you know?
3. Which of the indigenous vegetables you have mentioned are you growing
4. Why are you growing the ones you have mentioned? (importance)
5. Why are you not growing the ones you haven't mentioned?
6. How long have you been growing the ones you have mentioned?
7. Where did you get the seeds from?
8. How did you get the seeds?
9. Where are you growing them?
10. How are you growing them
11. How much are you growing (Acreage)?
12. Out of the ones you mentioned that you're growing, what do you have at the moment in the garden?
13. How did you get the seeds of that one which is in the garden?
14. Why do you have that one in the field at the moment?
15. How long do they take to grow?
16. In case you're selling them where do you sell them?
17. How do you transport them to the markets?
18. In case you want to collect and maintain the most important vegetable which one will you collect and maintain and why
19. Where can we maintain the most important vegetable?
20. Why do you think we can maintain it there instead of other places?
21. When should we maintain it there?
22. How long will it stay there?
23. What can we do to the vegetable seeds after that time?
24. Members who follow between the ages of 20-30, 31-40,
25. 41-50, 51-60 and above 61 years

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Developing a Legislative and Policy framework for conservation based informal seed system model for vegetative propagated material in Kenya

Background and rationale

Agriculture is the mainstay of Kenya's economy and the growth of the sector is crucial to the country's overall economic and social development. The sector directly contributes about 26% of GDP and a further 27% through linkages with manufacturing, distribution and service related sectors. However, the sector has major challenges related to plant genetic resources and conservation and utilization which need to be addressed for improvement of food security, better nutrition, income generation and sustainability of the industry. As a member of the World Trade Organization (WTO), Kenya is committed to comply with the Agreement on Trade-Related Intellectual Property (TRIPS) Rights, and has undertaken various legislative initiatives to implement the agreement. In the last decade, Kenya has signed several international agreements and enforced important legislation[26] which are relevant to Plant Genetic Resource (PGR) and are meant to enhance the conservation and utilization of our biodiversity.

Kenya's accession to the 1978 UPOV Convention is also one of the initiatives. Other initiatives include Kenya's ratification of the Convention on Biodiversity (CBD) and the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA). Kenya therefore firmly recognizes farmers' privileges and rights as captured under Article 9[27] of the CBD and in the ITPGRFA both of which rest enforcement responsibility on national governments. Under the CBD for instance, and consequently through the Nagoya Protocol, governments are invited to develop policy, legal and institutional frameworks to regulate access to genetic resources (GR) including plant genetic resources (PGR) for vegetative propagated material and sharing of benefits accruing from the utilization of those resources. This arrangement is commonly referred to as Access and Benefit Sharing (ABS). While a lot of effort has been made and substantive ground covered in developing ABS framework[28] in Kenya, A lot of streamlining is still required as a number of legislations either overlap or appear to be contradictory.

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[26] These include, the Convention on Biological Diversity (1994), the International Treaty on PGRFA (2003), the Environmental Management and Coordination Act (1999), the Industrial Property Bill (2001), the Statute Miscellaneous Amendment Bill (2000), the National Biotechnology Development Policy (2006), the National Environment Action Plan (NEAP), The Seeds and Plant Varieties (National Performance Trials) Regulations, 2009, The Environmental Management and Coordination (Conservation of Biological Diversity and Resources, Access to Genetic Resources and Benefit Sharing) Regulations, 2006 and the National Biodiversity Strategy and Action Plan (NBSAP). In addition, there are other pieces of proposed legislation including: proposed Seed Act, Bio-safety bill and the National Bio-safety Framework and Regulation.

[27] The responsibility for realizing Farmers' Rights, as they relate to plant genetic resources for food and agriculture, rests with national governments.

a) The right to equitably participate in sharing benefits arising from the utilization of plant genetic resources for food and agriculture; and

b) 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.

[28] A task force to develop laws for protection of traditional knowledge, genetic resources and folklore was appointed on 3rd March 2006 through gazette notice number 1415. Subsequently, a gazette notice regulating access to genetic resources and benefit sharing was issued in October 2006. Standard tools to assist in the implementation of ABS framework namely, Prior Informed Consent (PIC), Material Transfer Agreement (MTA) and Mutually Agreed Terms (MAT) are also at an advanced stage of development.

Furthermore, other legislation are not quite clear e.g. the wording in some of the international treaties[29]. In addition, the current framework does not adequately support the informal 'seed' sector[30]; and the conservation policy under which the Genebank should operate remains sectoral and not quite coordinated[31].

The informal seed sector is the most important source of seeds and other vegetative propagated materials in Kenya accounting for about 78% of the total supply. The informal seed system is both a source of cheap and easily accessible 'seeds' and also helps in the maintenance of rare crop varieties. It therefore plays an important role in *in-situ*[32]/on-farm conservation. Specific strategies therefore need to be developed for conserving PGRFA *in situ* and for managing crop diversity on farm and in protected areas.

Developing a clear regulatory framework for ABS of vegetative propagated PGR that is clear and takes cognizance of the informal seed sector has several important benefits. Plant genetic diversity is crucial to breeding food crops and is thus one of the central preconditions for food security. Best practices must be disseminated on conservation and sustainable use of PGRFA that support and maintain the social, economic and cultural values of local and indigenous communities and improve the quality of life. This will be best achieved by involving such communities in all aspects of managing and improving PGRFA on farm. Hence establishment of a regulatory mechanism for informal seed sector on farm is crucial.

Objectives

Major objective

The main objective of this Project of Change (PoC) was to interrogate existing PGR regulatory mechanism, its impact on the informal seed sector and prepare a strategy paper for an informal seed sector of vegetative propagated material that seeks to enhance on-farm seed conservation.

Specific objectives

1 To review literature and identify factors impeding the flourishing of the informal seed sector for vegetative propagated material
2 To identify available opportunities and develop a roadmap for establishing mechanism that will legalize genetic resource access and enhance the informal seed sector.

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[29] Article 14, UPOV Act, 1991 rescinds farmers' privileges to the production or reproduction of protected varieties without the authorization of the breeder, while Article 15.2 of the same act allows for farm saved seed.

[30] While under the National Seed Industry Policy of 2009 allows farmers to access planting materials through both formal and informal seed sector, the Seeds and Plants Varieties Act Cap 326 makes it illegal to trade in seeds/propagating material that are not certified.

[31] National Genebank of Kenya established in 1983 under The Kenyan National Plant Genetic Resources Programme has field gene banks for crops such as cassava, yams, sweet potatoes, bananas, mangoes, sugarcane and coconut which are managed as living collections in the field. However there is no centralized database of the different crops.

[32] The use of the term *in situ* is based on the definition in the Convention on Biological diversity (http://www.cbd.int/convention/articles/?a=cbd-02 accessed 21 November 2011). Thus:
"In-situ conditions" means conditions where genetic resources exist within ecosystems and natural habitats, and, in the case of domesticated or cultivated species, in the surroundings where they have developed their distinctive properties. "In-situ conservation" means the conservation of ecosystems and natural habitats and the maintenance and recovery of viable populations of species in their natural
surroundings and, in the case of domesticated or cultivated species, in the surroundings where they have developed their distinctive properties. In this sense, "on farm" is equivalent to "*in situ*" and where we stress "on farm" it is in order to draw attention to the role of smallholder farmers in providing "the surroundings where they have developed their distinctive characteristics".

3 To promote community-based PGR banks and strengthen mechanisms for accessing and exchanging information on PGR.
4 To identify centres for *ex-situ* in public Institutions and *in-situ/* on-farm conservation that could serve as institutional references for well-targeted conservation, research and development initiatives

Activities and methods

1. **Literature review and identification of factors impeding the flourishing of the informal seed sector for vegetative propagated material**
   A review of literature was done to understand the current status on Legislation and laws in Kenya including IPRs, Treaties and Agreements among others in reference to *in- situ*/ on-farm genetic resource conservation and utilization in general and specifically, for vegetative propagated food crops.

2. **Identification of available opportunities and development of a roadmap for establishing mechanism that will legalize genetic resource access and enhance the informal seed sector.**
   Meetings with key stakeholders and experts who included KARI legal officer and officer in-charge of intellectual property issues; National coordinator – Biodiversity conservation Programme, and team members; KEPHIS inspectors; Plant Breeder Association of Kenya (PBAK) officials; Ministry of Agriculture (MOA) officials; and potential informal seed sector producers – community based organizations (CBOs) and non-governmental organizations (NGOs) were held with a purpose of gathering and verifying information obtained from literature search. During the meeting, policy issues and factors that impede informal seed trade; available opportunities for strengthening the informal seed sector; and ways to establish structures that can legalize the process of *in-situ*/ on - farm conservation model of vegetative propagated crops in Kenya were discussed, bearing in mind the existing legislations and laws of the country. Emphasis was laid on the enforcement of the current policies; institutionalization of a functional conservation model that would strengthen the informal seed sector. Considerations were made on how to enforce the "new" legal framework following guidelines from the KARI-Intellectual Property (IP) draft policy; Kenya seed policy; biodiversity policy; and all the treaties relevant to GR in which Kenya is a signatory.

   Developing rules for the certification of vegetatively propagated GR *in situ/*on-farm was one of the activities suggested to be carried out for strengthening the informal seed sector. Kenya Plant Health Inspectorate Service (KEPHIS) who will carry out the activity is an official government institution which certifies the pureness and quality of all plant genetic resources. In this PoC model the Institute will carry out quality control of seed multiplication and production with the purpose of maintaining and making available to the public, through certification, high quality propagating materials of notified kind and varieties grown and distributed to ensure genetic identity and genetic purity. Meetings were held with the officials of the institute on the implementation of the rules for certification, borrowing from the existing rules of the formal seed sector found in the Kenya seed policy document and guidelines in the International Seed Testing Association (ISTA). Discussions were also held with Kenya Forestry Research Institute (KEFRI) and National Genebank of Kenya officials to borrow the model currently used by KEFRI in production and commercialization of forest seeds.

3. **Promotion of community-based PGR banks and strengthening mechanisms for accessing and exchanging information on PGR.**
   The main activity for effective implementation of the above objective was **awareness creation and capacity building.** The activity was done through seminars and workshops to sensitize stakeholders at all levels on genetic diversity, genetic erosion and vulnerability; and IPR issues on genetic resources. A series of seminars, workshops, meetings and on-farm demonstrations were organized

and conducted with KARI top management, research scientists, NGOs, CBOs, MOA extension staff, and farmers on genetic conservation and IPR issues and available opportunities for improving the genetic resources and utilization in the country and at community level.

4. **Identification of centres for *ex-situ* in public Institutions and *in-situ/* on-farm conservation**
   The role of e*x-situ* centres is to serve as Regional Genebank for safety duplication and long-term storage of the region's core collections; and also they will multiply and avail material to *in-situ*/ on farm sites who will in turn sell to other farmers through informal seed sector. In addition *ex-situ* sites will establish a database of all accessions conserved on farm. This will include passport data and other relevant data of the conserved material. Institutes and individual farmers were selected that could serve as institutional references for well-targeted conservation, research and development initiatives. Four institutes were identified which included KARI – Njoro, Kabianga University, Sotik and Narok prison farms for *ex-situ* and four individual farmers in Central Rift Valley for *in-situ* conservation.

Outcome and deliverables

A Strategy Paper with recommendations on legal mechanism that will enhance *ex-situ* / *in-situ* conservation and utilization of vegetative propagated genetic resources, geared towards enhancing the informal seed sector; and that will take into account ABS and farmers' rights within ITPGRFA Treaty is under preparation. It will incorporate the findings of the objectives of the PoC below. All important legislations[33] were studied and their relationship with genetic resource conservation was established. The planned draft model of the PoC will borrow from some of the existing frameworks under the indicated agreements and pieces of legislation.

1. Identification of the factors impeding the flourishing of the informal seed sector for vegetative propagated material

Meetings with key stakeholders identified three major factors that impede informal seed sector as follows:

i. Current Legal framework does not favour informal seed sector

The seed policies in Kenya are not conducive for the development of the informal seed sector. The present regulatory Framework does not support this sector since according to the Seeds and Plants Varieties Act Cap 326; it is illegal to trade in seeds that are not certified. Most of the exchange of seeds in the informal sector takes place in the form of informal trade. Some of the informal seed sector sources include farm-saved seed, farmer to farmer exchange, local markets, NGO, and CBOs. Most of these sources are either not registered seed suppliers or do not obtain the planting material from known sources hence quality is questionable. As farming becomes more commercialized these laws and policies need to be reviewed and harmonized for the development of a strong seed industry inclusive of informal seed sector. It is therefore important to put in place regulatory mechanisms and policies that would encourage rather than inhibit this informal sector.

[33] These include, the Convention on Biological Diversity (1994), the International Treaty on PGRFA (2003), the Environmental Management and Coordination Act (1999), the Industrial Property Bill (2001), the Statute Miscellaneous Amendment Bill (2000), the National Biotechnology Development Policy (2006), the National Environment Action Plan (NEAP), The Seeds and Plant Varieties (National Performance Trials) Regulations, 2009, The Environmental Management and Coordination (Conservation of Biological Diversity and Resources, Access to Genetic Resources and Benefit Sharing) Regulations, 2006 and the National Biodiversity Strategy and Action Plan (NBSAP). In addition, there are other pieces of proposed legislation including: proposed Seed Act, Bio-safety bill and the National Bio-safety Framework and Regulation. Also included are the 1978 UPOV Convention; farmers' privileges and rights based on Article 9

ii. Lack of centralized germplasm conservation and utilisation centre

During discussions in various forums with the stakeholders it was also found that on-farm conservation activities in the country are uncoordinated. Although there is a National Genebank of Kenya under KARI with other smaller Genebanks that cater for specific plant genetic resources, duplication outside the gene bank is not adequate. In view of the important role played by on-farm conservation in enhancing food security and PGR conservation, there is an urgent and growing need to support farmers in improving on-farm conservation methods. In order to achieve this, there is need to promote relevant policies, legislation and on-farm management of crop diversity. *In situ* and on-farm conservation instruments have unfortunately not been fully utilized to enable the conservation of existing diversity. While some efforts are being made to address these constraints, it is imperative that Kenya strengthen its technical and physical capacity both at the National Genebank and other collaborating national institutions for a vibrant National Plant Genetic Resource (NPGR) programme to be assured. Attention includes the establishment of field gene banks for vegetative propagated and recalcitrant seeded plants such as yams (*Dioscorea* spp.), cassava (*Manihot esculenta*), banana (*Musa* spp.), sweet potato (*Ipomoea batatas*) and taro (*Colocasia esculenta*). In order to promote on-farm conservation there is need to support the informal seed sector. Some of the crops that farmers are conserving in their farms are not served by the formal seed sector. There is therefore need for promotion of community seed banks, strengthening mechanisms for accessing and exchanging information and seed and implementing appropriate seed and IPR policies and legislation.

iii) Developing rules for the certification of vegetative propagated GR *in situ/*on-farm.

One meeting was held with KEPHIS officials on the implementation of the rules for seed certification borrowing from the existing rules from the formal seed sector found in the Kenya seed policy document. Discussions were also held with KEFRI and National Genebank of Kenya officials who suggested borrowing the model currently used by KEFRI in production and commercialization of forest seeds. In this procedure registered seed multiplier (farmers) will be contracted by a public seed agent who will buy the seed from them and distribute to other farmers. The public seed agent who is the market outlet will only buy certified material. Hence uncertified vegetative material will have no market outlet. The inspection and certification cost will be subsidized by government. Additional models to be used for support will include KARI Seed Unit (KSU) and the tissue culture banana value chain model. Incentives will also be given to farmers for producing certified material.

2 Promotion of community-based PGR banks and strengthening mechanisms for accessing and exchanging information on PGR

Awareness creation and capacity building at all levels

Awareness creation was realized by the stakeholders at the onset of the PoC as a priority for successful promotion of community based PGR banks and their utilisation. Seminars and workshops were conducted on the context of genetic resources conservation and intellectual property; while training of farmers was recommended to be carried out in the context of the whole production chain but mainly focusing on the production and maintenance of local vegetative propagated crops; promotion of product sales; and strengthening informal seed system. It was also recommended that training programmes should be designed in close collaboration with the National Agricultural Research System (NARS), farmers, farmer organizations and other stakeholders, and should be based on the needs expressed by these partners. As part of awareness creation farmers will be made aware of Part III and Article. 9 of the International Treaty which states that, “the responsibility for realizing Farmers’ Rights, as they relate to plant genetic resources for food and agriculture, rests with national governments.”

During the period of the PoC June to October 2012 one seminar was held for the management team with ten participants at KARI headquarters; and three workshops with a total attendance of sixty participants for research scientists from twelve KARI Centres in the country. Among the topics covered were Genetic Resource conservation and indigenous knowledge; patenting; plant breeders and farmers' rights; and treaties and agreements related to plant genetic resources (ITPGRFA, UPOV, ABS, MLC etc).

3 Identification of centres for *ex-situ* in public Institutions and *in-situ/* on-farm conservation

During meetings and workshop held with stakeholders, four *ex-situ* sites in public institutions; and four *in-situ* /on- farm plots for individual farmers were identified for plant genetic conservation bearing in mind recommendations made in the draft strategy paper. The following activities were suggested to enhance conservation and utilisation of vegetative propagated material for the informal seed sector: Training of Trainers; Exhibitions of value added products; Linking farmers to outlet markets; Stakeholder forums; Focused group discussions; Dissemination pathways; and working with farmer groups.

Lessons learnt

Awareness creation is the most fundamental requirement for implementation of genetic resources and utilisation policies and should be given to all levels of stakeholders from management to final consumer - the farmer. From literature review it was evident that there are very good laws documented for genetic resources and utilisation which if enforced could improve the crop productivity at community level. However, the enforcers have not been made aware and the few who are aware are not facilitated enough for implementation. Together with the stakeholders we identified factors that impede the flourishing of the informal seed sector for vegetative propagated material; we identified opportunities that can help in developing the roadmap for establishing mechanism that will legalize genetic resource access and enhance the informal seed sector..

From a general perspective, *in situ* management for informal seed sector has been the most neglected area of genetic resource management in Kenya. The implementation of *in situ* conservation activities has also been poorly/insufficiently coordinated in either planning or implementing the activities[34] since there is no legal framework model for guidance in their conservation for continuity. The PoC has helped in putting a draft strategy paper in place which can be incorporated in the existing seed policy for the benefit of the society and farming community. It has also helped in awareness creation and capacity building of the stakeholders in understanding their IPR issues especially in genetic resources. The new knowledge on genetic conservation will prevent genetic erosion and ensure biodiversity and conservation of vegetative propagated GR and restructuring of the informal seed sector. Through this project a better understanding of the Farmers' Rights and Traditional Knowledge and a greater need to sensitize and educate the farmers on their rights has been created.

From a national point of view it is important to address the issue of ABS within the proposed draft model for GR conservation in the frame work of International obligations viz; The International Treaty (ITPGRFA) which Kenya signed[35] and Nagoya ABS (which is now in force following the gazettement of the ABS regulations).

[34] Wambugu P.W. and Muthamia, 2009. The state of Plant Genetic Resources for food and Agriculture in Kenya.

[35] Kenya signed the Treaty in 2006. This legally binding treaty covers all plant genetic resources for food and agriculture. Its objectives are "the conservation and sustainable use of plant genetic resources for food and agriculture and the fair and equitable sharing of benefits derived from their use, in harmony with CBD, for sustainable agriculture and food security". In Biodiversity, Traditional Knowledge and Intellectual Property In Kenya

Since most of the vegetative propagated GR is listed in Annex 1[36] crops of Multilateral System (MLS) of ITPGRFA and should be treated as such when it comes to ABS. The benefits should therefore be in line with MLS requirements. Farmers' right is a new area for most stakeholders in the country including the farmers. However, Kenya is supposed to streamline its laws in order to accommodate and respect Farmer's Rights[37] as passed in earlier Resolutions of the Governing Body of ITPGRFA. The work within this PoC draft will put some mechanisms to complement the synergies between UPOV and the ITPGRFA[38]

The PoC has therefore helped in putting a strategy paper in place which can be incorporated in the existing seed policy for the benefit of the society and farming community. It has also helped in capacity building of the stakeholders in understanding their IPR especially in genetic resources. The following recommendations made in collaboration with the stakeholders will be part of the strategy paper for the on farm genetic resource conservation and informal seed sector model of vegetative propagated crops:

1. Need for a structured informal seed sector for vegetative genetic resources
2. Need for development of regulations that will govern informal seed sector and will also include the protection of local cultivars
3. Identification of key stakeholders for community-based on farm genetic resource conservation.
4. Establishment of the proposed Agro-biodiversity Institute should be fast tracked to be an overseer in the development of regulation
5. Guaranteed legal protection of the informal seed sector within the Genebank system

Way Forward

1. To finalize the strategy paper and publish
2. Use the strategy paper to acquire funding for the implementation of establishing on farm genetic conservation banks
3. Initiate the legalization of the informal seed sector

Since ex-situ conservation is a challenge backups of the vegetative genetic resource will be produced in the tissue culture laboratory to ensure sustainability and quality of the material

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Determination of approaches for licensing of crop varieties in National Research Institutes in Uganda

1. Background and rationale

The licensing of crop varieties as well as formulating policies of intellectual property rights is very critical in the agricultural sector in Uganda. In Uganda, over 80% of the households are engaged in agriculture for food security and income. Agriculture is the major contributor to the economy as it provides foreign earnings to the country with major cash crops namely coffee, cotton, tea and other horticultural crops. For

[36] Abebe Demissie, 2006. Regional strategy for the ex situ conservation of plant genetic resources in: Eastern Africa

high quality and yielding crop varieties is important for the country to benefit from the world trade markets in a competitive manner. In making benefits from the world markets, countries need to embrace agricultural research as an important component for development of new crops. In agricultural research, conventional breeding and biotechnology as major tools that play significant roles in imparting traits into the plants to generate a unique plant types. Research scientists have advanced in research work in trying to develop substantial numbers of crop varieties so as to ensure that the consumers and producers can have a wide choice of selection. This has enabled research scientists to provide seed companies, farmers and other agencies with new crop varieties for commercialisation. However, the approach used to license the crop varieties appears not to be well streamlined, thus making it very problematic to breeders and seed companies to follow when it comes to licensing of the technologies developed in Uganda. In the absence of the law pertaining to intellectual property rights, and in most cases the research scientists are not recognized for their work because they develop crop varieties for public domain since they are employed by the government. Similarly, the seed companies are also not placed in better position for them to favourably compete with other seed companies due to lack of the regulating laws that can guide, protect and govern them in the country.

However, this concept is beginning to change because the country has realised that there is need to put things into action so that the licensing policy and intellectual property rights are legalised as law. This intended to guide and protect breeders and seed companies. There has been consideration done by the government to conceptualize and draft bill for debate. The bill needs to be coordinated by the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) at all stages so that the process is done expeditiously for discussion in parliament.

2. Objectives

The project of change was initiated to gather information pertaining to licensing and intellectual property rights of crop varieties in the country. This organisation included the national research institutes, seed entrepreneurs, high institution of learning and MAAIF. The objectives of the project of change were to: 1) determine the mechanism and system that facilitates the licensing of crop varieties in the country, and 2) determine the functioning of intellectual property rights in relation to crop varieties.

3. Activities and methods

To achieve the stated objectives, studies were conducted in different organisations by engaging individual organisation in discussion using prepared set of sample questionnaires. The organisations visited included the national research institutes, private seed companies, University institution, Ministry of Agriculture Animal Industry and Fisheries. The interest was to capture and obtain their personal opinions on the issue of licensing and intellectual property rights of crop varieties. The study was conducted during the months of August, September and October, 2012. The issues were discussed at length by the officials whom I met in the various organizations, institutions and seed companies. The discussion provided friendly atmosphere and ample time with the officials whom a lot of information was generated.

5. Outcome and deliverables

The licensing policy and intellectual property rights bill is still in the initial stage waiting for debate in parliament. The government plans to the make this as a functional policy that will guide and govern the research institutions and seed companies engaged in crop variety development and production in the country. To establish the current situation on policies in regards to crop varieties in various institutions, the following information were gathered during the discussion with officials from different institutions and companies.

5.1 Licensing of crop varieties

Normally procedures are undertaken before the crop varieties are released and licensed to seed companies and other agencies for commercialization. The ministry of Agriculture, Animal Industry and Fisheries (MAAIF) ensures that the breeders conduct national performance trials (NPT) at least for two seasons but in several locations before submitting the variety filled forms to the national variety release committee for the varieties they intend to release. This is done to ascertain the potential and stability of the varieties on the basis of yield performance, biotic and abiotic factors before the varieties can be approved and recommended for release. The breeders do the NPT while the DUS (distinctness, uniformity and stability) test is done by the certification officials from MAAIF. The MAAIF has the final say on the release of the crop varieties. This means that the breeders have to meet all the requirements needed in order for the varieties to be released and subsequently licensed to seed companies and other agencies. It is important that the breeders demonstrate how well the new varieties are performing against the existing commercial variety. The samples of the crop varieties earmarked for release is sent to the seed certification unit to enable them characterize them.

However, the policy governing the licensing of crop varieties is still not in place but there is some hope that the draft bill is in its second round of reading by members of parliament. The National Agricultural Research organization (NARO) has its own policy it follows in licensing of the crop varieties to seed companies in the country. For crop varieties that are released NARO provides detailed information about the varieties and advert is made in media such as newspapers, radios and TVs. A meeting is organised by NARO where various seed companies, policy makers and other stakeholders are invited to attend. During the meeting, the officials discuss and judge the competencies of the seed companies, existing personnel, staff history and infrastructures before the crop varieties are given to the interested companies. An agreement on the amount and mode of payments of the quantities of particular variety is reached. A memorandum of understanding is signed on mutual agreement between NARO and seed companies. NARO specifies the type of licenses to the interested groups which can either be exclusive or non-exclusive/joint. In an exclusive license is given up to 5 years to one particular seed company so as to manage and produce. The seed company then goes into negotiation again with the organisation (NARO) after the expiry of the contract. Other benefits to the breeders are that on agreed terms, the seed companies can give royalties at least 2-5% to breeders of the total production and this depends on the volume of seed produced per year of particular variety. For a non-exclusive/joint license, this is open to any seed company who may want to engage in commercialisation but to well-established seed companies. This arrangement between the organisation and seed companies usually cements the relationships because it becomes more effective for the varieties developed to be easily taken up and maintained by the seed entrepreneurs in the country. In the country, we have 10 seed companies that are well established in terms of capacity development and capital who are engaged in the seed industry. It was noted that for the mechanisms to facilitate the seed companies to license crop varieties to other seed companies there should be consideration of the capacity for those companies willing to be in position to pay for a premium. This should be complimented with outstanding infrastructures, resources and proper staffing which should be prerequisite for any development of seed companies in the country. The availability of high quality and yielding crop varieties can enable the seed companies compete favourably with other partners in commercialization of products in the world market. Observation made showed that there should be royalties or rewards provided to the breeders as way of appreciating them in their technology generation.

This study established some challenges which affect the seed companies in their operations. The seed companies are not placed in better positions because of the lack of the governing policy. Sometimes the crop varieties developed and released take a bit of time to reach the seed companies and this limits their progress in the business industry. The officials proposed for the need of licensing policy to be considered and acted expeditiously so as to make the seed companies and researchers to have well guided and governed policy. This will eventually make the seed companies to be placed in good position to enable

them operate and compete favourably well. It was also observed that the seed companies have no capacity to make the policy functional and therefore results in the other varieties to be killed. It was noted that seed companies sometimes meet a lot of costs because each time or season they conduct trials, a tune of 350 USD is spent per location. It is important that the policy makers need to come together and discuss the issues affecting them so that the process is done expeditiously to make the policy put into action.

5.2 Intellectual Property Rights (IPR) governing crop varieties

As for now, there is no law governing or protecting the breeders in Uganda. As such it was difficult to ascertain its effectiveness because nobody knows about it. This has resulted into creating a lot of difficulties to seed companies to have full potential to trade in crop varieties especially in the seed industry and transfer of plant materials from and to the country. However, this trend seems to slowly changing because the government is realising the significance of research done by the research scientists. The respondents proposed that if the bill is passed and put into action, then 1) the breeders will enjoy the exclusive right to sell and export plant varieties, 2) It will promote the supply of good quality seed or planting materials to farmers in order to strengthen food security, 3) It will protect all the crop varieties, and 4) It will create incentives for breeders to encourage them to initiate new innovations. This will strengthen the IPR policy thus allowing the breeders to become sub-contractor of the organisation so that they are given a part of their effort in generating the technology. This law will also encourage the breeders to go ahead and enter into private research to develop the best crop variety which they can have control over it. The breeders need to make good publicity of their released varieties developed to seed companies who may express interest in the varieties so as to make contracts with them in time.

The IPR act to give privileges to the breeders so that they can be in position to supply a crop variety to seed company for specific period of time after which the breeder and seed company can then come into negotiation for another contract. The IPR law should be flexible so as to accommodate many stakeholders who are willing to operate in the agricultural sector in the crop aspects. For several years, breeders have been depending on the funds provided by the government from tax collections and external donors. Therefore, this bill should encourage the breeders to contribute a share of the money to sustain the research development. This calls for the national organisation to make arrangements for research scientists to come up with development budgets for research purposes.

With regards to IPR act, there are lot of challenges which breeders and seed companies face in their today-today works because the act is not yet in force and therefore makes the activities of the breeders and seed companies very difficult to operate. As reported, there has been loss of knowledge and technology initiated by breeders because other countries snatch it since the law that would protect them is not in place. This means that what breeders develop in their country ends up elsewhere. Most producers or consumers go for cereals and legumes which are open pollinated varieties and this makes difficult for seed companies to have control over them because they keep on reproducing them every season, thus putting the seed companies out of business. It is our hope that the IPR act be put in place to allow various stakeholders to establish for timely communication because there is a lot of pirating of information by unscrupulous people who hijack information for their personal gain. This then proposes for proper establishment of platform to be put in various agricultural sector developments to carry out massive sensitization to inform the stakeholders how the IPR act can function so as to guide and govern the research activities of the breeders and seed companies in the country.

The information gathered on licensing of crop varieties and intellectual property rights provided significant tools for use for research scientists at national research institutes and seed companies. This will enable seed companies to understand the mechanisms of the system and how to follow when dealing with crop varieties which they commercialise. Our hope is for the parliamentarians to pass and implement the draft bill. This will provide an enabling environment in the provision of privileges to breeders especially

for granting them with protection and rights of their works they do in research. This will be significant in agricultural sector because the researchers will have a say for their technologies developed. The intellectual property rights will therefore be the regulating tool to follow by the research scientists/breeders and seed companies in the agricultural research for breeders and seed companies. This will deter from other people pirating information and technology generated by research scientists/ breeders.

6. Lesson learned-way forward

The parliamentary committee conducted consultative meeting with different organisations and gathered information needed during the debate in parliament. The consultation involved the Seed companies, National agricultural organisation (NARO), National agricultural advisory services (NAADS), Ministry of agriculture, animal industry and fisheries (MAAIF) and Makerere University on the status of the bill. This was to get responses from different partners so as to further scrutinize the bill before it is approved and implemented. It was stated that the bill needed to be harmonized with other laws within the East African countries that address the same issues. It was also proposed that the bill to give penalties to breeders or seed companies who deviates from the implemented law. The lack of licensing and intellectual property rights was a major concern to many researchers because the law appear to be overdue for implementation. The research scientists and seed companies are secure in their works when the law is well streamlined and workable. Therefore need for the policy markers to expedite the process so as to make it a policy to enable guide and govern research scientists and seed companies in the country. It is important that the government gives regulation to include fees to be paid to the right holders of the new crop varieties developed. The system can only remain strong unless the breeders come together as one entity and form an association. Therefore, the policy makers need to put these issues as priority in their agendas and pay a lot of attention so that the agricultural research is not constrained in the country. This can be avoided if these pertinent issues are addressed amicably and put into action in order to realise huge agricultural transformation in the country. This can be achieved if have well established and functional licensing policy and intellectual property right act governing the crop sector in the country.

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Promoting Rice Breeding under PVP Acts in DPR of Korea

Background and Rationale

The purpose of plant breeding is to develop improved crop cultivars that must be available to end users(farmers) and must satisfy their needs.

Korea is surrounded by sea on three sides - west, south and east, and is joined to China and Russia in the north. DPRK has the great population compared with the small area. The climate is very changeable with 4 distinct seasons. Northern part of Korea is very cold but south part is very hot. Some areas have continental climate and some areas – oceanic. Main food of DPRK is rice. Different areas need different seed. There are some rice varieties in DPRK. It is very important to select correct varieties according to the areas in order to increase yield.

All the seed farms are governed by the government in DPRK and lots of breeders don’t exactly know about PVP and other international legislation for promoting breeder's role.

DPRK enacted the Plant Varieties Protection Act of 1999, but has not been fully implemented yet. This needs some time, efforts and money.

In DPRK there is Academy of Agriculture where there are some institutions such as institute of agricultural seed, institute of agricultural biology, institute of soil, institute of livestock and so on. This academy becomes center of agricultural research work in DPRK. There are some partial agricultural institutes in different parts of DPRK which are connected to the central institute and other partial institutes. But now the relationships between institutes are not so close to widely share and exchange needed research results and data. And the scales of these institutes are not so large to preliminarily know farmers' needs and fulfill their needs. Now there is not unique rice variety database including information about all rice varieties cultivating in DPRK.

Of course it is obvious that a survey of all rice varieties should be carried out. Our project will conduct this survey and guidance on the implementation of the act under existing circumstances. Moreover, the project will present useful lessons for policy makers to take into consideration both needs of intellectual property right protection and genetic resources conservation.

Objective
The purpose of the project is as follows:

Collect characteristics data of different rice varieties and create variety database.

Surveys on rice varieties must be done in all part of DPRK and additional surveys on relevant species such as maize, reed and soybean must be done in order to search genetic resources which can be used to improve rice breeding, for example salt resistant and drought resistant.

Variety database must be network-based database which can be accessed from all parts of DPRK (but it is not public to the other countries yet).

Support rice breeder's role under PVP acts.

This project aims to support rice breeders by fast and correct choosing suitable rice varieties and needed genetic resources. Accessing database breeders can clearly know and use characteristics of rice varieties and easily register new varieties.

Activities and methods
In the first stage of the project collection of information about rice and some crops has been done. Information about rice varieties and some relevant crops such as maize, reed and soybean was mainly from the Institute of Agricultural Seed and partial seed institutes in some parts of DPRK. Institute of Agricultural Seed is the center of seed data processing and storing where there is the National Genbank. Partial seed institutes store information about their regional crop varieties. This is the first source of information The second source of information is something such as research reports, journal articles, books, and project description in scientific journals dealing with rice varieties in DPRK.
In the second stage of the project data analysis has been done and rice variety database has been made. Significant characteristics of rice varieties were selected and standardized by comparing data from various sources, removing redundant information and ranking data.

In the third stage database management program were made. This program can be used through the network and also in local computers.

In the final stage of this project, meetings with some breeders, agricultural officers and agricultural researchers were organized and they discussed about problems to improve rice breeding by PVP and rice varieties database.

Outcome and deliverables
Rice variety database with 25 fields (categories) containing accumulated temperature, stress resistances and so on has been made. This database contains over 150 rice varieties in DPRK. Institute of Agricultural Seed stores crop varieties information during over 50 years, but old information is not correct. So database contains only recent 20 years' information. More than 20 partial seed institutes store and manage regional information, but data formats are different. So it is necessary to compare data from different sources and to remove overlapped data, to choose most significant information and to standardize all those data. Database maintains clear and sorted dataset. There is need for use of new techniques such as DNA markers to ascertain uniqueness of varieties. This database incorporates morphological marker information and genetic information about crops.

Rice varieties database program were made by which user can view any information about rice varieties, add and correct data by consulting with administrator. Information stored in this database may be incorrect and does not contain all information about rice varieties. So researchers can correct and this database. To implement publicity user must consult with administrators, and of course any changes to the database can be displayed to all the users.

Through the meetings with breeders, researchers and officials they understood about the role of PVP acts in promoting breeder's role by presentation of PVP acts and some international legislation, and they are trying to establish breeding plan by selecting correct varieties according to the partial features and increasing breeder's role.

I would like to summarise one example of promoting rice breeding to be expected. In the west parts of the country there are many tidelands, but rice can be hardly grown in these regions. Some breeding researchers intended to breed salt-resistible rice varieties but could not succeed. They will choose some salt-resistible rice varieties and some genetic resources from reed data stored in the database. They will establish breeding plan and require of some measures to the government. Governmental officers will recognize their need and benefit from their project. Breeders will enforce their work by advanced breeding system.

Lessons learned and way forward
The major problems encountered during this were getting together all the members of the committee charged with the responsibility of promoting breeder's role.

Some governmental officers don't exactly know significances of PVP and other international protocols. And all the breeders and researchers don't want to know about this. It will take some time to make all of them to understand international legislation and intellectual property right. In order to do this we need some printing materials and media to be made and time to organize meetings.
We must add some information to rice variety database and complete this database, classify rice varieties according to their needs for temperature, water, mineral and fertilizer and so on and discuss with the government about practical measures to increase breeder's role.

Even then all the breeders and researchers will know significance of PVP acts and require of their demand in seed selection and crop breeding. This will increase breeder's role in rice breeding and it will give big crops in rice breeding.

Thus technical support from different stakeholders, especially from international support like WIPO, WTO, and FAO is very important.

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Development of Maize Reference Collection in Kenya

Background

Our department's (Plant Variety Protection) mandate focuses on plant genetic resource in the area of variety testing and seed certification. In Kenya Distinctiveness Uniformity and Stability (DUS) test is a requirement for the protection of new plant varieties and to undertake this test we are guided by the International Union for the Protection New Varieties of Plants (UPOV) test guidelines (TGs).
In the DUS examination, most of the key characteristics are observed visually and this is based on the examiner's judgment. For these visual observations to be accurate and repeatable the DUS examiner requires adequate training, experience and reference aids such us color charts and example varieties. Example varieties are used to bench mark the state of expression of the characteristic under observation hence the basis for the examiner's judgment. These example verities must be adaptable in the agro ecological zones where the candidates are being examined. Apart from the cassava UPOV TG which is under our development, all other UPOV TGs contain example varieties majorly grown in Europe and Asia thus they cannot be used as example varieties in Kenya apart from those ornamentals grown under controlled conditions(green houses).
It is on this basis that these UPOV TGs need to be transformed into National DUS test protocols. I take maize as my case study and UPOV TGs to conduct DUS tests contains example varieties not grown and adaptable in Kenya. Thus there is need to transform the UPOV TGs for maize to national TGs by coming up with reference collection of example varieties for each character state of expression.

Objective

The example verities in the UPOV maize TG are foreign thus they are not adaptable to the Kenyan ecological zones where maize is grown. Hence the needs to transform the UPOV maize TGs to National DUS maize test protocol. The transformation process will entail examination, and selection of local varieties expressing the relevant characteristic(s) of interest.

Activities and Methods

The following activities were undertaken:

1. Collection of the parental lines to be evaluated
   A total of fifteen parental lines and five open pollinated varieties were submitted for evaluation.
2. Trial Planting
   The trial design was designed to result in 33 plants per plot for the parental lines and for the open pollinated varieties. The spacing in the trial was 75cm between rows and 30 cm within rows. Three rows were planted per plot and the trial design contained two replicates. Length of each row was 3m and the stand count per raw was 11 hills multiply by 3 rows = 33 plants. Sowing rate was 2 seeds per hill which was thinned to one seedling at 3-4 leaf stage. The trial was surrounded by 3 continuous border rows. At planting di-amonium phosphate fertilizer (DAP 48:26:0) was used.

3. Trial agronomic management (weeding, top dressing, pest control)
   Weeding was done manually and control of the stalk borer was controlled using betacyfluthrin granules two weeks after emergence, Imidacloprid was used to control the termites and lastly lambdacyhalothrin was used to control cutworms at planting. Top dressing using calcium ammonium nitrate (CAN) was done at 3-5 leaf stage.

4. Character evaluation of:
   - Leaf characters
   - Tassel characters
   - Silk characters
   - Stem characters
   - Grain characters
   - Cob characters

Outcome and deliverables
We have been able to develop colored photographs that can be used to identify the state of expression of different characters at different stages of plant growth as illustrated below:

Character 13. Tassle Characters
Character 10. Anthocyanin colouration of the glumes excluding the base


Char: weak/very weak
Variety: Inbred A


Char: medium
Variety: MUL 703

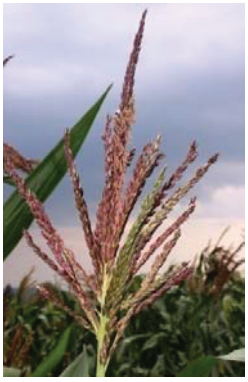

Char: strong
Variety: MUL 702


Char: weak/very weak
Variety: Embu Synthetic

Character 11. Anthocyanin colouration of the anthers

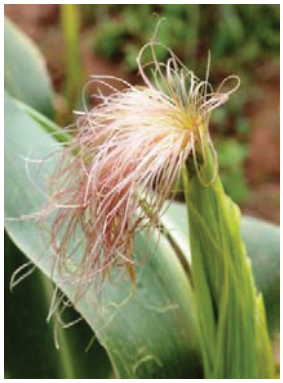

Char: weak
Variety: B 4


Char: medium
Variety: MUL 704


Char: strong
Variety: R12 C10

Character 16. Anthocyanin colouration of the silks

Char: weak/very weak



Char: weak
Variety: Inbred A

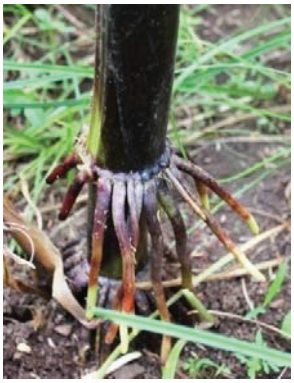
Char: medium
Variety: MUL 704

Char: strong
Variety: MU015

Character 17. Anthocyanin colouration of the brace roots

Char: weak
Variety: B 4

Char: medium
Variety: R12 C10



Char: strong
Variety: MU015

Character 19. Anthocyanin colouration of the sheath.

Char: Absent

Variety: W 93

Char: Weak

Variety: A14

Char: Medium

Variety: R11C744

Char: weak/very weak
Variety: MU015

Character 20. Anthocyanin colouration of the internodes

Char: Medium
Variety: W 93

Char: Strong
Varieties: A14

Character 36. Type of grain.

Char: Flint
Variety: DLC1

Char: Flint like
Variety: MUL 114

Char: Intermediate
Variety: MUL 15

Char: Dent like
Variety: CML444

Character 38. Colour top of grain

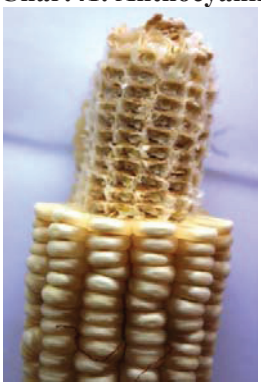
Char: White
Variety: B1

Char: Flint like
Variety: DLC1

Char:39. Colour of dorsal side of grain

Char: White
Variety: A14

Char:41. Anthocyanin colouration of glumes of cob



Char: absent /very weak
Variety: EC573C7

Impact of the Domesticated Test Guideline

- Precision when carrying out the DUS test.
- Training of new plant examiners.
- Coming up with a reference collection for each character state of expression.
- Selecting traits for further breeding of improved varieties of plants.
- Enriching the UPOV test guidelines.
- Regional variety testing seed certification.

Lessons Learned

We were not able to obtain the seed for the parental lines of the varieties whose production is done outside the country but within the continent due to the time constrain but since development of maize reference collection will be a continuance process notice will be given on time to our development partners to avail seed for the purposes of evaluation.
It will be necessary for a team comprising of plant examiners and crop specialist to be established so as to define ranges for quantitative characters.
There is need for Kenya Plant Health Inspectorate (KEPHIS) to put a team of plant examiners whose task will be to come up with reference collection of agricultural crops and crops of economic importance. The plant examiners will work hand in hand with crop specialist where need arises.

Way Forward

UPOV develops Test Guide Lines (TGs) used in describing new varieties of plants. It is up to each UPOV member state to customize the TGs to suite there testing needs like Selection of varieties adoptable to their environment for use as reference aids. It is on this basis that there is need to domesticate TGs for each crop of national importance for use by all players in the breeding industry.

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Towards a functioning Plant Breeders Rights in Malawi

1.0 Background and Rationale of the Project of Change

In order to protect the farmers in Malawi, government has developed a defined sequence of events, interfaces and responsibilities involved in the development and release of agricultural technologies. Government continues to take the lead in variety improvement programmes although the private sector and other institutions, such as the University, are encouraged to take an expanded role, particularly for hybrids, vegetables and potatoes. To promote private sector research, Department of Agricultural Research Services (DARS) will make available germplasm from its own research and, where possible, from the international research sector centres with which it collaborates. Testing of agricultural technologies including varieties is a responsibility of the Department of Agricultural Research Services, semi-autonomous research stations such as the Tobacco and tea research institutes, University of Malawi and Private seed companies. Private Seed companies however, are supposed to work in collaboration with scientists from the Department of Agricultural Research Services in the Ministry of Agriculture and Food Security. DARS as a public body will continue to coordinate such activities to ensure impartiality. While plant breeders from various institutions as indicated earlier are actively involved in developing new crop varieties, plant breeders' rights (PBR) in Malawi are still in a form of a draft bill.
Within the SADC region, only 4 countries so far (South Africa, Zambia, Zimbabwe, Tanzania and Kenya) have functional Plant Breeders' Rights (PBR). This implies that currently efforts by breeders, both from public & private research institutions, to release new crop varieties are not recognised and rewarded in many African countries including Malawi. In Malawi, for example, the seed industry has recently expanded due to increase in demand for certified seed of improved crop varieties. This demand has brought in SEED-CO & eight other seed enterprises over the last 5 years.

However, non-existent of a functioning PBR is envisaged to deter other foreign seed companies from conducting seed business in Malawi for fear of commercial exploitation (seed multiplication of foreign varieties is not possible).

2.0 Objective with Project of change

In order to facilitate, create awareness and draw attention of the policy makers regarding the position of Malawi with respect to Plant Breeder's Rights, this project of change was initiated. It was anticipated that at the end of this project the under-listed objectives would have been achieved:

1) Identify strategies that will speed up finalization of the PBR draft bill currently with the lawyers;
2) Critically and practically review the PBR draft (with the knowledge & skills acquired through the GRIP initial training programme in Sweden);
3) Develop/draft license agreement in the absence of an operationalized PBR to enable interested seed enterprises commercialize new released crop varieties

3.0 Activities implemented and Methods used

To successfully address the above objectives three major activities were planned for implementation over the period during which the project of change was carried out. The activities implemented were as outlined below:

3.1 Meeting to review the PBR draft

Due to financial limitations, it was not possible to bring all plant breeders together to discuss and critically look at the Malawi PBR version currently with Ministry of Justice. The meeting attended by a cross section of plant breeders from Chitedze Research Station and Lifuwu Rice Research Station within the central region of Malawi to review the PBR and the revised document was re-submitted to the Ministry of Justice. The absence of farmer's rights in the PBR document was noted. The Malawi PBR excludes farmers' rights because it is included elsewhere within the Ministry of environment and Natural resources where local communities are recognised in the resource access and benefit sharing.

3.2 Follow up with the Ministry of Justice on the status of the draft bill

In March 2012, the PBR draft document was submitted to the Principle secretary in the Ministry of Agriculture and Food Security so that they could draft an accompanying/supporting letter to the Ministry of Justice for their immediate action. Unfortunately, this was not done as no feedback was reported until August 2012. In September 2012, a re-submission of the document was made to the Ministry of Justice with copies to Secretary for Agriculture in the Ministry of Agriculture and Food Security. In the second attempt, a civil society non governmental organisation called Civil Society on Agriculture Network (CISANET) was used to take a lead, lobby and engage the responsible Ministry in a dialogue on behalf of the Department of Agricultural Research Services so that the bill can be considered in parliament.

The parliamentary session which was planned to start in November 2012 did not take place. It was anticipated during that time the Department of Agricultural Research Services would follow up with CISANET so that they can engage in a discussion with the Parliamentary Committee on Agriculture and Natural Resources before the November seating to impress upon them to consider passing the bill if presented and make them understand the implication of not doing so. Although the November seating of parliament never took place, the Department had a discussion with CISANET to further pursue this matter. The mid term parliament review meeting, as this final reported was being compiled, had just started (4th February 2013) and we are yet to establish whether or not the bill on PBR will be tabled this time around. However, following an indirect probing that was made with the Chairman of Parliamentary committee on agriculture and Natural resources on 8th February 2013, he doubted and gave no knowledge of the issue that I had raised on PBR bill. However, a follow up was to be made on the same with CISANET so that soon or later this issue comes to pass.

3.3 Align the PBR with the plant breeder's rights in the SADC Region

The Ministry of Agriculture and Food Security is responsible for the approval of all agricultural technologies in Malawi. In 1993, the ministry established Agricultural Technology Clearing Committee (ATCC) replacing the then Variety Release Committee (VRC). ATCC ensures that all agricultural technologies are rigorously tested and found appropriate for both smallholder and estate commercial agriculture in Malawi. The mandate of ATCC is broadly to approve and recommend for release crop varieties, livestock breeds, crop and livestock production technologies, processing and mechanization/engineering technologies.

Malawi as a member state of SADC is aligning its National Variety Release System to the Regional Harmonization of Seed Technical Agreements. This will stimulate the availability of new and improved varieties: hence increasing farmers' choices. The process requires all key stakeholders to work together and mainstream the alignment of legal instruments. A meeting was therefore held on 8th October 2012 in Lilongwe involving plant breeders, seed companies, representatives of smallholder farmer organisations, civil society organisations among others to discuss alignment of the variety release and seed certification and quality control assurance system to the SADC seed regulatory system. The proposed new variety release system in Malawi is attached.

4.0 Outcome and deliverables

Following successful implementation of the above planned activities for the project of change in Malawi, the under-listed have been the achievements.

- A coordinated effort by DARS, CISANET and Ministry of Justice operational to lobby for the endorsement of the PBR bill into a binding and legal entity by members of parliament.
- The PBR document was reviewed to align it with the SADC variety release protocol thereby enabling plant breeders to release varieties in Malawi that can be commercialized in other SADC countries.
- A Civil Society organization (Cisanet) has been engaged to take the leading role and drive the process with the Ministry of Justice and this will soon yield some positive results.
- Awareness to some extent, has been created to the parliamentary committee on agriculture and natural resources regarding the importance of the PBR and the need to have it considered in parliament
- Information shared on the status of the PBR in Malawi and that only 4 SADC countries have functional plant Breeder's rights.

5.0 Lessons learned -way forward

The GRIP training significantly contributed towards driving the entire process of project of change. It has been possible to engage a civil society organisation to take a leading role in pushing for a consideration by the members of parliament to assent to the plant breeder rights bill. It is sometimes difficult to find the right people and bring them all at one place to discuss issues of common interest. The organisers of the training should consider a modest financial support to enable participants organise and facilitate meetings where necessary. It is a clear lesson that cases requiring intervention at policy level can be slow and requires multifaceted efforts to achieve meaningful progress.

A follow up on the status of the PBR draft bill will be required to ensure that this is fully passed into a law since non-existent of a functioning PBR is to deterring growth of the seed industry in Malawi. Although the effort to align the Malawi variety release process is critically important, the current implementation process is fairly complicated.

IP-policy

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Awareness of the Legal Framework on Access to Peruvian Genetic Resources for Investigations in a Peruvian University

Background

Peru is not only a country with a millenary culture; it is also one of the few existing mega diverse countries in the world. It is this combination of factors that has put Peru in a special situation in which it is able to act as the provider of a wide variety of genetic resources. Because of this role as provider of resources Peru has been very active in the international fora with respect to the issues of access to genetic

resources. Some of the multilateral organizations which have raised the issue at hand and in which Peru has actively participated include the World Intellectual Property Organization (WIPO), the Convention on Biological Diversity (CBD), the Asia-Pacific Economic Cooperation (APEC) and the Andean Community of Nations (CAN).
Besides its participation in various multilateral forums, Peru has negotiated and established over the past decade many bilateral agreements, such as Free Trade Agreements with the United States, the European Union and other trade partners, in which rules for the access to genetic resources have been agreed. As a result of these bilateral treaties Peru has developed over the past decade a national legislation for the access to such resources, to go along with its previous legislation on the matter. However, this legislation is still in process of implementation in some parts, and in other parts is sometimes unknown to the intended users and thus it is not observed. Therefore this project seeks to understand the level of awareness of such legislation by researchers of national universities in Peru in order to determine what needs to be done in order to be able to fully apply the law and have researchers comply with the law when accessing genetic resources.
The National Agriculture University is a public university created in 1902. It is considered among the most important universities of Peru within the fields of agricultural and forestry sciences. The university is organized into eight faculties which contain twelve academic departments which include Agronomy, Environmental Engineering, Biology, Meteorology, Forestry Engineering, Business Management, Economics, Statistics, Food Engineering, Agricultural Engineering, Fishery Science, and Animal Science. The university also has over 25 graduate or masters programs including Agricultural Economics, Forest Resource Conservation, Forest Resource Management, Agricultural Innovation for Rural Development, Food Technology among others. It is also important to mention the PhD programs in the fields of Animal Sciences, Biological Sciences and Engineering, Economics of Natural Resources and Sustainable Development, Environmental Engineering, Nutrition, and Sustainable Agriculture and Water Resources. The univsersity is also one of the leading universities in Peru regarding research, however like most universities in Peru it still lacks clear intellectual property policies and suffers from a small budget for research.

Objective

The main objective of this project of change is to determine the awareness of the Peruvian intellectual property regime on access to genetic resources by researchers of the National Agriculture University, thus having a better understanding of the awareness of all other national universities in Peru dedicated to research, seeing as the National Agriculture University is one of the leading national universities when it comes to research. This will help research, because if research is done without observing these laws and regulations, the researchers run the risk of not being able to make use of their findings.

Activities and methods

- Identifying the pertinent laws and regulations of Peru regarding the protection of genetic resources.

I have identified and examined the pertinent laws and regulations with regard to the protection of genetic resources in Peru. This includes among others the following:

1. Andean Decision 486 (2002), Andean Community Common Intellectual Property Regime

2. Law 29316 (2009), Law which modifies, incorporates and regulates various provisions in order to implement the Trade Promotion Agreement signed between Peru and the United States of America.

3. Law 28216 (2004), Law regulating the access to Peruvian biological diversity and the collective knowledge of indigenous people.

4. Supreme Decree 003-2009-MINAM (2009), Supreme Decree which elevates Ministerial Resolution 087-2008-MINAM to a Decree status and thus ratifies the Regulation on Access to Genetic Resources.

5. Legislative Decree 1075 (2008), Legislative Decree approving supplementary provisions to Decision 486 of the Andean Community Commission which established a Common Intellectual Property Regime.

- *Participating in the National Comission against Bioparicy.*

I have attended and participated in the meetings of the National Comission against Bioparicy. The National Commission against Biopiracy is made up of representatives from different private and public institutions with the main purpose of developing actions to identify, prevent and deter acts of Biopiracy in order to protect the interests of the Peruvian state. Therefore the Commission has been one of the key actors in the process of establishing a system of protection against acts of Biopiracy in order to contribute to the sustainable development of Peru.

Through my participation and involvement with the Commission I have learned about the work being done in the areas of protecting biological resources of Peruvian origin and collective knowledge of indigenous peoples of Peru, which include the creation of a registry of biological resources of Peruvian origin; the identification, monitoring and evaluation of patent applications filed or patents granted abroad involving such resources; actions of opposition or revocation against patent applications filed or patents granted abroad involving such resources; the establishment of permanent channels of information and dialogue with the patent offices of other countries; and the promotion of the legal access to genetic resources in accordance with international treaties and national legislation.

- *Establishing contact with the National Agriculture University*

I have established contact with the head of the Investigation Office of the National Agriculture University. The university is one of the few universities in Peru which significantly contributes to the scientific development of Peru through research, therefore it can serve as a perfect messuarement of the awareness of researchers of the laws and regulations regarding access to genetic resources.

- *Acquiring information from the National Agriculture University with regard to their knowledge and policies on proper access to genetic resources.*

I prepared a questionnaire which was delivered to the Investigation Office of the National Agriculture University. The main purpose of the questionnaire was to obtain information with regard to their investigation and intellectual property policies including rules on the ownership of the results of the investigations performed by researchers with university funds, the structure and hierarchy of all departments involved with research in the university, the existence of intellectual property offices, investment on research, quantity of research, areas of research which involve genetic resources, quantity of the research which is later used in the private sector or put into commerce, and the knowledge of the researchers of the university about the laws regarding access to genetic resources. The answers to this questionnaire helped me grasp a better understanding of the policies of Peruvian universities in the areas regarding access to genetic resources and how much researchers know about these issues.

Outcome and deliverables

The purpose of this project is to determine the level of awareness of the laws and regulations of Peru regarding the access to genetic resources by the researchers in the National Agriculture University.

As it has been stated before, the National Agriculture University is one of the most prolific research universities in Peru; however the university lacks internal regulations and policies on intellectual property when it comes to research. Even though the university's regulation states that all research conducted at its facilities are co owned by the National Agriculture University and the researchers involved, the university does not have any more rules on the matter thus it lacks clear rules on issues such as how to conduct technology transfer agreements with other institutions or further rules on how to protect the intellectual

property that derives from the research undertaken in this institution. Research in the university is in charge of the Academic Department which has an office for research, however in the next few months this will change due to the creation of a specific Department for Research. This change is positive and will enhance the university's ability to have a wider control and accountability of the research performed in its campus. Another issue that will be fixed with the creation of the new department will be that at present the office for research has no internal sub-units, this means that there is no one assigned to intellectual property issues exclusively. Intellectual property issues are overseen by the head of the office along with many other issues. The creation of the new department exclusively created to oversee research will allow for a sub-unit which can handle intellectual property issues as its main purpose.

With respect to the budget of the National Agriculture University destined for research, the university has almost no budget for research activities. It is noteworthy that the general budget of the university provides some funding for research a year, but this amount only covers the salaries of researchers across the university and it is not enough to cover the cost of the investigations. Aside from the budget, the Academic Department can grant other amounts of funding for research of students and also the university receives an annual extra budget derived from taxes which goes directly to research. Even with this extra amount of money the university cannot fully cover its research expenses. It is because of this reason that the university usually seeks partnerships or grants from public and private institutions in Peru and abroad. It is important to highlight that in spite of this difficulties, the Engineering Faculty alone annually generates about 90 graduate theses, as well as a similar number of undergraduate research papers. Research in the university is conducted in all Faculties and Departments. The research directly related to genetic resources mostly takes place in the Agronomy Department through the programs dedicated to cereal, corn, roots and tubers, legumes, ornamental plants, native fruit, among others. There are also some biology laboratories working with plant genetic resources and the Biotechnology Institute working on breeding varieties of plants with commercial interest. On the other hand, the university also works with medicinal plants in the Forestry Engineering Department and the Institute of Biochemistry. Some research in animal genetics is also undertaken.

There are cases where innovations have been carried out in the university and have later been sold to private companies. In the majority of these cases the improved varieties have been sold to farmers. However the innovations were not protected through intellectual property rights. This happens mainly because the university does not have set rules for the protection of its innovations, which in turn is a result of the lack of money to cover the cost of the procedures needed to protect intellectual property rights; therefore the university does not encourage such protection as an institutional policy. It is important to notice that the officials of the university do work hard to promote the understanding and knowledge of the importance of acquiring such protection, but this work is an uphill push if the university does not have the budget to cover the cost of the legal procedures needed.

When referring to the researchers, the university has provided many workshops or seminars in order to inform them of the national legislation regarding access to genetic resources. Most of these short seminars have been carried out by the national intellectual property agency of Peru as part of the cooperation the university has with such agency. In this manner the university has managed to provide information to its researchers of the rules that directly affect their research, which in this case are usually intellectual property rules. However, while some researchers working on genetic resources have attended such workshops, the procedures for the protection of intellectual property rights and the procedures to access genetic resources seem rather cumbersome to the researchers, this together with the lack of clear policies established by the university on intellectual property have contributed to the fact that researchers many times choose to forgo such procedures for protection or access.

With this information it is easy to understand that the key issue in this case is to provide information in a constant manner. This is because researchers already know they must follow national law when accessing genetic resources, but they either do not understand the little details in the law or do not have easy access to such laws for consulting when needed. That is why the best way to provide such easy access is through

a simple web page which can contain the procedure on accessing genetic resources presented in a simple manner and easy to understand by researchers.

Lessons learned / way forward

Even though Peru is a country which actively seeks to promote the establishment of international legislation regarding proper access to genetic resources, and taking into account the extensive legislation it has developed in order to implement such policies within its borders, there is still a need for further rulings to be developed which could finally make the legislation fully applicable. There is also a dire need to simplify such legislation in order to make it easy for researchers to do what they are best at which is researching and not having to worry about intricate laws which sometimes seem impossible to understand by those who are not lawyers. This issue becomes much more important when we take into account that most national universities in Peru have little money derived towards research and therefore have even less money to hire lawyers in order to understand such laws.

On the other hand, it is also very important to disseminate the laws and regulations on intellectual property rights and specifically those on access to genetic resources, in a manner in which such laws can be easily accessible to the researchers at national universities. A good way of doing this can be through a web page with clear straight to the point information on the issue, but the best way of achieving this would be through the creation and funding of intellectual property offices in all national universities dedicated to research.

In conclusion, Peru must keep pushing forward for international protection of genetic resources, but must also pay attention to its national legislation in order to simplify it and bring awareness of it to those who will make use of such legislation. It would it also be a step forward if the government would keep investing more and more in research in its public universities in order to be able to take advantage of such legislation.

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Documentation of Traditional Knowledge (TK) and farming practices of oat *(Avena sativa)* as important forage crop in mid hills of Nepal.

Background and rationale to the Project of Change (PoC):

Agriculture sector is basis of livelihood of Nepalese farmers, contributing to 35% of the country's GDP and employing 66% of its labor force (MoAC, 2011/2012). Government of Nepal (GoN) has given top priority to agriculture and livestock sector in poverty reduction and food and nutritional security program. Livestock contributes about 31% to the agricultural GDP of the country among which the largest amount is derived from the hills (53%) followed by Terai (38%) and the least from the mountains (9%) (APP,1995). In 2012, livestock sector contributes 26% of AGDP. Livestock and livestock products are an important source of household cash income (about 20% of total income) especially in the hills and mountains.

The total Dry Matter (DM) availability in the year 1995/96 is 15.2 Million ton, but the requirement was 20.9 Million ton which is 24.5 % deficit and it can be forecasted that the deficit will certainly increase to 29.7% in the year 2014/15 according to the high DM requirement which is 25.6 Million ton (APP, 1995). Forage such as oat, vetch, white clover, Napier grass and rye grass contributes substantially. There is little

practices of using hay and silage in Mid hills and Terai of Nepal. Though, the practices of making hay and silage have been used in high hills.

The winter is very harsh in high hills and mountain region of Nepal. Therefore, summer oat cultivation is best for them. Rest of the country winter is very dry with scanty rainfall. In the irrigated land oat can be cultivated and it is the major forage crops in Nepal. Milk production is directly correlated with oat forage yield. Therefore, the PoC will focus on standardization of cropping patterns of oat as forage crops in Nepal.

Objectives:
Documentation of the local practices of cultivation of forages in each domain of mid hills of Nepal (11 districts) shall be recorded. Oat is the major forage crops for Nepal and its cultivation pattern, optimum use in animal feed replacement for higher milk production is one of the emerging challenges the country has been facing.

The PoC will make farmers benefited from this work to uplift socio-economic status by means of livestock keeping. The oat germplasm shall be deposited in Gene Bank of Nepal for further characterization.

TK on oat farming workshop for stakeholders was held in the region. It would be the guiding steps for further action in the forage cultivation in the mid hills of Nepal.

Activities and methods:

1. Preparation of questionnaire for surveying.
2. Standardization of questionnaire format for 11 districts.
3. Orientation workshop for all personnel involved in collection of data.
4. Field visit and fill up of questionnaire
5. Documentation of questionnaire in one format.
6. Interpretation of the data

Methodology:

June/July – data collection and field verification process.

August – September – data interpretation and write up.

October – November – Validation workshop and present in Kenya

Final write up by January, 2013.

Stakeholder workshop for validation was carried on second week of November in Pokhara. The workshop was very much interactive to know farmers' vision on the topics and gave valuable information for future strategies to cope with increasing demand of forage crops in winter season. There would be interaction between stakeholder to finalize the report in precise and accurate form. Literature review is the major part of the study to guide the forage deficiency in the mid hills of Nepal too.

Data interpretation was done in short time. The format was in local language and translation to English was necessary to facilitate the write up for midterm reporting. Final draft is ready with the comment from

the midterm review in Kenya. The information asked was differently perceived by interviewer in different districts. It had made difficult in tabulation the data and this was resolved in validation workshop.

Funding was not there for workshop, surveying and field visit which makes it harder to run PoC. Though I had channelized some government funds along with NGO support in this regard.

- Cultivation of oats (Avena sativa) in Nepal was started some 100 years ago by landlords in the Terai region.
- Winter forages- Oat, Berseem and Vetch.
- Summer forages – Teosinte, Bajra, Sorghum, Jointvetch, Dinanath
- Perennial forages- Napier, broom grass, stylo, molato and molasses.

Outcome and deliverables:

- Average ploughing 2.09 times in the field.
- Organic fertilizer used in field is 90.47%.
- Amount of fertilizer is 1. 6 tons / Ha.
- Seeds required 1 ton/Ha.
- Mode of plantation- Broadcasting 100%.
- Irrigation 2.09 times / season.
- Average cutting age 1.9 months.

Oat Cultivation
Oat is a winter forage crop originated from Africa. It is soft, nutritious and palatable which contains 7.1 percent crude protein. It is highly esteemed forage for milking animals and can also be conserved in the form of hay for fodder deficit period.

Climate and Soil
Oat has wide adoptability and can successfully be grown from tropical to temperate zone so it can be grown from Terai to Himalayan region (over 2000 m of height) of Nepal. Similarly, oat can be grown in almost all types of soil however, loamy soil is the best. It cannot resist water logged condition.

Time and Method of Sowing
Oat can be sown from first week of October to the first week of December. It can be sown alone or in a mixture with berseem or vetch. The field is prepared after harvest of kharif crop. One deep ploughing with moldboard plough and 2 harrowing followed by planking are required for land preparation. The seed rate recommended is 80-100kg per hectare. It can either be sown by broadcasting or behind the plough. If line sowing is done the spacing between line to line should be 20-25 centimeter.

Varieties
Kamdhenu, Netra, kent, Swan and staut are the popular varieties of oat. Nepal Agriculture Research Council (NARC) has recommended Kamdhenu and Netra which are more productive than others for mid hills and Terai of Nepal.

Manuring

About 10 ton of well prepared compost or farm yard manure (FYM) along with 60 kg of Nitrogen, 30 kg of Phosphorus and 20 kg of Potash are required for one hectare of land. All the amount of compost, Phosphorus and Potash should be applied during land preparation before sowing. Whereas the recommended dose of Nitrogen should be splitted into two parts. The first half dose should be applied during the land preparation and the remaining half dose should be broadcasted after first cutting if

irrigation facility is available otherwise the full dose of Nitrogen should be applied during land preparation.

Irrigation
For better production oat should be irrigated 2-4 times depending on soil moisture. If the soil is dry first irrigation should be done after 1 months of sowing followed by second irrigation after 3 weeks of first irrigation. Similarly, third and fourth irrigation should be done after first cutting and second cutting respectively.

Yield
The harvesting of oat can be obtained after 2 months of sowing and the subsequent harvestings can be done at monthly interval. Altogether 3-4 cutting can be obtained under improved cultivation practices. The average production of green forage from oat is estimated to be 24-46 metric ton per hectare depending on the variety, soil fertility and locality.

Lesson learned – way forward:
Oat has been cultivated as winter forage in Nepal since last 100 years in the hills and Terai of Nepal.

- The oat and Napier are the major forage crops in Nepal.
- Seeds are from governmental sector to small entrepreneurs, where as commercial farmers buys from local market in due time.
- Oat is cultivated in high hill in May- June and September to October in mid hills and Terai.

Oat is the summer forage crops in mountain and high hills where as it is the major winter crop in rest of the country. The green matter is highly palatable. The forage crops are cultivated in all eco-zones and domains of Nepal.

- Forage collection is 26 tons of green matter / ha. Therefore, oat is the forage of choice in winter season in Nepal.
- Seed collection by farmers' group and develop benefit sharing mechanism. In the subsequent years farmers can sell to other farmers. The farmers may have revolving fund scheme for smooth flow of fund for forage seed cultivation and storage of seed in off season.

Meat and milk are staple food for food insecure district of Nepal.
Poverty alleviation is tied up with livestock keeping. In Nepal livestock feed is 1/3 deficient and it is more in winter season. Therefore oat is the major forage crops to supplement animal feed.
The cultivation practices shall be recorded in Department of Livestock Services (DLS) for future use in different communities within Nepal.
The different varieties of oat have been stored in recently built Gene Bank in Nepal under NARC. The standard practices of oat cultivation were established in PoC and it shall be translated in Nepalese languages to benefit needy farmers.
Research on different germplasm of oat and its varieties shall be done by NARC. The foundation seed is provided by them and certified seed can be grown in leader farmers' field. The DLS will play extension role for propagation of oat in Nepal.
Forage based livestock keeping is the government policy to enhance milk production in the country with low cost of production.

- TK on Avena sativa documented and utilized to the benefit of local farmers. The local farming practices may be different in High hills, mid hills and Terai.

- Enhances food security program- Nepal is food deficit country. Animal protein is scarce source to rural population. When winter forage crops will help to increase milk and meat production. It will uplift the livelihood of rural people.

The PoC will standardize the oat cultivation practices along with TK of farmers in Nepal.

Annex:
Stakeholders in this PoC in Nepal:

- Ministry of Agriculture Development
- National Seed Centre
- Department of Livestock Services
- National Agriculture Research Centre
- Animal Nutrition Division
- Agriculture Input Corporation
- Directorate of Animal Production
- National Pasture and Animal Feed Centre
- Regional Directorate of Livestock Services
- Pasture and forage development farm
- District Livestock Services Office
- Livestock service centre and sub centre
- Farmers' group
- Breeder farmers
- Agro-veterinary suppliers
- Seed suppliers.

Reference:

1. APP (1995), Agriculture Perspective Plan, GoN.

ABPSD (2011/ 2012), Statistical information on Nepalese Agriculture 2011/2012 published by Agribusiness promotion and statistics division, Singhadurbar, Kathmandu.

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Designing an Accessing and Benefit Sharing Mechanism for the Germplasm Nurseries of MOA Built by Chinese Academy of Tropical Agriculture and Science

BACKGROUND AND RATIONAL TO THE POC

Chinese Academy of Tropical Agriculture and Science (CATAS) have eleven germplasm nurseries built by its institutions, which collected and reserved thousands tropical plants, such as pasture, spice and beverage, fruit tree, cassava, mango, rubber tree, palm, pepper, pineapple, southern herbal medicine and so on. Most reservations are landraces, traditional varieties, introduced varieties and experimental new varieties.

People outside germplasm nurseries access genetic resource generally through two ways, one is to via researcher' promotion, the other is to apply. Germplasm nurseries and institutions per se have responsibility to serve society. Researchers often popularize good stocks to peasants, farms, research institutions and companies, offering seed and germchit free of change, in order to help them increase income and make technology innovation. On the aspect of initiative accessing, applicants from companies, institutions and individual accessed genetic resource only need to fill a simple blank. Most of materials were used for non-profit purpose, breeding research, seed selection, trials and research of plant physiology, for example. In the past, the superior of germplasm nurseries considered that as a public institution, facing a lot of low-literacy farmers, the procedure of accessing should be as simple as possible.

In recent years, several institutions supervised germplasm nurserie gain great achievement on plant breeding and selection, even ran a good business of selling seed and germchit. Since 2008, after MoA award these germplasm nurseries to be national successively, they attracted more and more people to apply for accessing genetic resource. A situation appeared was that some receivers cultivated certain plants on a large scale but not shared benefits (monetary or non-monetary benefit) with germplasm nurseries. In the current regime of Intellectual Property Rights, the price of safeguard is high and the cost of stealing is low. As a result, some germplasm nurseries were reluctant to accept the accessing application of certain variety. This kind of case is not only accord with the obligation of MoA germplasm nursery but also limit the innovation. At the same time, for own varieties, some institutions realized the right and benefit of themselves, and sighed contracts with receivers on the variety of commercial value. However, most germplasm nurseries have not aware of the importance of advantages of using ABS contract.

In China, for new variety, there is the Protection of Plant New Variety Rules to regulate receiver's behavior, which provides for protection of the intellectual property rights of plants breeders and farmers involved in development of plant varieties. For those germplasm without ownership, like landraces, traditional varieties and variety of farmer breeding, which are saw as valuable sovereign genetic resources and form the basis of improved variety, we consider that if germplasm nurseries should use a universal contract as Material Transfer Agreement including benefit sharing (monetary or non-monetary benefit) condition to protect and facilitate the utilization of genetic resource. Designing guidelines and an internal SMTA model for the germplasm nurseries is the first work. Then establishing a benefit sharing foundation is a kind of long-term mechanism.

OBJECTIVES

Throughout introducing MTA contract and listing materials provided

- Two parties of MTA, provider and receiver would be aware of the rights and obligations of themselves and for genetic resources;
- MTA would provide facilitated access of the genetic resources in the material list, without negotiation one by one;
- MTA would protect farmer's variety which have not apply new variety and help farmer to receive monetary benefit sharing.
- Non-monetary benefit sharing, like information of research achievement, would accelerate the utilization of genetic resources.

ACTIVITIES AND METHODS

- Survey: Telephoning each supervisor of germplasm nurseries to ask the running of germplasm nurseries and problems about commercialization of genetic resource given out.
- Questionnaire: Making a questionnaire sending to supervisors to collect the information about material transferring in every germplasm nursery, especially the major utilization of recipient of the material.
- Studying the national laws and regulations about genetic resource and their transferring, the Bonn Guidelines and Nagoya Protocol, the Standard Material Transfer Agreement and many kinks of MTA models, in order to draw out legal basis, principles and elements to be considered in the development of mutually agreed terms.
- Designing an internal SMTA model and Benefit Sharing Shapes.
- Gathering the supervisors of germplasm nurseries as an advisor to have a meeting to look through SMTA model and Benefit Sharing Shapes.
- According the suggestions from supervisors to modify the SMTA model and Benefit Sharing Shapes.
- Seeking for opinion from potential supervisors.
- Setting out the final text of SMTA model.
- All germplasm nurseries to make an agreement to promise using the SMTA model.
- Calling for establishing a benefit sharing foundation.

OUTCOME AND DELEVERABLES

Throughout survey and study the PoC, some documents should be drafted out as follow:

a) The guidelines of making SMTA and legal basis;
b) An internal SMTA model;
c) List of materials provided;
d) Different scheme of benefit sharing suited to different germplasm nursery;
e) Some considerations of fulfilling the SMTA in the angle of law;
f) A proposal of establishing a benefit sharing foundation and administration office.

In the process of carrying out the PoC, all germplasm nursery supervisors know much more about the rationales of international conventions and ABS situation in the other countries of the world. Through meetings and discussions, issues concerning about genetic resource made them further realized that the SMTA would protect the rights of provider and genetic resource. Under the immature genetic resources policy and law regime of China, with mass dispute, the germplasm nurseries of CATAS offers an alternative to protect those exposed outside the umbrella of plant variety rights. The application of MTA symbolize that germplasm nurseries will enhance awareness of the IPR and ABS-genetic resources. The disclosured information about the practices and approaches to be adopted by users and providers in the context of access and benefit sharing will enrich the academic research, accelerating the utilization and development. Using SMTA to transfer material also integrates with the international conventions. Hence, they agreed to accept the SMTA as their formal contract for transferring genetic resource. It is a significant activity of protection of germplasm by CATAS in tropical area, which will influence the other cooperated institutes.

LESSON LEARNED-WAY FORWARD

It is very necessary to design an accessing and benefit sharing mechanism of the germplasm nurseries of MoA in CATAS. The internal SMTA model will make people clear their right and obligation during the process of transferring the genetic resource. The provider has already aware of the benefit they can share. Although we may come across difficulties in carrying out the contract, it is a good start to improve the law related to genetic resource.

Germplasmn nursery supervisors also mentioned some points which should further discuss. One is how to deal with the commercial behavior of institutions of CATAS themselves using genetic resource from germplasm nursery. In this situation, institution is the provider at the same time the recipient. When the institution uses genetic resource to do business but is discharged, it is obvious unfair for other recipients. A method of some institutions now is that institution spends a fixed amount of money every year to invest into the renovation of germplasm nurseries. But this method only relies on the self-awareness of institution and it is still without a long-term mechanism to ensure the stable fund every year.

The other one is the toughest one. In China, there is no specific national law requiring recipient to make information disclosure after accessing genetic resource and share benefit after commercialization. It means that there is no according of some terms of SMTA in national law. Thus, it is hard to punish people who don't fulfill the terms of SMTA contract only depending on the Contact Law. That is to say, in real world, the problem of enforcing the law is the biggest problem. We should keeping improving legislation related to genetic resource.

The third one is that single germplasm nursery has thin prosecuted ability. Establishing a benefit sharing foundation is a way for lasting a long-term benefit sharing mechanism. But except the national rubber germplasm nursery, the other ten are not very big scale. If one of them suffers default, it may not have enough strength to prosecute because appeal takes time and cost. With the consideration, we propose that the eleven germplasm nurseries of CATAS can establish a benefit sharing foundation and administration office. The financing arrangement is extremely importance, which should be made a specific work. Every germplasm nursery takes out a part of benefit sharing money to put into the foundation every year. Administration office makes overall plan. Once one of the germplasm nurseries need money to deal with the legal issue, foundation can support it immediately. Year by year, it will become a long-term mechanism to maintain an efficient mutual assistance. This idea needs a group to push forward perseverely.

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The Role of Geographical Indications(GIs) in the Conservation and Benefit-sharing of Genetic Resources (GRs) in China: A Case Study from Laiyang Wulong Goose

Background and Rationale

The big role of Geographical indications(GIs) in the development of regional rural area and increasing the income of farmers are well-known and cannot be replaced by other IP types. Besides these, the positive effect on the conservation and sustainable use of Genetic Resources(GRs) by the development of GIs is being gradually recognized by the researchers, officials and farmers.

Since December 25th 2007, Chinese Ministry of Agriculture(MoA) began to register and protect GIs of agricultural goods. By now, the number of GIs is up to 1,047. But due to such short time and lack of resources, little research and evaluation has been done on the impacts of GIs brought to the local farm industry, farmers and GRs as well.

Laiyang Wulong Goose is a typical GI which is denominated by the name of a traditional goose in Laiyang Wulong river and registered in the early 2010. The distinctive characteristics are the goose has

the highest egg production rate in the world which is 160-180 per year, the highest record is 210, and there is a scar upon eyes so sometimes we can tell it authentic or fake from the appearance.
These characteristics are essentially attributable to the peninsula climate, which is not too hot or too cold, and the Wulong river, which give them sufficient and nutritious food. Of course over 500 years of breeding by the local farmers is another key factor resulted in the unique quality.

Objective
The PoC is especially focusing on:
(1)Effect on rural development and farmers' income by the promotion of GI;
(2)Change in the population of the goose before/after GI protection and marketing;
(3) Change in the population of farmers involved in wulong goose farming;
(4)Local people's awareness in conservation, sustainable utilization of the goose before/after GIs protection and marketing.
The conclusions and policy advice as a report will be submitted to the local government and MoA.

Activities and methods
Since June to November, I've been able to
(1)Elaborate 6 types of questionnaires which are used to acquire data and information from different stakeholders including competent officials, entrepreneurs, farmers and consumers. 5 of them have been completed, 1 for consumers has been carried out due to lack of financial support.
(2)Have a conference with the competent officials of Laiyang government to know what have been done on the development and marketing of GI and the effects shown so far. Visit the laboratory which is used to analyze the samples of wulong goose, which is an essential work to the quality control of the GI product. Send out questionnaires to gather information.
(3)Interview with a local famous entrepreneur who is very interested in GI and has invested over 4 million Yuan established a new wulong goose breeding base. Visit the new breeding base. Send out questionnaires to gather information.
(4)Interview with big-two local farmers, the number of goose they reared are 2,000 and 8,000, to know how the market and industry is. Send out questionnaires to gather information.
(5)Have a phone-interview with professor Wang, Qingdao Agriculture University, who is the most famous scientist in the research area of wulong goose, to know the essential value of the wulong goose.
(6) Analyze the materials collected and finish the PoC report. The conclusions are integrated into a policy advice report which has been submitted to MoA and Laiyang government.
(7)Have a lecture in a workshop which is held by the MoA and some stakeholders from Laiyang participated along with the representatives of other GIs.

Outcome and deliverables
The outcome and deliverables are
(1) I find that the local competent authority has a clear and huge plan on the development of the GI and the wulong Goose industry. The first step to commercial utilization of wulong goose is to conserve and expand the population of wulong goose. The preliminary effect is shown that at least 6,000 more wulong geese are reared by the new breeding base and the big-two local farmers, which is 2 times the geese reared by the conservation farms owned by the Laiyang government. The new breeding base has 3,000 wulong geese now, and by the end of next year the number will come to 20,000, according to the

entrepreneur's plan. The total output value of wulong goose industry increases from 39.7 million Yuan in 2010 to 42 million Yuan in 2011, and the estimated output value in 2012 is 45 million Yuan.
What the local government lack is financial support. Marketing and promotion of GI need lots of money that is unaffordable for the local government. By now, there is no financial support scheme from the MoA or other central ministry. Human resource is insufficient too. Only 2 staffs are responsible for the quality control and GI management.
Thus, what urgent things for the MoA are to establish a comprehensive and consistent GI promotion scheme which will provide some projects to help the local government and other stakeholders to develop local GI. For the local competent authorities and other stakeholders, a larger management group consisted of various stakeholders is a top priority, as long as such group is established, more effective quality control and promotion activities could be achieved.
(2)The entrepreneur is very interested in the brand of GI and he has strong willingness to invest in the wulong goose industry further. But due to the unpredictable future market and no successful precedent in the goose-processed industry, the local entrepreneur does not want to invest huge money right now.
There is one thing needed to be concerned. Because of the cooperation between the Laiyang government and the famous entrepreneur, whose company (the breeding base) is the only one authorized to use the name and symbol of GI now, it has potential risk inducing GI monopoly. Therefore, monitoring on the authorization of GI by the upper competent authority is needed in order to prevent the potential risk of monopoly.
(3)Local farmers are benefited from the brand and promotion of GI. The growth of order is 20%-40%. In spite of that the price premium is not so obvious and the price fluctuation is still pretty strong, the average income of local farmers who rear wulong goose is increasing 30% in average.
Once again, a promotion scheme is so expected to gain more price premium and keep it from fluctuation.
(4)More and more local farmers are engaged in the wulong goose farming. The annual average growth of population involved in this industry is 500.
(5)As to the understanding of GI, not only the entrepreneur, the farmers but also the competent officials are not sufficient enough.
So, to raise understanding and awareness of the GI, MoA and local government needs to elaborate and carry out more effective and positive scheme of communication and training. For MoA, a regulation on such scheme is a considerably choice.
(5)Fake wulong goose in the local and nearby market is not an uncommon thing. Tackling this problem is not only relying on more enforcement strength as well as technical assistance but also more precise provisions. Revising the current GI regulation, especially the provisions on official controls and enforcement, is an urgent job for MoA.

Lessons learned- way forward

Due to the busy daily work and lack of resources, it is too hard to interview more local farmers, officials, entrepreneurs, scientists and get information by the questionnaires from them, particularly the information from consumers. Thus, financial support is needed to carry out more extensive field research and the consumer survey so that more first-hand materials could be gained, which is essential for a practical and reliable policy advice.
Another important thing I gradually realized during the process of my PoC is the GI evaluation model, although at first it is not one of the aims. I think this is definitely a valuable work needed to improve GI research in China and provide more reliable data and advice to the policy makers of MoA.

In the meantime, more discussions on the impacts that GIs development in China have brought to the conservation and sustainable utilization of traditional varieties are needed. Now I am preparing a paper on this issue on the basis of the conclusions from the Laiyang Wulong Goose and other cases such as Liaoning Cashmere Goat.

Best practice on this arena is needed to draw up as well.

No doubt, legislation is still the most important thing in China for GIs protection and promotion either by establishing new ones or revising the current one. MoA has to do this job in the coming years effectively in order to meet the demands of quality control, promotion, enforcement, training, communication and etc.

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Awareness of Intellectual Property Rights within the Informal Sector in Kenya

Background.

Kenya has the **Kenya Industrial Property Institute (**KIPI) which is a parastatal under the Ministry of Industrialisation/Minisrty of Trade and Industry. It's functions include:

(1) Administering Industrial Property Rights
(2) Providing Technological information to the public
(3) Promoting inventiveness in Kenya
(4) Providing Training on Industrial Property among others.

The services offered by KIPI are not mandatory. Legislation in this area is covered by the Industrial Property Act, Act no.3 of 2001.

The rationale for my PoC was to reach out to the informal sector and create awareness about the existence of KIPI and the services it offers.

Objective.

There are challenges that are faced in the implementation of Industrial/Intellectual Property Rights in Kenya. Within the informal sector they are among others;

(i) The Public in the 'Jua Kali' sector does not understand the industrial property system and this mainly leads to industrial designs/inventions not being registered.

(ii) Lack of funds-this mainly happens with the designers/inventors as they have the ideas but no funds for registration. Total fees charged is Kshs.7,000/=(Approximately 83 USD)

(iii) The public is unaware that the protection is only given for a short time, e.g For industrial designs ,it is 5years with two renewable terms of 5years each giving a total of 15years.

What I hoped to achieve by the PoC was to spread knowledge about what intellectual property rights are and the importance of registration of Industrial designs/inventions within this sector.

Activities and methods.

I chose the 'Gikomba Open Air Market' as my target group. This was initially a second hand clothes market but in time it has grown to include food, carpentry products and many more. The Method I chose to use in carrying out my PoC was to carry out workshops.

To gather information, I used the following:

(1) Reconnaissance.

(2) Questionnaires.

It became apparent that people from the 'Jua kali' sector rarely register industrial designs with KIPI.The reasons are:

(i) Cultural-wanting to show off.

(ii) Training system is mainly by relatives.

I gathered my background information by going to the Kenya Industrial Property Institute offices and spoke to some officials, Mr.Omiti Onunga as well as Mr.Stanely .S. Atsali

I gathered information on the trends of registrations so far from the "Jua Kali' sector and the Challenges they face when it comes to the sector. I also looked into Genetic Resources as regards the 'traditional Healers'. I analysed the information I had gathered and was able to narrow down to the areas I would mainly focus on. I carried out the awareness workshops by having out two sessions on two different days with about twenty people per session. I did this on weekday afternoons as these are not as busy as the weekends. Weekends are when clients and prospective clients visit the area so to get anyone to listen would have been next to impossible. When it came to GR and the Traditional Healers, I learnt that there is currently a project through the National Council for Population and Development to try and make Traditional Medicine part of the National Health Care system . The feedback is still pending at the Attorney General's Office.

Outcomes and Deliverables.

In the Course of carrying out my Project of Change, I got to learn how the sector works. Most people have only had a basic education and due the lack of school fees did not get an education past that.

Most of them had traveled from upcountry and were trained on the job by their relatives. This was so mainly when it came to the crafts .The system of passing down was thus mainly by relatives.

On the other hand, those who learnt/invented any new design /improvement were always more than willing to show/teach it to the others and never saw the need to register this or even charge for it. This basically was about pride and wanting to show off. I noticed that the people I worked with had a keen interest in what I was informing them and learnt that most of them had never heard about KIPI and did not even know what Intellectual Property Rights were or what one would gain from registration.

I believe that intellectual Property Rights protection is very important in the world today. From my visits to the workshops, I generally gathered that the people there:

(i) Do not know what intellectual property rights are.

(ii) They do not know of the existence of KIPI.

(iii) That the various products are 'generally known'.

(iv) Passage of skill is mainly by traditional knowledge.

(v) Also if anyone comes up with a new design they are always willing to teach/show it to the others.

There was however concern over the fee charged for registration by KIPI. Most people thought it was high. Through my POC so far, I can say that I now look at this sector in a different way .The people there are just concerned with having a job and nothing beyond that. Apart from the above, they were mostly

just interested in earning their daily living. I believe that this sector will greatly benefit from my Project of Change in that it will help increase Intellectual Property Rights protection and actually bring about the realization to the people in this sector that they are in business.

Lessons Learnt - way forward.

The lessons learnt from my Project of Change are that when it came to the questionnaires and during the reconnaissance, I discovered that the people were actually very busy and I had to wait or even to move to the next person then go back to the earlier post later on. This clearly showed that this is a very important sector which apart from being a big employer had great potential. I learnt that the services offered by KIPI do not actually trickle down to the citizens who actually need them. And if they do, it is still a 'work in progress' and we have to put in more effort to reach the current markets as well as the emerging market. So Far KIPI has established the Traditional Knowledge and Genetic Resources unit which is a major step towards getting to a wider market. In my opinion, the Project of Change has improved my ability to induce Change in Kenya by taking a step that can possibly improve the state of Intellectual Property Rights in Kenya. I would recommend periodical outreach programmes to the informal sector Through my POC so far, I can say that I now look at this sector in a different way. They need to understand that they are in business when it comes to not only their manual work but also products of their intellect.

APPRECIATION

SIDA, KIPI, Guram & Company Advocates.

LIST OF ABBREVIATIONS.

Jua Kali –Swahili word meaning 'hot sun'. Refers to the Kenyan Informal Sector, mainly Manufacturing i.e. work is done under the hot sun, without proper workshops.

POC -Project of Change.

KIPI –Kenya Industrial Property Institute.

PP-partnership

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Formulate Material Transfer Agreements for germplasm exchange with private and non-government organization

Background and Rationale

The National Bureau of Plant Genetic Resources (NBPGR) as nodal institute in India is mandated for acquisition, exchange and management of indigenous and exotic plant genetic resources (PGR), and to carry out related research and human resource development for sustainable growth of agriculture. The major objectives of the organization are to plan, organize, conduct and coordinate exploration and collection of indigenous and exotic PGR and to undertake introduction, exchange and quarantine for PGR including characterization, evaluation, documentation and conservation of crop genetic resources and promote their use in collaboration with other national organizations. The other activities include to conducting research, teaching and training, develop guidelines and create public awareness on PGR.

NBPGR also houses the 'National Genebank' for long term conservation of plant genetic resources for food and agricultural crops, which is the third largest in the world. Currently the gene bank holds about 0.4 million accessions of different crop species. The thrust areas for future are to undertake trait/gene specific mapping and evaluation of genetic diversity for targeted augmentation and promoting utilization of PGR; Developing tools for gene prospecting and allele mining for drought and heat tolerance and conservation of genomic resources isolated from crop plants; Developing national PGR database and effective tracking or monitoring system for flow of PGR for its subsequent IPR benefits/ ownership issues. Therefore, effective exchange of PGR is of utmost importance to undertake future research programmes.

NBPGR exchanges material for research purposes to *bone- fide* researchers at public, private and non-Government/Non-profit organizations. The national policies for exchange of germplasm with private sector are not well defined. The requirements and expectations of private sector and NGOs in terms of genetic resources are different from public sector because of commercialization aspects. Public sector on the other hand aims for products and technologies for public good. Of these three categories, exchange with public sector is currently being done under a nationally accepted Material Transfer Agreement (MTA). However, there is a need to develop MTAs for material to be exchanged with the other types of user categories especially the private sector to ensure appropriate IPR and benefit sharing mechanisms. There are many opportunities for public- private partnership in the seed sector for catering to the needs of agriculture based economy of the country like India. Therefore to explore these opportunities, this case study is proposed.

Objectives

The basic objective was to develop terms and conditions for exchange of germplasm between public sector gene bank and private seed companies/NGOs for research and utilization.

Activities and Methods

- Establish links with selected private and non-government organizations engaged in crop improvement and using PGR.
- Meeting with, National Seed Association of India (NSAI) organized on June 12, 2012.

Outcome and Deliverables

National Bureau of Plant Genetic Resources, New Delhi
Exchange of Germplasm with Private Sector
Questionnaire

Details of the Company

- Name of the Company
- Major Objectives/ Crops working on/ other Business?
- Capacity of Crop Improvement Department (How big/ small)?
- Major varieties developed so far?
- Major markets India/ Abroad?

Information on Germplasm usage

- Where do you get your germplasm from for your crop in programmes?
- Do you use public sector germplasm?
- If yes, what are the sources and conditions of such an access?
- If no, what are the possible reasons?
- Do you think Indian laws and regulations hinder or facilitate exchange?
- Do you see possible focus of your organisation for PPP in near future?

Views on access from public Sector

- On what conditions would you like to get germplasm from public sector?
- On what conditions would you share your material with public sector?
- What type of germplasm would you like to get access from Indian Public sector/ organisations
- Do you have any linkages and contact sources in the public sector for access to germplasm
- Would you like to have a contract agreement with the sources mentioned above?
- What % value of your anticipated commercial benefits would you like to offer for such a germplasm?
- Can you suggest similar experience in other countries (which can be followed?)
- Does your company have a germplasm access policy?
- Does your company have an IP policy in case a commercial product is developed in collaboration with public sector?
- If yes can you specify?
- Any other observation/comments?

Only two responses to the Questionnaire were received and theses are summarized below.

Response: I

Unlike other countries where germplasm resources unit readily supplies material to private sector (USDA, CGIAR Institutes), germplasm is out of bounds for private sector in India. NBPGR and other germplasm repositories should bring out lists and relevant information on available germplasm including passport data and make it available for viewing through net. For a fee these lines can be made available to private sector after signing MTA. It is now well recognised that the quickest way to reach the farmer with any important trait is through the private seed sector.Conditions to get germplasm from public sector should be on same rules and regulations as adopted by CGIAR Institutes (read ITPGRFA).This sharing can also be on reciprocal basis. Basic germplasm and collections will be acknowledged in catalogue if used; nominal payment for each sample for handling charges. Advanced lines with special traits bred and usable as parents in hybrids can be fixed at higher price.

Response: II

The respondent expressed the following parameters for germplasm (GP) should be on uniform basis.

a) For all exchanges NBPGR should be the nodal agency
b) Uncharacterized unpurified accessions: Freely available with standard fixed fee for gene bank as benefit sharing mechanism. Scientists from both sectors can be encouraged to deposit such entries
c) International accession: free exchange unless imported by any of the sector under MOU and /or IP based payment. In such a case the consent of original importer should be must to check if he has right to share otherwise the inventor be referred to original source. If under IP cost the original indenters be compensated on mutually agreed terms.
d) RILs and mapping Populations from defined (Characterized parents) Details be available with NBPGR and can be exchanged on predefined terms and conditions. These are going to be precious materials for GWAS. Mutual exchange or one-time cost should be the only condition of course O/H and handling charges of NBPGR will always be an integral part of charges.

d) Notified /Characterized lines with application with PVPFR filed. The cost and terms be mentioned at the time of deposition itself and be considered as catalogue price. These lines will become free from restriction with the termination of validity of registration. The inventor needs to be informed.
e) Commercial varieties and Hybrids and parents for which application with PVPFRA has been filed : same as for D except that in case of these cannot be given without the consent of owner and the T&C will need to be settled with owner /assignee and NBPGR will have to be paid storage fee. The line will be issued only after the NOC has been issued by the owner.
f) Unique lines to be kept in long-term storage: No characters need to be shared but standard locker fee be paid to NBPGR
g) In long term the NBPGR should have Genomic fingerprinting of all its entries and can make it mandatory for all to deposit the above category of genetic Resource.
h) Both for Ag and Horticultural Crops NBPGR will be the authorized nodal agency of PVPFRA and NBA or any such other agency for import, exchange, export of GP. No individual will need to go to any other agency.

Regarding Indian Legislation some strong opinions were expressed by this respondent such as:

- Laws are ambiguous and so also information and interpretation. For example original intention of Biodiversity act was for wild species and land races with provision of ill defined benefit sharing. We were expecting similar thing in Ag crops. Unfortunately the restriction in personal interpretation has been extended to populations. Registration of Extant varieties from back date has created lot of confusion. What was legal use before PVPFR is now perceived as illegal from retrospective effect and causing loss of trust. It is now that wisdom of US in opposing the provision of restriction of free flow and exchange of genetic resources is becoming clear. With lesser support to Govt jobs especially at state level Pvt. sector have become major source of employment for scientific talent resulting in loss of trust and competition instead of synergy seen earlier. Time has come to set our house in order if Ag in India is to achieve a sustainable healthy growth.

The following proposals were also made and circulated to the private sector representatives and requested their response on the draft proposals.

Sharing of Germplasm between NBPGR and Private Seed Companies (exchange only under the ICAR/DARE approved MTA)	
Private Companies with recognized R & D certified by DSIR(Govt. of India) – Agree to share their working collections – Obtain national identity on such collections (Indigenous collection IC numbers) – Provide undertaking that they do not fall under Section 3 (2) of BDA 2002	Section 3 (2) of BDA 2002 All non-Indian entities are required to take prior approval of NBA as per provision laid out in BDA, 2002 *Definition of non-Indian entities* • *A person who is not Citizen of India* • *A person who is non –resident* • *An association or organization* ✓ *not registered in India* ✓ *has any non- Indian participation in it share capital or management*
Provided the above is agreeable, the additional conditions for sharing are proposed…	

A Proposal		
Conditions & Categories of Material to be Shared		
Characterized Germplasm • Limit number of accessions	**Characterized value added Germplasm**	**Registered Germplasm** • Only limited quantity to

• Results to be shared with NBPGR/ NAGs as a pre-condition in MTA • NBPGR specialist to be involved • Multiplied seed to be sent back to NBPGR	• Limit number of accessions • Maintenance cost to be charged/accn.* • Sharing of benefits arising from any commercial outcome with NBPGR[#]	be shared • Maintenance cost to be charged/accn.* • sharing of benefits from any commercial product [#] with the owner of the germplasm with a separate MoA • Multiplied seed to be sent back to NBPGR
* Based on 2012 estimates by L. Guarino of CGN Netherlands (euro 50/ accn.), we propose ~ Rs 5000/ accn. # As per ICAR Guidelines for Intellectual Property Management and Technology Transfer/ Commercialization Private Sector can also access designated material (Annex I crops under SMTA) maintained by NBPGR as and when the designation process is completed		

The representatives from NSAI were positive to these proposals and wanted an in-house opinion at NSAI. These proposals have, therefore, been sent for comments and inputs from all concerned on 28th September, 2012 with a request to send back their views by 15th Oct, 2012.

Lessons learnt – way forward

Very few first hand responses to the questionnaire were received which were in a way anticipated. However, another way was devised by putting up with additional conditions in the existing MTA, which would encourage the NSAI to respond and negotiate.

Development of Questionnaire has been completed and circulated. Although very few responses were received. Additional conditions to be included in the new MTA for exchange of plant genetic resources with the private sector have been devised and proposed to all stakeholders for further discussion. (Annexure 1)

1. The idea of sharing germplasm specially the plant genetic resources (PGR) for research and utilization, although has been welcomed by the private sector but they have not responded either to the questionnaire or to the proposals mentioned above.
2. They have expressed their apprehensions about sharing germplasm in their collections with public sector on a reciprocal basis.
3. The idea of sharing germplasm with private seed companies has however has not gone very well with some NGOs. It has been expressed very categorically by some NGOs (Refer my email to Professor CG dated 27th November 2012).They feel that the germplasm collected from all over India and conserved in the National genebank is held in trust and must be shared with caution.

The concerns raised by them include:

- Who is the rightful owner of the genebank accessions? Not the NBPGR atleast
- What happens to the IPR on the material and on the traditional knowledge associated with these?
- Who will own the rights on the outcomes of the material accessed for research?
- What are the equitable benefit sharing arrangements? What is good for farmers in these transactions, if everything is received by NBPGR/ICAR in return?

Keeping in view the issues raised by the NGO and following the discussions at national level, and also the lack of will in sending their views on the proposals, the matter of sharing germplasm with private seed companies has been put on hold and it has been decided to hold a national level consultatation to put forth different views and opinions.

My personal notes:
1. As per the objectives of my PoC, conditions of sharing germplasm with the private seed companies and the draft MTA has been formulated, however its implementation would depend on the willingness of private seed companies.
2. In my opinion the private sector opinion is divided over the fact that after the enactment of The Biological Diversity Act 2002 of India (which came into being after CBD), all non Indian entities are required to take permission of the National Biodiversity Authority for access to any genetic resources "occurring in India". That term has lot of interpretations and is ambiguous such as does occurring in India also mean germplasm introduced earlier by private companies, proprietary material of individuals, or does it mean only "*in-situ"* material occurring in India, developed in India protected in India by any IPR etc, etc,.
3. The constitution of companies is also of two types; wholly Indian or newly aligned multinational companies (merging and demerging everyday), that their status changes accordingly as per the Indian law. The opinion of companies is therefore divided on how to respond to the proposals made by NBPGR. The national consultation therefore should focus on accepting a uniform interpretation of terms used in the context of the Act.
4. Regarding the issue of exchange with CGIAR institutions and the national institutions where these are based (ICRISAT in India, and CIMMYT in Mexico but having established its ASIA Office at ICRISAT Campus, India), we are proposing to exempt FAO designated material collected by these Institutions before 1993 for exchange out of India and under SMTA.

ANNEXUE 1

A Draft Material Transfer Agreement
(Changes in the Existing ICAR MTA have been indicated in bold)

Indian Council of Agricultural Research
Krishi Bhawan, New Delhi – 110001. INDIA

Agreed between

National Bureau of Plant Genetic Resources (NBPGR), New Delhi-110012

of the Indian Council of Agricultural Research, Krishi Bhawan, New Delhi – 110001, the apex agricultural research organization of India **mandated for conservation and exchange of plant genetic resources**, being the first Party (Provider of the Material)

And[1]

Being the Second Party (Recipient of the Material)

For the Supply/Exchange/Transfer of Genetic Resources for Food & Agriculture/ Germplasm / Genetic Material/ Genetic Components for Research[2]

- ❑ Within India, not covering persons as described in Section 3(2) of the Biological Diversity Act, 2002 (18 of 2003) (BDA).

AS follows:

Recipient Name	
Recipient Institution/ Organization/ Agency/ Centre	
Recipient Full Address with PIN Code	
Phone number	
Fax	
Email	
Purpose of access and Objectives of research activities	
Germplasm material (specify)[3]	Crop and varieties -
Supply made through	NBPGR
For Official Use of Supplier	1. Germplasm Identity (Species name, common name, etc.) 2. Accession Number 3. Short Description of the Material 4. Passport Data

[1]Mention Name and address of the Second Party
[2]Tick mark the appropriate box
[3]Specify the type of material involved for supply/transfer e.g seed, **vegetative propagule** tissue culture, DNA etc.

I/We agree to abide by the following terms of the MTA and certify that:

i) The germplasm MATERIAL (S) transferred herein as above shall be used only for the purpose of research under my/our direct/close supervision and will not be used for commercial purposes or profit making whatsoever, without prior written approval of the NBA[4]/MoEF[5]/DARE[6]/ICAR[7], Government of India as the case may be. The recipient (Second party) agrees to provide a concept note of research project in which the MATERIAL (S) will be used, including the manner in which to be used. The recipient (Second party) agrees to cease any use of the material in case of suspension of research project at the instance of either party or due to factors beyond the control of either party. Upon such suspension of further research work, both parties will mutually agree for adopting a suitable provision for their preservation. In case of failure of the parties to arrive at an agreement, the materials including derivatives will be destroyed upon 90 days notice from NBPGR.

ii) All information and material supplied by NBPGR shall be deemed to have been disclosed or provided to the recipient in confidence. The recipient agrees to preserve the confidential status of the material and information.

iii) The germplasm MATERIAL (S) or its (their) part(s), components or derivatives (including live or dead tissue/DNA) that can be used to retrieve whole DNA/fragment or sequence or any other genetic information shall not be distributed or transferred to any third country/party, except those directly engaged in research under direct supervision of the recipient (second party), without prior written approval of the NBA/MoEF/ICAR/DARE, Government of India as the case may be.

iv) Any development of commercial product based on research on gene manipulation/selective breeding programme for genetic improvement shall be **with the** consent of NBA/MoEF/ICAR/DARE, Government of India as the case may be. Modalities of undertaking any such work will be worked out before its conduct, **and in case of commercialization of any product a separate MoA shall be entered into with conditions of mutually agreed benefit sharing with the owner/ developer of the material**.

v) If any third country/party is to be associated with any commercial development arising out of the germplasm accessed, permission from NBA shall be sought.

vi) The recipient agrees to acknowledge explicitly the name, original identity and source of the material, if used directly or indirectly, in all research publication(s) or other publications, such as, monographs, bulletins, books, etc. and shall send a copy of each of the publications to the NBPGR.

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[4]National Biodiversity Authority
[5]Ministry of Environment and Forests
[6]Department of Agricultural Research and Education [7] Indian Council of Agricultural Research

vii) The recipient agrees to supply the feedback information on the performance/ utilisation/ research outcome of the material(s) to the NBPGR.

viii) **In case of characterized germplasm the receipient agrees to send back multiplied seed of the accessions received. The multiplied seed should be at least 4000 seeds for cross pollinated crops and 2000 seeds for self pollinated crops. For vegetative propagates 25 propagules are required to be supplied to the identified NAG site.**

ix) **In case of value added characterized and registered germplasm accessions being supplied by NBPGR the recipient agrees to pay Rs. 5000/- (to be decided/mutually agreed upon) per accession as handling charges**.

x) The recipient agrees not to claim any intellectual property right over the MATERIAL (S) received including its related information and knowledge without prior written approval of the NBA/MoEF/ICAR/DARE, Government of India as the case may be.

xi) The intellectual property protection or benefit sharing in respect of derivatives of the material(s) received/accessed, where applicable, shall be as per the Indian IPR/Biodiversity laws.

xii) The recipient also agrees that the material is for experimental use and is being supplied without any warranties, whatsoever.

xiii) The MTA is non-assignable. The recipient agrees to abide by any other conditions that may be set in and conveyed to them from NBPGR in respect of this germplasm access/exchange or any Law, Rules, Regulations, etc. enacted by Government of India from time to time.

xiv) In case of any dispute between the parties to this MTA, the dispute shall be referred to the Sole Arbitrator to be appointed by the Secretary, DARE, Government of India. The Decision of the Sole Arbitrator shall be final and binding on the Parties. The Arbitration proceedings shall be governed by the Arbitration and Conciliation Act, 1996. The Arbitration proceedings shall be in New Delhi.

AGREED RECIPIENT	**PROVIDER**
Authorised Officer's Name: Designation: Organization/Institute/University Address: Signature: Date:	Authorised Officer's Name: Designation: Organization/Institute/University Address: Signature: Date:
Recipient Scientist/Person's Name: Designation: Organization/Institute/University Address: Signature: Date:	Provider Scientist/Person's Name: Designation: Organization/Institute/University Address: Signature: Date:

DEFINITIONS

Extract from Section 3(2) of BDA-2002-

a) a person who is not a citizen of India;
b) a citizen of India, who is a non-resident as defined in clause (30) of Section 2 of the Income-Tax Act, 1961 (43 of 1961);
c) a body corporate, association or organisation-
   (i) not incorporated or registered in India; or
   (ii) incorporated or registered in India under any law for the time being in force which has any non-Indian participation in its share capital or management.

GRIP 12b not finalized PoCs

PBR/PVP-UPOV, FAO-IT

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Harmonization between CBD and ITPGRFA: How does the ABS regime established under the Nagoya Protocol impact CGIAR Centers operating under the MLS of the ITPGRFA?

Background and Objectives:
The Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity (the "Nagoya Protocol") was adopted by the Conference of the Parties to the Convention on Biological Diversity on 29 October 2010 in Nagoya, Japan. Having secured 92 signatures at the time of closing for signature on 1 February 2012 the Protocol will enter into force on the ninetieth day after the date of deposit of the 50th instrument of ratification, acceptance, approval or accession. To date the Protocol has been ratified only by 12 countries so even though it is still some way from achieving this milestone, the recent ratification of South Africa as the third mega-diverse country to ratify the Protocol gives a timely reminder of the changing international ABS landscape and the need to explore the implications of ABS under Nagoya in greater detail.
The Protocol aims to provide a greater legal certainty and transparency for providers and users of genetic resources to strengthen the opportunities for fair and equitable sharing of benefits from their use. The key objectives of this POC is to **(i) assess the extent to which harmonization exists between CBD and ITPGRFA from an ABS perspective; (ii) to determine how the ABS regime established under the Nagoya Protocol effects CGIAR Centers operating under the MLS of the ITPGRFA; (iii) assess whether the Protocol achieves its stated objective of providing legal certainty and transparency regarding ABS**. In undertaking these inquiries the POC will review national legislation of countries of interest which provide insight as to how these international instruments relating to ABS are being implemented at the national level.
The management of IP rights and transfer of genetic resources at CGIAR Centers are governed by a 'holy trinity' comprised of the of the International Treaty on Plant Genetic Resources in Food and Agriculture ("ITPGRFA"), the CGIAR Principles on the Management of Intellectual Assets, and internal Center policy. To date, these instruments have provided CGIAR Centers with a relatively clear framework for dealing with ABS issues, however given the changes taking place as a result of the implementation of Nagoya, CGIAR Centers will need to ensure that they keep pace with ABS developments to fully understand the international regulatory landscape they operate in, and the implications these developments may have on their operations.

A. Activities so far:

A.1 International regulatory framework analysis re ABS

1. Identified and comprehensively reviewed the international treaty framework relating to ABS as established under (i) the International Treaty on Plant Genetic Resources for Food and Agriculture ("ITPGRFA") and (ii) the Convention on Biodiversity ("CBD") and Nagoya Protocol; including review of the decisions and reports issued by the Governing Body of the ITPGRFA, and the Conference of the Parties to the CBD and the Ad Hoc Intergovernmental Committee (ICNP) for the Nagoya Protocol.
2. Identified additional international instruments/bodies which may impact changes in the ABS legal/regulatory landscape:
    a. Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional Knowledge and Folklore;
    b. Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES)

A.2 National regulatory framework analysis re ABS

3. Identified and comprehensively reviewed the legislative framework in **India** dealing with IC/ABS which is comprised of the following:
    a. 1998 General Law of Ecological Balance and Environmental Protection
    b. 2000 Norma oficial Mexicana NOM-126-SEMARNAT-2000
    c. 2002 Ley General de Vida Silvestre
    d. 2003 Ley General de Desarrollo Forestal Sustentable
4. Identified legislative framework in **Mexico** dealing with IC/ABS which is comprised of the following:
    a. 1998 General Law of Ecological Balance and Environmental Protection
    b. 2000 Norma oficial Mexicana NOM-126-SEMARNAT-2000
    c. 2002 Ley General de Vida Silvestre
    d. 2003 Ley General de Desarrollo Forestal Sustentable
5. Identified legislative framework in **South Africa** dealing with IC/ABS which is comprised of the following:
    a. 2004 National Environmental Management Biodiversity Act 2004
    b. 2005 Patents Amendment No. 25
    c. 2008 Regulations on Bio-Prospecting, Access and Benefit-Sharing
    d. 2012 South Africa's Bioprospecting, Access and Benefit-sharing Regulatory Framework Guidelines for Providers, Users and Regulators

A.3 Obtaining approval under a National regulatory framework re ABS

6. CIMMYT and an Indian Institution are collaborating on a complex PPP project which involves the following characteristics:
    a. screening of Indian germplasm to evaluate draught tolerance characteristics;
    b. use of Indian germplasm with high trait potential in a breeding program to develop elite lines to enter field trials and eventual variety release;
    c. PPP partner (contributing significant technology to project) to have exclusive right to secure IP rights in outputs and to commercialize project outputs in certain markets (not including India). CIMMYT is to have license to release in other markets for the benefit of smallholder farmers.

I am currently supporting CIMMYT's negotiations with the Indian Council of Agricultural Research ("ICAR") to obtain permission for the Indian Institution to participate in the above PPP project with CIMMYT, and to contribute Indian germplasm to the project. Interestingly despite India being a signatory to the ITPGRFA, the indications are that once/if approval is given by ICAR, CIMMYT will need to obtain the necessary approvals from the National Biodiversity Authority (pursuant to the Biological Diversity Act 2002 (BD)) in order to obtain "access to biological resources occurring in India" (note potential berth in application of such a phrase). The ABS framework under the BD is much more complex than that established under the ITPGRFA and includes the requirement for ex-ante permission to be given in respect of any IP rights applied for (whether inside or outside India) which may relate to the germplasm. Expected milestone for this activity will be an ABS agreement relating to the use and commercialization of project outputs developed using Indian germplasm.

B. Activities to be done before submission of Report:

7. Re [2] above: review in greater detail to determine potential impact on regulatory landscape concerning ABS.
8. Re [4] and [5] above: comprehensively review national frameworks to have other examples of national ABS legislation to compare to the Indian framework.
9. Re [6] above: Continue negotiations and necessary applications to achieve anticipated milestone. Once an agreement is in place which is compliant with India's BD framework, this can be used to compare the ABS requirements under Nagoya with those under the ITPGRFA, and to draw conclusions as to the transaction costs involved and the core objectives of the project.

Problems / Obstacles / Support needed:

10. Re [4] and [8] above: obtain translated versions of the documents underpinning the legal framework for Mexico.
11. Re [6] above: the process for securing ICAR approval for participation of Indian Institution is taking much longer than expected. The consequence of this is that it may not be possible to finalize the ABS negotiations under the BD Act prior to finalization of PoC. This will result in the PoC report being a more theoretical document, and will limit the scope of the deeper level analysis and conclusions that were hoped to be achieved under the PoC.
12. To help address some of the concerns raised in [11] regarding the level of analysis that can be undertaken in the absence of the conclusion of the activity under [6], I propose to contact the national focal points recorded for ITPGRFA and the Protocol for India and to survey them as to their understanding of the ABS framework in India from their respective positions.

Planned preliminary deliverables within POC:

13. Report providing (i) comprehensive overview of international regulatory framework concerning ABS; (ii) overview and comparison of ABS framework at the national level focusing on at least 2 of the national frameworks examined; and (iii) analysis against objectives outlined for the PoC in 'Background and Objectives' above.
14. An internal memorandum of advice to CIMMYT regarding implications for its operations based on the contents of the report indicated in [13].
15. A project specific ABS agreement negotiated under the national framework of India (however see concerns raised in [11] above).

Preliminary conclusion of work done so far:

16. Re **harmonization:** despite the frequent cross-references in the Protocol and the ITPGRFA (and in decisions and reports associated with these instruments), the international legal framework does not provide certainty as to the operational relationship between the two instruments. This ambiguity is reflected by the implementation of these ABS regimes at the national level in respect of countries that have adopted both frameworks (as exemplified by India in which no distinction is made between the access and use to genetic resources generally, and those accessed and used for food and agriculture).
17. Re **effect of the Protocol ABS regime on CGIAR Centers** operating under the MLS of the ITPGRFA: anticipate increasing complexities at the national level in respect of countries adopting Protocol; anticipate overall result will be restrictions to international flow of germplasm and increase transaction costs;

Re **whether the Protocol achieves its stated objective** of providing legal certainty and transparency regarding ABS: given the very different nature of the ABS regime established under the MLS of the ITPGRFA, and that established under the Protocol the Protocol, legal certainty and transparency will not exist until a clear framework for the coexistence of these regimes is established at a national level (at least in respect of countries that commit to adopt both ABS regimes).

IP-TK databases National legal frameworks databases

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Protection of genetic resources and traditional/indigenous knowledge in South Africa: A look at international treaties and national compliance therewith

1) Background and objectives

South Africa has an impressive number of indigenous fauna and flora species. This is especially true for the south-western part of South Africa which includes the Fynbos region that is recognised as a world heritage site. This is a biodiversity hotspot and houses a multitude floral species. Many of these plants have medicinal value and form part of the traditional knowledge of certain communities (i.e. the Khoi-San and Hoodia).

The South African government has long realised the importance of biological resources and has taken steps to ensure preservation thereof and reduce "genetic erosion". These steps include for instance ratification to treaties and agreements such as CBD and TRIPS as well as promulgating the National Environmental Management: Biodiversity Act No. 10 of 2004 (the Biodiversity Act). Furthermore, the Patents Act was amended in light of the promulgation of the Biodiversity Act. The purpose of the Biodiversity Act is inter alia to protect TK, manage and conserve biological resources, ensure that these resources are used in a sustainable manner and to prevent biopiracy.

There is a lack of harmonisation between some of the treaties that South Africa has acceded to. Additionally, South Africa does not comply textually with some of the treaties. For this reason, the PoC will involve an examination of these treaties and how they affect protection of genetic resources and traditional knowledge in South Africa. Ultimately, I hope to make important role players aware of how they may adequately protect genetic resources and traditional knowledge in South Africa. This will hopefully supplement the efforts made by the department of science and technology (DST) to create a traditional knowledge library (TKL). The statues and treaties I am reviewing are listed in the table below:

International Treaties	National Statutes
International treaty on plant genetic resources for food and agriculture	National Environmental Management: Biodiversity Act No. 10 of 2004
Convention on biological diversity	The South African Patents Act
Agreement on trade related aspects of intellectual property rights	South African Plant Breeder's rights Act
International convention for the protection of new varieties of plants (Act of 1978)	ARC policy on intellectual property management and protection
Cartagena protocol on biosafety to the convention on biological diversity	

2) Activities so far

When I initially wrote my proposal for a PoC, I was still trying to contact relevant people from the DST and South African National Biodiversity Institute (SANBI) regarding the development of a TKL similar to the one developed in India and China. I had set up appointments to take place after my return from Sweden. I met an official of DST who informed me that a TKL already exists and that DST was almost ready to launch it.

I was still interested in finding out how the library was compiled and what information would be found in it. This would be essential in determining the type of protection afforded TKL and other indigenous resources. As a result, I have scheduled a follow up meeting with other DST officials that will tell me more about the TKL and how it will be utilised in order optimally protect our essential resources.

Additionally, I have been looking at some of the South African statutes relating to genetic resources and traditional knowledge as well as treaties pertaining thereto.

3) Activities to be done before submission of report

On 28 January 2013 I will be meeting Ms K. Aphane from the DST in order to obtain a detailed account about the TKL. Once I have met with her, I will complete my review on TK protection in South Africa.

I must also complete my perusal of treaties and South African statutes in order to complete my review on the state f protection of genetic resources in South Africa.

I will also provide possible means of improving the implementation of the provisions in the treaties and statutes as part of my PoC conclusion.

4) Problems/obstacles/support needed

Currently, I have not experienced any problems or obstacles. The relevant people from DST and ARC have been of great assistance and have supplied me with information that I have asked for.

The support that I would require from the GRIP team would be advise on whether the treaties I am reviewing are relevant or should be left out. Additionally, if there is any other relevant treaty that I have not included for review, please advise which one it is so that I may include it in my report.

Lastly, I would also like to find out whether or not my project is overambitious and should be revised.

5) Planned and preliminary deliverables within the PoC

After attendance of the GRIP phase 1, I wrote a report for the attention of my supervisor and the CEO. In the report I outlined the key issues that I noted during the course such as contradiction between treaties and the fact that our statutes and policies may not be compliant with some of these treaties.

I also undertook to provide a detailed report of my review of the treaties and statutes. This would be in the form of a legal opinion. The report is to be delivered to the CEO who will then advise whether he will be following the recommendations in the report regarding protection of genetic resources and TK.

Therefore, a planned deliverable of my PoC is to hand in a detailed report outlining my findings from the perusal of the abovementioned treaties and statutes. I also plan to include a clear conclusion that will include recommendations for remedying some of the difficulties or non-compliances I might find.

6) Preliminary conclusion of work done so far
I believe that I am on the right track so far and that I will be able to achieve my planned deliverables. I have read all of the relevant national statutes and I have commenced with the review of the international treaties. I will soon be able to write a complete report on my findings.
More importantly, I have also identified the role players in the different government departments and institutions that will assist me in my final report.

Publ univ-IP and commercialization

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Development of IP policy for the University of Walter Sisulu (Eastern Cape, South Africa)

1.Background

The Eastern Cape Regional Technology Transfer Office was established by the Dept of Science and Technology (DST) through the National Intellectual Property management (NIPMO).The are four member institutes, amongst them is the University of Walter Sisulu for which I am working for as an assistant in the Research Tech office.

The RTO office have managed to host a lot of IP awareness and training mainly to senior staff members with technical backgrounds such as chemistry, and library personnel who showed great interest in copyright issues. In addition to holding awareness workshops the RTO office developed print material (brochures) for on-campus distribution. Positive feedback regarding the impact of the IP awareness workshops has been received from participants.

2. Activities so far:
The impact of IP awareness at WSU has been remarkably positive as a result the number of IP disclosures increased, the research office experienced a lot problems because there were no guidelines and processes of managing the disclosures, hence on my project of exchange I saw a niche for a development of an IP policy that will protect and manage all disclosures especially in the framework of genetic resources with compliance of the national IPR act.

When I got back from the Grip programme, which provided me with so much knowledge and information, I really felt confident that I can provide guidance to researchers and be able to engage and contribute on the development of the IP policy for the institute. There was an IP document that was sent to NIPMO concerning the IP disclosure management for the University, and a review report was received, where a number of areas of non-compliance were pointed. The ECR-TTO instructed the RTO for the development of the WSU IP policy guided by the requirements of the IPR act and due regard was given to the key issues raised in the review comments received from NIPMO concerning the IP policies of other member-institutions (i.e. UFH, NMMU and RU).

In November 2012 meetings were initiated in the RTO to discuss the current policy, the envisaged amendments, and institutional stakeholder consultation and routing requirements. The ECR-TTO and the University (WSU) Director: Policy Administration and Governance.

An amendment plan was submitted to the National Intellectual Property office (NIPMO) in December 2012.WSU have since reconsidered the amendment plan and would like to follow a different approach which will entail having internal stakeholder discussions and /or approvals prior to the submitting an amended IP policy to the NIPMO for further review.

At the RTO we managed to get confirmation from the NIPMO that the IP Disclosure processes and the templates required for their implementation have been established. We have done a lot of follow up on both the new and previously received disclosures, this engagement included liaison with the patent attorneys. The RTO is in the process of developing a website that will be linked to the member – institutions' such that the researchers at all ECR-TTO member institutions are able to easily access all IP-related information communicated by the ECR-TTO. Once the website is up and running, it will be used as a portal for displaying patents and other forms of IP available for commercialization.

The ECR-TTO is currently planning for the Innovation Expo to showcase innovative R&D outcomes from the Eastern Cape Universities to industry, venture capital institutions and governmental agencies within the innovation space. The ECR-TTO will partner with the innovation EC in hosting the Innovation Expo wherein the EC Provincial Innovation Strategy will also be launched.

Beginning of the year, further discussions were held with the Local Innovation & Regional Innovation Systems and Head of Innovate EC for the possibility of funding the Expo and the East London (Buffalo City Metropolitan Municipality) chapter of the Regional Innovation Forum which will have greater involvement of the UFH and WSU, as institutions having presence in the area.

On 18 November 2012, the ECR-TTO Regional Manager was invited by the e-Monti Science and Technology Park in East London and so asked for my assistance in moderation of an IP awareness event as part of the panel that made presentation and discussed IP issues with an audience of university researchers and entrepreneurs. The event focused on important IP considerations to be made by the entrepreneurs when collaborating and when working separately or with other parties.

Furthermore, a meeting was held with ELIDZ (East London Industrial Development Zone) on 28 November2012 wherein the commitment and interest in working with the ECR-TTO and member-institutions in funding R&D that seeks to respond to practical challenges facing the Eastern Cape Province was pronounced. Provincial government through the ELIDZ will work with the ECR-TTO to conceptualize the projects in question and member-institutions will apply their R&D expertise in assisting the government in developing such outcomes.

Activities to be done before submission of report:

 Follow up on the IP disclosures received and start planning for commercialization in some cases.

 Driving IP awareness in the public community and local small technology businesses in the province, hoping to get positive response for funding the Innovation Expo in the pipeline.

 Identifying most promising research areas with commercialization

 Above all, feedback from the Policy Administration and Governance and institution stakeholders about the amendment plan, so we can submit the amended IP Policy to the NIPMO for further review.

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Sensitisation and introduction to IPR and plant variety protection in Cameroon

1) Background and objectives

Cameroon is one of 17 member countries of the African Intellectual property Organisation (OAPI). The Bangui Agreement (1999) is the revised version of the organisation common law with a *suis generis* PVP system comparable to that of UPOV. Since The annex X of the agreement dealing with Plant variety protection entered into force in January 2006, a grace period of one year was given to members states to apply for varieties created prior to the regulation. In IRAD a total of 22 PVP titles and 02 patents on agro technological processes have so far been granted.

Unfortunately, the institution management team and researchers are very few aware of IP and about the stakes of innovations patenting and PVP. OAPI and its Bangui Agreement are not well known, and application procedure remain an expert business.

In other to raise awareness on IPR and strengthen IRAD and researchers capacity in protecting their new varieties and other research achievements, the PoC aims at organising one or two workshops with two main objectives:

- Sensitise decision makers and researchers about the stakes of IPR and raise awareness about the issue
- Train researchers on plant breeder rights, application procedures, especially for PVP.

2) Activities so far

The initial PoC provided two main activities.

i) Sensitisation of researchers and decision makers vis a vis the importance of IPR and especially PVP and wareness raising on the issue,

ii) Training of researchers and other stakeholders on PVP procedures and plant breeder's rights.

The activity is to be funded by IRAD as a workshop to be organised in IRAD headquarter in Nkolbisson (Yaoundé). IRAD General Manager who is still very interested and committed to this activity is looking forward to 2013 annual budget to become operational before he can allocate fund to carry out the activity.

Following my PoC presentation in the PVP training Course in Uppsala, I was introduced by CG to his French colleagues in Agropolis (Montpellier, France) to seek collaboration and support towards my PoC activties. I got in touch with them before leaving Uppsala and we are in permanent contact discussing about the issue. Dr Jean-Louis PHAM (head of ARCAD project) and Selim LOUAFI (project genetic resources expert).

After many internet messages exchanges and telephone calls. Dr Pham suggested a collaborative activity in PVP training of trainers involving not only Cameroun, but also 5 to 10 other counties selected within African intellectual property organisation (OAPI) member countries. The five days training workshop will be held in may 2013 in Cameroon according to budget and French colleagues availability. After the training, participants will be able to organise training sessions in their home country and share the knowledge acquired with their interested colleagues and other PVP stakeholders.

A concept note and budget have been since prepared and sent to Montpellier.

3) Activities to be done before submission of report
As stated earlier, the activity to be done before submission of report is the implementation of workshop within the framework of PoC. Hopefully, the first workshop to be funded by IRAD will be organised before submission of report in March. The one to be organised in collaboration with Agropolis will not take place before May 2013. the workshops preparation: choice of venues reservations, workshop modules and agenda, participant candidates information, budget finalisation, is being prepared in close collaboration with IRAD management and Agropolis.

4) Problems/obstacles/support needed
The situation of the project at the end of financial year led to difficulties in having a cash budget necessary for it immediate implementation. The objective might be fully achieved only after the time scheduled for PoC activities implementation.

5) Planned and preliminary deliverables within the de PoC
The workshop to be organised under the sponsorship of IRAD will help to raise awareness of researchers, decision makers and other PVP stakeholders about the issue. It will put emphasis on the necessity for each institution to have an internal rule to manage all PVP and related issues, to give incentive in order to encourage researchers in further new varieties breeding efforts and investments.
The regional training of trainers course will deliver a set of trainers to whom will be assigned the mission to raise awareness and spread knowledge in their respective home countries according to Bangui Agreements provisions.

6) Preliminary conclusions of work done so far
So far for both activities, efforts are still in the preparation phase. Useful contacts were taken with the Dr Karl Gustave Thornström, the GRIP Programme Team Manager. Preparations are in progress and all now seems to be just a matter of time.

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Establishment of an IPR office at the National Institute for Medical Research (NIMR) in Tanzania

1) Background and objectives

The National Institute for Medical Research (NIMR) is a statutory research body established in accordance with Act of parliament no. 23 of 1979 as body corporate of the Government of the United Republic of Tanzania under the Ministry of Health and Social Welfare (MoHSW). NIMR has dual government mandates, as a health research institution and as a regulatory authority of health research undertaken within Tanzania. As a health research institute, NIMR is mandated to carry out medical research and advise the government on alleviating disease among the people of Tanzania. On the other hand as a regulatory authority it is mandated to regulate, monitor, control, coordinate and promote the carrying out of medical research within Tanzania. NIMR is a national authority which receives and reviews research protocols both on scientific soundness and adherence to research ethics and for qualifying protocols it clears them and provides a national ethical clearance certificate for the study to be conducted in Tanzania. NIMR is also the national authority controlling biological material transfers

outside Tanzania and it has in place material transfer guidelines and agreement to be signed by the sending and the receiving part.

On traditional medicine research, NIMR is mandated to carry out, and promote the carrying out of research into various aspects of local traditional medical practices for the purpose of facilitating the development and application of herbal medicine in health care in Tanzania. Expertise on IPRs lacks at the NIMR although her research works involves a lot of IPRs and that, the institute has in the past lost a number of economic opportunities by either exposing commercializable knowledge or products into the public domain without due protection or not realizing it. NIMR sometimes receives protocols for review, applications for material transfer agreement approval and sensitive research findings which have IPR issues, but the lack of scientists with expertise in IPRs creates a big loss to the nation. Establishment of an IPR office is needed to spearhead the development and implementation of an institutional IPR policy, organization of meetings and training workshops and symposia on IPRs as well as develop expertise for IPR protection in the institute. The office will encourage innovation, protection and dissemination knowledge. It will serve NIMR and Tanzania at large by helping on IPR and commercializing discoveries developed by Research Scientists. Furthermore, the office will also provide for an institutional platform for airing voices on IPR issues as well as carrying research audit of institutional IPR needing protection. Running under the already given mandate by the government, the office will also facilitate and promote IPR protection and utilization in innovations in health research.

2) Activities so far

Activities within the project so far are to:

i. establish an IPR office
ii. draft an institutional IPR policy
iii. sensitize and create IP awareness to NIMR researchers through brochures, leaflets, email communication
iv. identify IP focal persons in each centre and stations and build their capacity by giving framework for IP assessment and protection in the institute
v. create of a clip on NIMR webpage providing for IP communication, exchange of information and online resources
vi. carry out inventory of critical research output with IP needing protection and commercialization

3) Activities to be done before submission of report, March 2013

Planned activity	**What will done**
i. Establishment of an IPR office	• Employing a lawyer
ii. Drafting of an institutional IPR policy	• Approval and enforcement of Research and IPR policy
i. Sensitizing and creating IP awareness to NIMR researchers through brochures, leaflets, email communication	• Emailing and hard copy distribution to NIMR scientists • Conducting IP awareness seminars and discussions
ii. Identification of IP focal persons in each centre and stations and build their capacity by giving framework for IP assessment and protection in the institute	• Nominations and training of PI focal persons
iii. Creation of a clip on NIMR webpage providing for IP communication, exchange of	• Launching of a clip on NIMR website as IP

information and online resources	resource for NIMR scientists
iv. Inventory of critical research output with IP needing protection and commercialization	• Distribution of an IP assessment form to NIMR scientists • Collection and analyze for expected outputs needing IP protection

4) Problems/obstacles/support needed

Problems/obstacles encountered	Support needed
i. Lack of IP awareness among policy makers and decision makers in the institute	• This is a group of busy persons a special strategy is needed for advocacy such calling them to attend international seminars and workshops on IP
ii. Lack of fund for printing IP materials, daily subsistence allowance and transport to allow me to travel and conduct focal person training and IP sensitization seminars in centres and stations	• A seed-corn grant (US$ 5,000 to 10,000)
iii. Shortage of simplified IP reading materials	• Supply/writing and printing simplified IP reading materials

5) Planned and preliminary deliverables within the POC

Planned activity	Preliminary deliverables	What remains to be done
ii. Establishment of an IPR office	IPR office established as a unit within the Department of Traditional Medicine Research	• Staffing: lawyer need to be employed
v. Drafting of an institutional IPR policy	v. Drafted Institutional Research and IP policy and guidelines vi. Draft Research Policy and IP policy and guidelines circulated to scientific, administrative and finance staff for comments and inputs	• Finalized Research Policy and IP policy and guidelines will be submitted to NIMR administration for approval and enforcement
vii. Sensitizing and creating IP awareness to NIMR researchers through brochures, leaflets, email communication	IEC materials on IP (brochures, leaflets) drafted and being proofread	• Distribution to NIMR scientists • Organization of IP awareness seminars and discussions
viii. Identification of IP focal persons in each centre and stations and build their capacity by giving framework for IP	Letter requesting Centre Directors/Head of Stations to appoint IP focal person in each Centre/Station dispatched	• Nominations from Centre Directors/Head of Stations • IP package and work protocol (job description/assignment) is

	assessment and protection in the institute		being drafted
ix.	Creation of a clip on NIMR webpage providing for IP communication, exchange of information and online resources	Soft copies of documents submitted to webmaster for uploading to NIMR website (www.nimr.or.tz)	• Uploading of IP documents to the NIMR website
x.	Inventory of critical research output with IP needing protection and commercialization	Template for provision of IP information is being finalized	• Expert and stakeholders inputs needed

6) Preliminary conclusion of work done so far

The drafted Research Policy and IP policy and guidelines provides for a legal ground for the promotion of science and IPR in the institute. Scientists are showing interest and appreciation for IP as it will benefit individuals, the institute and the country at large. Already a number of IP concerns are emerging as a lot of useful and patentable research outputs by scientists have been put in the public domain, hence a big loss to the custodians of the traditional knowledge, researchers and the nation. Therefore, this project is a timely intervention before more losses are made.

GRIP 12b Final reports

FAO-IT TK/GR

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Strategy development of IPR related to PGR

Background and rationale

The value and importance of plant genetic resources for sustainable food production and the mankind future were stressed at the begging of 20th century. Activities and researches on Plant genetic resources for food and agriculture started in former Yugoslavia during eighties known as a project "Gene Bank of Yugoslavia". This project was part of a Strategy for technological development of Yugoslavia. As a part of former Yugoslavia Bosnia and Herzegovina was included in implementation of this project but due to the unfortunate happenings during the nineties all activities on this project were stopped. After the disintegration of Federal Republic of Yugoslavia the constitution of Bosnia and Herzegovina has changed. Pursuant to the General Framework Agreement for Peace, Bosnia and Herzegovina is a complex State with an especially elaborate structure. It comprises of two entities, the Federation of Bosnia and Herzegovina and Republic Srpska and Brcko District, each of which have to a high degree the features of Statehood. After the Dayton Peace Accord, in the field of environment is in charge administration of both entities, Federation of Bosnia and Herzegovina and Republic of Srpska and District, which from 2003 to

2004. adopted sets of environmental laws. The adopted laws on nature protection in Federation of BiH, Republic of Srpska and Brcko District are based upon Habitats Directive (EU HABITATS DIRECTIVE (92/43/EEC) and Bird's Directive (Council Directive 79/409/EEC). In general the main international legal and policy framework for agriculture is within the FAO. In the area of plant genetic resources the most important is International treaty on plant genetic resources for food and agriculture (ITPGRFA) and FAO Global Action Plan for the conservation and sustainable use of plant genetic resources for food and agriculture (GPA). Within the legal and political framework there are other important international following provisions: Directives of the European Union Council; CBD (Convention on Biological Diversity); Cartagena Protocol; Nagoya Protocol; TRIPS (Agreement on Trade Related Aspects of Intellectual Property Rights); UPOV (International Union for the Protection of New Varieties of Plants); WIPO (World Intellectual Property Organization);International Convention on the Protection of Plants; EPPO (European and Mediterranean Plant Protection Organization);WTO (World Trade Organization). Bosnia and Herzegovina acceded Convention on Biodiversity on 26.08.2002. On 01.10.2009. Bosnia and Herzegovina also ratified Cartagena Protocol on Biosafety to the Convention on Biological Diversity.

Activities in Bosnia and Herzegovina on plant genetic resources were renewed in year 2004 trough ten year regional project called SEEDnet which was established and financed with help from SIDA. SEEDNet was established in 2004 in order to strengthen the national efforts for ensuring a long-term conservation of theirs valuable plant genetic resources and promoting a sustainable utilization of PGR, both at the national and regional levels. As an outcome of this project Republic of Srpska created a draft of Programme for Conservation of Plant genetic resources of Republic of Srpska, which later on was adopted by the National Assembly of Republic of Srpska in 2008 (Official Gazette act no.01-936/08). Genetic Resources Institute of University of Banja Luka (GRIUNIBL) was assigned as coordinating institution to work on implementation of the Programme. Up to now Republic of Srpska, with this Programme which regulates the conservation and sustainable use of plant genetic resources, has been a unique example in the region in terms of the legal basis for the activities related to genetic resources. The Programme covers issues such as legal and policy framework at some extent, present situation regarding plant genetic resources; existing legal framework in Republic Srpska, agricultural legislation and nature protection were explained; importance of public awareness and promotion; and there is section about education and training where it was stated that we do not have programmes which would combine technical trainings with trainings in different areas, including management, policy and legislation for plant genetic resources.

Objective with Project of Change

By adoption of the Programme, as a central document regarding PGRFA issues, it is assured a legal framework for further continuous flow of all activities on conservation and sustainable use of plant genetic resources. Soon after the establishment of the Institute the National Gene Bank was put into function. Territory of whole BiH trough the history was under the influence of various civilizations, so great number of foreign germplasm from east and west were introduced at this territory. Further on trough spontaneous and planned hybridization and selection these new introduced germplasm took part in creation of new autochthonous varieties. This is why Institute set as it's priority to conduct systematic inventarisation and collection of different plant varieties at its territory. GRIUNIBL has already inventorised and collected significant number of accessions. GRIUNIBL uploads it's data on EURISCO, which is a web-based catalogue that provides accession-level information on germplasm maintained in ex situ plant collections in Europe. EURISCO is based on a European network of National Inventories that makes European accession-level biodiversity data easily and readily available everywhere in the world. A National Focal Points (NFPs) on behalf of GRIUNIBL has been appointed who regularly updates data about new accessions. By having these data available interest for our collected accessions is becoming bigger. Since the established Gene Bank situated within the Institute is fairly new and having in mind above-mentioned treaties that BiH has accepted and national legislations it is compulsory for us to define

procedures while exchanging plant genetic materials with other interested parties in order to achieve satisfactory cooperation for all. In a certain way, as a start up point we could say that the objective was also to build awareness on importance of IPR on genetic resources, where certain measures have been undertaken which will be explained later on in report. This is a small but necessary step for further work with collected genetic material in our country.

Activities and methods with expected results

As I was setting out for this training I have discussed the situation of genetic resources and connection to intellectual property rights with my coworkers and other relevant parties within the University, so initially it was concluded for my PoC to be tackling with issues of "Strategy development of IPR related to PGR". I have to stress out, this was before getting to know how complex issue of IPR is. After first presentation of PoC, at the beginning of the course in Uppsala, Sweden, it was suggested by leading lecturers that the theme is way to broad and that the focus of PoC should be shifted to smaller feasible issue, such as firstly to work on raising awareness on PGR IPR and to provide the researchers and academia community with adequate information on IPR related to their work, and secondly to include use of MTAs in our work which is especially of great importance for GRIUNIBL. First phase of this training was about getting closer insight into the IPR matter which results in more specific objectives, as mentioned above. During the second phase upon return to home institution following activities were undertaken:

1) Web-page: integration of information about intellectual property rights related to PGR on Institute's existing web-page→ expected result are to achieve higher awareness on importance of IPR in research and innovation
2) Outlining existing relevant documents → this is to achieve MTA together with legal expert that will follow local existing legislations

We have managed to set up a small workshop for interested parties (researchers involved in work with genetic resources) where the focus was to pass on impressions from the lectures held in Uppsala, hand out some of the teaching material and to discus where do we stand in this whole picture of IPR and PGR. Participants gave their inputs regarding priority issues and agreed upon set objectives. They agreed that web-page is a great way of disseminating information. The web-page is still under reorganization (www. gri.unibl.org) but when finished it will be designed in form where information on PGR in general will be found, information about national Programme and links with description on following organizations with their respective treaties: International Union for the protection of new varieties of plants, Convention on biological diversity, International treaty on plant genetic resources for food and agriculture, FAO CGRFA etc. as well as domestic laws. When it comes to second activity the results will also be presented on Institute's web-page within the section about Programme providing following information:

- Definition and Purpose of MTA
- On-line forms for incoming MTA
- On-line forms for outgoing MTA

As it is previously explained the web for the Programme needs to be reorganized (work in progress). It is needed to design and upload above mentioned information, and to pay special attention to IPR to PGR. Our job on will not stop upon completion of this course. The idea is to continue our work in this direction and continuously upload news and information regarding GRIP issues. This would also mean to have these news translated into local language and make them available to all interested local parties and public.

We are at the very beginning of our long journey towards establishing our own IPR policies, for which is needed above all understanding of the matter and willingness to work on this issues. As an outcome of this PoC we will have set procedures and MTA for genetic material transfer, on-line information available about importance of genetic resources. Another thing that is not and issue in this PoC but is of upmost importance for future research and innovation work at University of Banja Luka is that we have started to talk about IPR, it's importance for the academia world and their work, how they can gain and give back to the society they live in. We will continue our work on public awareness of genetic resources importance, it has initiated our future activities in direction of academia awareness about intellectual property rights.

Lesson learned -way forward

Bosnia and Herzegovina must work on developing of institutional and national policies and frameworks on both entity and state levels. As it was mentioned before within the legal and political framework important international directives for Bosnia and Herzegovina, amongst others, are: WTO Trade - related Aspects of Intellectual Property Rights, The International Union for the Protection of New Varieties of Plants, Cartagena Biosafety protocol, WIPO, International convention on plant protection, EPPO, FAO CGRFA etc. In order to become equal member in EU Bosnia and Herzegovina must fulfill all prerequisites given by international rules within the FAO. Sustainable development of natural resources in our country is directly dependent on the application and improvement of legislation and standards which have to be harmonized with the laws and standards of the European Union. The responsibility of each country, including ours, is usually transferred to the gene banks and implemented through National Programmes with other public institutions and other relevant partners in the country. Having said the above facts it is clear that BiH still has many legal issues to work on and deal with. Since we are no party to most of the above mentioned conventions and protocols, from one perspective one could say that we have an advantage as we can learn from others' mistakes. The other problem we are facing with is lack of means and instruments of control that would insure proper conducting of the existing laws.

The maintenance of biodiversity of Bosnia and Herzegovina in current state is impossible to achieve if there is no efficient system with developed mechanisms in place, which include:

1) financial support for the realization of activities
2) strong and efficient institutional framework which shall encompass legal, human and technical capacities
3) development of mechanisms for carrying out activities of biodiversity protection through relevant economic sector
4) exchange of scientific and technological information
5) preservation and promotion of traditional knowledge and practice.

Big problem that deserves special attention is general public unawareness about the value and the meaning of genetic recourses for ones nation and human mankind in general. It is very important to continue our work on general public awareness and especially on educating and making informed our politicians, decision makers and even University staff. We will do so trough our web page, trough handing out educational leaflets while conducting our expeditions, organizing lectures, workshops, etc. During the realization of the project my knowledge of international IP regulatory environment has somewhat broadened and it has become clear the importance of the intellectual property rights in research and innovation for our University and country. Again, it is very clear that institutional support is needed for future work.

This course was very valuable from the aspect that participants were coming from diverse backgrounds which gave us an opportunity to share our knowledge and experience. It was a wonderful opportunity to meet wonderful people whom with I have learned from great teachers.

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IP rights and prebreeding material

Background and rationale
The Institute of Field and Vegetable Crops (IFVCNS) is one of the leading research and development institutes in Serbia. Since the focus of the work is plant breeding, we have developed representative collections of all major cultivated species we work on, in order to ensure sustainable development and quality of our cultivars and hybrids.

The bases of that work are the wild relatives and pre-breeding material that originated from various gene banks or field collecting trips and was further developed at the Institute. There is a need to exchange that germplasm with other institutions/gene banks which is not always met because of undefined or lack of clearly defined Intellectual properties rights (IPRs).

The project of change was made to address issues that arose during the work with plant genetic resources and management of orders/seed requests for such material from different parties like public, private, research and others. The main issue was IP rights management for prebreeding plant material. An example can be made on the collection of Helianthus (sunflower) species, where interspecific hybridization is used for the purpose of cultivated sunflower plant breeding. A gene pool of sunflower preebreding material was created from interspecific crosses and that kind of material is also sought in germplasm exchange with other gene banks, Institutes... IP management for wild relatives can be solved based on the conditions upon which the material was received or collected in the originating country but the IP management for prebreeding material remained to be defined.

In Serbia, The International Treaty on Plant genetic Resources for Food and Agriculture (PGRFA) was signed in 2001 and ratified in 2012, which made the use of Standard Material Transfer Agreement (SMTA) possible. Other approaches in answering to seed requests, were to provide seed material with no MTA or to negotiate some form of cooperation through a bilateral agreement. The GRIP program was recognized as a good opportunity to stimulate work on this issue.

Objective
My short term objective was to *understand the recent developments related to IPRs and exchange of genetic resources.* Moreover, I wanted to address issues with PGR and management of orders/seed requests for such material from different parties like public, private, research.

A long term objective was conceived and further developed during the GRIP training and defined as making and strengthening of workable IPR /ABS policies concerning management of prebreeding material and accessions of wild relatives so that researchers and staff of the Institute of field and vegetable crops can have an additional tool to use when working with that kind of material.

The purpose of this *project was to* contribute to *increasing the awareness and efficiency of managing IPRs considering plant genetic resources at* the **Institute of Field and Vegetable Crops, Novi Sad, Serbia**.

Activities and methods
The project was aimed at increasing the awareness of IPRs considering plant genetic resources. It was done through consultation with PGR stakeholders at IFVCNS which were the main target group. **Two lawyers working at the Institute and dealing with IP rights management were in person informed about the project and asked for support. A call was made to all interested to provide comments about the program and express their specific interest.**

At the start of the PoC, an effort was made to collate information on the current situation regarding pre-breeding material and IPRs. That focus and target group were broadened after I was included in the working group for the writing of the Serbian National Programme on Conservation and Sustainable Use of PGRFA (2013 – 2020) for the area of Industrial crops and chapter 5 – Organization and implementation of the program. The text is now at the stage of a final draft and is in the procedure for government approval which is expected at the end of 2013. Considering national legislation relevant to ABS, it is still partly in development as described in the chapter "Access to PGR" which is given here as it is in the national program:

"Current situation - At the international level, Serbia adopted a CBD that encourages the availability and distribution of PGR regarding their use in research and education. Also, Serbia ratified ITPGRFA in 2013. By ratifying this agreement, Serbia will allow free access to all users toward its genetic diversity and relevant information regarding cultivated plants that are conserved in national plant gene banks through the Multilateral System (MLS).
To put MLS in the function, Serbia should conceptualize and adopt appropriate regulations at the national level. Special attention will be paid to technical details such as the layout and content of documents. Whenever possible, standard forms of documents will be used, such as the "Standard Material Transfer Agreement" (SMTA). Acceptance of the MLS provides researchers, plant breeders, scientific institutions and private sector the opportunity to make more work with, and to improve existing PGR. Public institutions should to decide which PGR would enter in the MLS.
Actions needed:
- Adopt legislative measures concerning the implementation of MLS.
- Prepare documentation for free access to PGR accessions.
- Identify accessions, which will be accessible under the MLS."

Regional harmonization of international treaties may be a god approach and in some communities like the European Union, it is well under way. An example is the process of adopting a Regulation on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization in the Union. A draft document can be found on:
http://ec.europa.eu/environment/biodiversity/international/abs/pdf/PROPOSAL_FOR_A_REGULATION_EN.pdf

Similar to that example, designating accessions to an international gene bank system like AEGIS (A European Gene bank Integrated System) also requires complying with policies of that institution were for example SMTA will also be used for non-annex 1 crops.

As a part of the long term objective, it is planned to summarize the comments/contributions and conclude about the further actions to improve work on IP protection in IFVCNS. General plans considering IP protection policy development will include discussions about the form of Institutional IP policy, whether it should be one policy covering all aspects of Institutional IP or a larger number of smaller, more specific policies. The question of material transfer agreement will be assessed based on solutions in various institutions, gene banks etc and the experience and needs in IFVCNS. Proposal will be made for an MTA

adapted for IFVCNS including the option of using SMTA in the form offered under ITPGRFA for certain type of genetic resources.

Outcome and deliverables
A working group was made consisting of people directly working on maintaining collections of plant genetic resources in each department to facilitate further work on the project.
A written report about the activities in the GRIP Programme 2012 b was made and published on the IFVCNS intranet website. The highlights of the text were to emphasize the growing importance of IP rights management in plant genetic resources, proliferation of national and international policies/agreements and potential problems that could arise if they are left unattended.

A workshop was made at the Institute on November 30th 2012 with the title "Training in the field of IP rights protection and author rights". Close to 50 Institute employees attended the workshop. Three lecturers came from the Education and Information Center (EIC) of the Intellectual Property Office of the Republic of Serbia and two were from the IFVCNS. EIC was founded in January 2010 with the aim of raising general awareness and developing professional skills in the field of intellectual property. The following topics were addressed:

- The importance of protection and types of intellectual property rights
- The basics of patent protection and inventions of an employee
- Specifics of patent protection in the field of biotechnology
- Copyright and related rights
- Protection of plant varieties as intellectual property
- The use of biochemical and molecular markers in the protection of plant varieties

Outcome of the group work from the GRIP 12b - phase III, possibly reflecting also the national and institutional IP management of PGRFA in Serbia:

Basic components:

- Global commons like FAO treaty, CBD, Nagoya protocol, UPOV
- National sovereignty is protected through National GR laws, yet again small countries are too different and usually too dependent on foreign help/funding, so that conflict of interests is frequent.
- Issues: Patenting enforcement through economic or/and political pressures (TRIPS+), and at the same time evasion of ABS through loopholes by multinational companies

Tools for a change:

- Regional harmonization of international treaties could be performed by joint work of neighboring countries sharing similar problems and opportunities in agriculture or food production in general.
- Regional because it would help promote cooperation on the IP and GR issue and better understanding of their economic importance.
- It would also hopefully provide better understanding of international treaties and their real application and not a ratified shelf life in dark.
- We assumed that regional agreement or pact (The Andean pact was mentioned as an example) would provide a better starting point in negotiations for smaller countries, or at least a more defined opinion on GR and IP.
- Making open contractual agreements based on nationally defined terms for collecting and using GR (National GR law...) should help in solving some conflict of interest issues.

Lesson learned -way forward
Before the start of my GRIP training, I was not completely aware of the National and International issues relating to intellectual property rights. The received training was a well organized introduction by people

with rich experience in the field. Listening to the participant's project of change and discussions with them has provided me the opportunity to share experience and to see the same problem in different angles.

The major obstacle to phase two was time duration due to heavy work load at the Institute. I have successfully completed my short term objective within the limited time. Hopefully, in time, the remaining tasks which I have mentioned under the objectives will also be achieved. An obstacle was found in defining the material, not so much because of the material itself but the people working on it and different opinions they have on what that material represents. Specific support from the GRIP team may be needed for advice on policy making and how to solve specific issues that may arise during the making of those, after the phase three of GRIP program 2012b.

There is an ongoing effort of all major stakeholders in Serbia for the regulation of PGR field which also includes IP management. The most recent activity was making the final draft of the National program on conservation and sustainable use of PGRFA (2013 – 2020). It will serve as a tool to ensure permanent and organized work on the conservation, enrichment, research and sustainable use of PGR of Serbia, cooperation at the bilateral, regional and international level, coordination of all participants in the program, raising social awareness of the importance of plant genetic resources and their use based on active role of research and educational institutions, media, NGOs, and other agencies.

The first specific objective of the program is the harmonization of national policies/legislation on PGR with international conventions / treaties and EU regulations / directives.

Acknowledgements
I take this opportunity to thank CG, Eva, Maria and Ivar from Sweden for their cooperation and an entirely positive training environment provided for us. My deepest gratitude is due to dr Ana Marjanović Jeromela, head of the rapeseed section and dr Vladimir Miklič, head of the oil crops department at IFVCNS for understanding the need and supporting the work on IP issues involving PGR.

My sincere thanks are also due to all GRIP 12b participants for sharing their valuable knowledge with us and for making my stay a memorable one at Sweden and Thailand.

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Operative Program for Plant Genetic Resources in Agriculture in the Federation of Bosnia and Herzegovina

Background & rationale
Bosnia and Herzegovina (B&H) is not a member of WTO, nor UPOV, but joining these organizations is inevitable if we want to achieve a higher degree of integration of our country into international structures. Our country has endorsed the objectives of the UN Convention on Biological Diversity (CBD - Rio de Janeiro, 1992) by ratifying it in 2002. Since then, B&H is a signatory to the Convention of Biodiversity, whose legal framework is still not implemented. Currently, negotiations are being led for B&H to gain access to the FAO (Food and Agriculture Organization) and UPOV (International Convention for the Protection of New Varieties of Plants). Important part of fulfilling the requirements for joining international organizations is to harmonize national legislation with international regulations.

Harmonization of national legislation with international laws and regulations is slow, because the regulations that treat issues of PGR in B&H are not labeled in legal frameworks. Although Bosnian legislation declares conservation of biologically diversity, the system of practical measures to be taken towards protection of local varieties, populations and their wild relatives is lacking. There are no legal documents which clearly regulate the activities on collection, description, inventory, conservation and efficient use of PGR. The state program for plant genetic resources, which is an essential document in the integration into the EU, has not yet been created. This means that accessing international funds for the preservation of plant genetic resources in the future will not be possible if the above mentioned requirements are not met.

The current legislation which treats the problematic of PGR includes only the Strategy of Bosnia and Herzegovina and Action Plan for Biodiversity and Landscape's Protection (NBSAP 2008-2015).

Inventorisation of genetic resources, which is very important for agricultural production in B&H, has still not been fully carried out, nor have the efforts resulted in the creation of an official gene bank at the Federal, or state level. First steps in the preservation of plant genetic resources have been made by experts from the Faculty of Agricultural and Food Sciences in Sarajevo, whose involvement in the SEEDNet project helped to form the first collection of seed material of agricultural crops on the territory of the Federation of Bosnia and Herzegovina. Creation and sustainability of on-farm collections is not possible without adequate compensation for the farmer. This represents one of the crucial problems in the preservation of plant genetic resources.
One of the consequences of inadequate treatment of plant genetic resources in agriculture, in terms of their preservation and exploitation, is the lack of institutions in Bosnia and Herzegovina engaged in plant breeding and seed production. The only exception are enthusiastic breeders and farmers who do multiplication of seed/planting material from foreign modern cultivars.

There was an urgent need to draw up an operative program for plant genetic resources in agriculture in the Federation of Bosnia and Herzegovina so as to improve the legislative base related to conservation and efficient utilization of PGR. The aim of this PoC was to create a draft of the Program for Plant Genetic Resources which would include the following segments:

- Establishment of Internal Legislation and International Agreements on Genetic Resources;
- Conservation and sustainable use of PGR;
- Raising of public awareness regarding the PGR.

Objectives

- To make a list of mandate crops and cultivars, which will form the framework for future actions when working with plant genetic resources in agriculture;
- To conduct an effective distribution of responsibilities in the process of preservation and sustainable use of plant genetic resources of agricultural crops in the Federation of Bosnia and Herzegovina between local institutions;
- To provide suggestions for adaptation of national legislation in order to achieve compatibility with EU legislation in the field of plant genetic resources;
- To improve the level of coordination between entities of Bosnia and Herzegovina regarding the plant genetic resources for agriculture;
- To ensure the sustainability of diversity of plant genetic resources in agriculture by establishing ties with the business sector, the potential beneficiaries of these resources.

Activities and methods
A draft document, entitled as "Operative Program for PGR in Agriculture in the Federation of Bosnia and Herzegovina", was created during this Project of Change and submitted to the Ministry of agriculture, water-management and forestry for consideration in January 2013. The draft clearly defines activities on collection, conservation and protection of PGR and emphasizes the need for creation of a genebank at the national or entity level. The "Operative Program for Plant Genetic Resources in Agriculture in Federation of Bosnia and Herzegovina" includes the following overall segments:

- Creation of a financial plan;
- Establishment of internal legislation and international agreements on plant genetic resources (used in agriculture);
- Conservation and sustainable use of PGR;
- Raising of public awareness regarding the PGR.

To achieve better results we separate the project in two different fields: 1) establishment of legal framework and 2) activities on raising public awareness.
This has made it easier to manage the different activities. All activities from the field of raising public awareness was entrusted to colleagues from the Faculty of Agriculture and Food Sciences in Sarajevo.

The "Operative Program for Plant Genetic Resources in Agriculture in the Federation of Bosnia and Herzegovina" has been made by an expert team from the Faculty of Agricultural and Food Sciences in Sarajevo, which has, based on the decision of the State Ministry of Foreign Trade and Economic Relations in 2004, implemented the SEEDNet project (Southeast European Development Network for Plant Genetic Resources) for the period of 2004-2011. This project, funded by the Agency SIDA (Swedish International Development Agency) and coordinated by the NGB (the Nordic Gene Bank) and CBM (Centre for Biodiversity), aimed to establish a network for plant preservation, and preservation of genetic resources of crops in South Eastern Europe. After eight years of implementing, the work of the partners from Federation of Bosnia and Herzegovina has been evaluated twice by independent experts (hired by the financiers) as very good. It is important to note that the SEEDNet project represented the first project of its kind in this part of Europe, and the successful operation of a team of experts from the Faculty of Agricultural and Food Sciences (University of Sarajevo) and that it's implementation is the best reference for this team to work on the Operational Program for Plant Genetic Resources in Agriculture in the Federation of Bosnia and Herzegovina. In addition, this team of experts has published numerous scientific papers regarding the plant genetic resources in agriculture in the last few years.
The creation of the Program has been conducted with the help of experts from the following institutions:

- Agro-Mediterranean Faculty, University of Mostar;
- Faculty of Biotechnology, University of Bihać;
- Institute for Genetic Engineering and Biotechnology, Faculty of Agriculture, University of Mostar;
- Faculty of Agriculture, University of Zagreb.

Outcomes and deliverables
In March 2013 the draft was signed by the Ministry of Agriculture, Water Management and Forestry. From that moment until now, the following has been achieved:

- The list of mandate crops and cultivars, which will constitute the framework for future actions when dealing with plant genetic resources of agricultural crops was compiled. The list will make

the assessment of future applications for funding of projects in the field of plant genetic resources in agriculture much easier;

- Task groups were established and the mandate of the committee for plant genetic resources in the Federation was determined. The members of the task groups and the committee need to assist the Ministry of Agriculture, Water Management and Forestry in further activities related to the management of plant genetic resources in agriculture;
- Local institutions which will take responsibility regarding the management of plant genetic resources (with clearly defined mandates) in the Federation of Bosnia and Herzegovina were identified;
- The coordination of actors in the field of plant genetic resources in order to strengthen cooperation between the entities of Bosnia and Herzegovina was improved. A network between potential stakeholders was created.

With the creation of the "Operative Program for Plant Genetic Resources in Agriculture in Federation of Bosnia and Herzegovina", our country will get an essential document which is indispensable when it comes to conservation and sustainable use of plant genetic resources. Also, this document represents a good base for the creation of a Program for Plant Genetic Resources on the State level. Determination of a legal framework, and further adjustment of domestic legislation on plant genetic resources to the EU legislation (which is the product of various international conventions on plant genetic resources) is also an important step that our country has to make.

Lesson learned – way forward

Bosnia and Herzegovina has a bicameral legislature and a three-member Presidency composed of members of each major ethic group. The country consist of two autonomous entities: the Federation of Bosnia and Herzegovina and the Republic of Srpska. Further, there is a third region – Brčko District, which is governed under local government. The organizational structure of the Federation of Bosnia and Herzegovina complicates the work of all institutions, because the territory is divided into 10 regions. These regions are further divided into 79 municipalities. The second entity is organized only on the municipal level and has 56 municipalities. From the above mentioned it is clear that B&H has an extremely complex administrative system, which makes the adoption of new laws and regulations very difficult.

In order to achieve a higher degree of integration of our country into international structures it is necessary to improve the current situation in B&H legislature. Although B&H legislation declares conservation of biologically diversity and Bosnia and Herzegovina is a signatory to the Convention of Biodiversity, the system of practical measures to be taken towards protection of local varieties, populations and their wild relatives is lacking. The conservation and efficient use of PGR is essential for the further development of agriculture production.

During our work on the operative program we encountered many problems, out of which the organization of B&H administration was the major one. Primarily, it was planned to create a Program appropriate for both entities, to develop a national program for PGR for Bosnia and Herzegovina, but, considering all the mentioned facts, such action is currently not possible.

With the creation of the “Operative Program for Plant Genetic Resources in Agriculture in the Federation of Bosnia and Herzegovina” we make a significant step towards the establishment of a good legal framework. One of the next steps, an actions of particular importance, is the creation of a genebank on the Federal level.

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Operative Program for Plant Genetic Resources in Agriculture in the Federation of Bosnia and Herzegovina – raising of public awareness

Background & rationale

Bosnia and Herzegovina (B&H) has a bicameral legislature and a three-member Presidency composed of members of each major ethic group. The country consist of two autonomous entities: the Federation of Bosnia and Herzegovina and the Republic of Srpska. Further, there is a third region – Brčko District, which is governed under local government. The organizational structure of the Federation of Bosnia and Herzegovina complicates the work of all institutions, because the territory is divided into 10 regions. These regions are further divided into 79 municipalities. The second entity is organized only on the municipal level and has 56 municipalities. From the above mentioned it is clear that B&H has an extremely complex administrative system, which makes the adoption of new laws and regulations very difficult.

Our country is not a member of WTO, nor UPOV, but joining these organizations is inevitable if we want to achieve a higher degree of integration of our country into international structures. Since 2002, B&H is a signatory to the CBD (Convention of Biological Diversity, Rio de Janeiro 1992), whose legal framework is still not implemented. Currently, negotiations are being led for B&H to gain access to the FAO (Food and Agriculture Organization) and UPOV (International Convention for the Protection of New Varieties of Plants). Important part of fulfilling the requirements for joining international organizations is to harmonize national legislation with international regulations. If we consider the above mentioned organizational structure with its complex administrative system, it is obvious that the process of harmonization will be difficult to enforce. An additional problem is the lack of B&H legislation which treats the issues of PGR. Although Bosnian legislation declares conservation of biologically diversity, the system of practical measures to be taken towards protection of local varieties, populations and their wild relatives is lacking. There are no legal documents which clearly regulate the activities on collection, description, inventory, conservation and efficient use of PGR. Currently there is only one document, entitled as the Strategy of Bosnia and Herzegovina and Action Plan for Biodiversity and Landscape's Protection (NBSAP 2008-2015) which partially treats the issues of PGR in agriculture.

The state program for plant genetic resource has not yet been created. This means that accessing international funds for the preservation of plant genetic resources in the future will not be possible if the above mentioned requirements are not met. Therefore is an urgent need to improve the legislative base related to conservation and efficient utilization of PGR.

This difficult undertaking is entrusted to a team of experts from the Faculty of Agriculture and Food Sciences, which has, based on the decision of the State Ministry of Foreign Trade and Economic Relations in 2004, implemented the SEEDNet project (Southeast European Development Network for Plant Genetic Resources) for the period of 2004-2011. This project, funded by the Agency SIDA (Swedish International Development Agency) and coordinated by the NGB (the Nordic Gene Bank) and CBM (Centre for Biodiversity), aimed to establish a network for plant preservation, and preservation of genetic resources of crops in South Eastern Europe. This team of experts draws up a draft document, entitled as the "Operative Program for Plant Genetic Resources in Agriculture in the Federation of Bosnia and Herzegovina", with the aim to improve the legislative base related to conservation and efficient utilization of PGR.

During the work on the operative program for PGR we encountered a lack of understanding from the responsible authorities. Also, the wider community has little knowledge about these topics. Since that this represents a problem for successful implementation of the program, it was necessary to take actions to raise up the public awareness regarding to PGR.

Objectives
The main objective of this PoC is to identify groups of interest and to find the best ways to get access to these groups in order of raising public awareness. The raising of public awareness would ensure a better implementation of the Program.

For this purpose it was necessary to:

- Identify the groups of interest
- Identify special activities for each group to rais up their knowledge and awareness about PGR

Activities and methods
The draft document of the "Operational Program for PGR in Agriculture in the Federation of Bosnia and Herzegovina", was created and submitted to the Ministry of agriculture, water-management and forestry for consideration in january 2013. This program clearly defines activities on collection, conservation, protecting PGR and emphasizes the need of setting up a genbank in our country.
The program consist of the following segments :

- creation of a Financial Plan,
- establishment of Internal Legislation and International Agreements on Genetic Resources,
- conservation of PGR,
- sustainable use of PGR,
- researches on PGR and
- the raising of public awareness regarding the PGR.

To achieve better results we separate the project in two groups - establishing of the legal framework and activities on raising public awareness. This has made it easier to manage the different activities. A good cooperation between the actors in this group is necessary to ensure efficiently development of the Program for PGR.

In the fields of public awareness the first step was to analyze the current situation regarding to PGR and to identify the groups of interest. To achieve this tasks we had to involve an dconsult all possible stakeholders. As already mentioned, the situation in our country is difficult. The general knowledge of the wider community about PGR is on a low level. Our group, which was entrusted with the creation of the draft document, encountered a lack of understanding.

After consultation with colleagues who work on the Program of PGR we identified the following target groups:

- farmers
- experts and scientists who deal with the use and study of plant genetic resources of agricultural crops in the Federation of Bosnia and Herzegovina
- responsible persons in the executive and legislative (state, entity, cantonal and municipal level) authorities under whose range of action belongs to agricultural production
- students

An important part of successful implementation of the Program is the raising awareness of the wider community. To ensure a successful implementation of the program, for each group were identified special activities in order to raise the knowledge about PGR, the benefits of collecting, conservation and efficient use of these resources. The best way to get access to these groups is to organize seminars and presentations.With this type of education and dissemination of information about the Program of PGR we expect to achieve better results.
The special activities for each group are the following:

- Farmers will be informed about the results of the project through a public presentation on at least four annual fairs of agriculture in the Federation of Bosnia and Herzegovina (with the printing of pamphlets).
- To experts and scientists, who deal with the use and study of plant genetic resources of agricultural crops in the Federation, the project results will be presented at the Scientific-Expert Conference of Agriculture and Food Industry. This conference will be held in 2013 in Sarajevo, and in 2014 in Istanbul (presentations will be included in a book of the conference).
- Presentation of the program for plant genetic resources for responsible persons from the executive and legislative branches will be held at a special Conference.

A special target group are students. In the first step it is planned to continue with smaller presentations to raise up their knowledge about PGR.

Outcomes and deliverables
In March 2013 the draft was finally signed by the Ministry. After several months of work on the program for PGR, the following was achieved:

- Compiled list of mandate crops and cultivars
- Establishing the task group, and determining the mandate of the committee for plant genetic resources in the Federation.
- Local institutions are identified that should work with the management of plant genetic resources in the Federation, with clearly defined mandates and responsibilities.
- Improved coordination of actors in the field of plant genetic resources in order to strenghten cooperation between the entity, and on the national, regional and global level.
- Identified target groups and special activities for each group
- First activities of building teaching moduls about PGR at the Faculty

Lesson learned – way forward
To achieve a higher degree of Bosnia and Herzegovina into international structure it is inevitable to join to organizations like WTO or UPOV. Our country has a difficult legislature and administrative system, which complicates the endorsement of objectives set by this organizations. Harmonization of national legislature with international regulations is essential for a membership in WTO or UPOV.
The draft document “Operational Program for PGR in Agriculture in the Federation of Bosnia and Herzegovina” is important for fulfilling the requirements for joining international organizations and a good base for the further development of a program at the state level.

Raising of public awareness is only a part of the program, but without it an successfull implementation can not be ensured. As mentioned above, the program is intended to professionals who deals with the use and study of PGR and also to farmers. In order to get access to the target groups, the Faculty already

organised several presentations and seminars. Farmers will be informed about benefits of PGR in agricultural production during the four annual fairs in B&H.
On the scientific-expert conference of agriculture and food industry, held this year in Sarajevo and 2014 in Istanbul, experts and scientists will be informed about the outcomes of this Program.
It is necessary to continue with regulary meeting to ensure the dissemination of information about this topic.
Recognizing the importance of PGR, the Faculty of Agriculture and Food Sciences has taken activities of building teaching moduls, what will contribute to institutional development.

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Strengthening awareness and action of the stakeholders as implementing Intel' agreements/conventions on genetic resources (GR) and intellectual properties (IPs) in Vietnam

Background and rationale
Under globalization, nations and international/regional institutions always communicate to rest of one by a common language, that is intel' agreements/conventions for keeping peace, stabilization and justice benefits for whole relevant parties. Today, humankind is facing to increasingly global challenges such as erosion and loss of biological diversity (GRs) and protection of right and benefit from technological and scientific advances (IPs). Erosion and loss of biological diversity (GRs) is caused to extinction of organism species on the world and is threatening to existence of the planet and mankind. Then global efforts on conservation and sustainable use of biological diversity is calling interest of global than before. However, mechanism of ABS on CBD and ITPGRFA could be not clearly and not satisfactory for relevant parties. This is a big barrier for the efforts. Otherwise, dispute and conflict of benefit brought from tech & sci-advances is more serious on the world. This made IPs area become so important/sensitive to every nation/intel institution in a green and digital- economic echo. Both of challenges is creating borders to global integration and development. Vietnam is an active and responsibility member of international/regional organizations such as ASEAN, UN, WTO, WIPO, FAO,CBD, WIPO, ect. Moreover, Vietnam's integration and development into international community is facing to the challenges by information lack and awareness differences. So investigating status of stakeholders understanding in the field and delivering schlolars' view, comments to bridge the gaps for Vietnamese stakeholders to international community for improving and propagandizing, developing, implementing laws of GRs and IPs in Vietnam

Objective
- investigating status of understanding of stakeholders Vietnam in GR and IPs sectors;
- collecting legislative documents issued by relevant levels on the sectors in Vietnam;
- interviewing and summarizing some views of stakeholders Vietnam on the sectors;
- proposing some recommendation and policy implication on the sector in Vietnam;

Activities and methods
- Collect relevant legislative documents on GRs and IPs at different levels in Vietnam. In the activities, used method is directly interview and collection of legislative documents from relevant ministries. It will normally be carried out in legislative departments of relevant ministries at Ministry of Agriculture and

Rural Development, Ministry of natural resources and environment, Ministry of Technology and Science, and another ones. However, legislative documents sometime did not store in system by objective and subjective reasons such as separation and merging of department and ministries. Therefore, to ensure full collection on the legislative documents, we have just accessed legislative departments of relevant ministries as well as website of the law companies.
- Investigate and interview 3 main object groups (policy/decision makers; tutor/researchers and farmers) on their understanding of above mentioned field as well as recommendations from tutor/researcher group on developing a strong institution (laws and enforcement) on GRs and IPs in Vietnam. Method is used in the activity is development of questionnaire form on understanding and interest of stakeholder to GRs and IPs sectors in Vietnam in line with evaluation of interviewers to interviewees. This will help an overview and a reason view from PoCs. Questionnaire form is simple composed/ designated to evaluate interviewees on their understanding to the terms of intel' agreements/conventions in different level. From hearing, interest, understanding and knowledge of the one such as CBD, WTO/TRIPs, UPOV, WIPO/IGCGRTKP, FAO/IT and Biosafe protocol. Furthermore, assessment of interviewer is an open factor to collected data is objective and correct. 15 interviewees of every stakeholders group will be interviewed.

Outcome and deliverables

PoCs collected 224 legislative documents related to GRs and IPs sector in Vietnam, including 5 law documents issued by national assembly, 60 documents issued by governments, 142 documents issued by MARD, 9 documents issued by MOST and 8 documents issued by MONRE. On the structure and institution, law system of Vietnam is so completed and transparency. First top is the constitution, then is the law, what is composed and approved by national assembly. Next, is decrees/ decision of government or directive of prime minister. Last one, decision, circular of ministries. For an example, CBD was signatory by Vietnamese government in 2000. But after 8 years, in 2008 CBD was drafted/ratified and issued in to law by national assembly. Next step, directive of prime minister is issued and finally, relevant ministries just issued decision and circular. On governmental management, MOST will releases legal documents to be used as direction tools to other ministries like MARD, MONRE, ectc … Also from figures, We will see that almost of documents on GRs and IPs sector is issued by MARD. Therefore, MARD plays an important role of GRs and IPs sector of Vietnam, exception of geographical instructions areas that is under MOST. Another side, the legal document covered intel agreements/conventions that Vietnamese governments pledged and signed to one like WTO, WIPO,CBD, FAO, Biosafe protocol. This is explained why Vietnam is an official member of intel community. However, the figure will not express status of awareness and implementation of GRs and IPs in Vietnam. To know clearly on status of awareness stakeholders on the sector, a summarized tables on results of investigation and interview is showed below

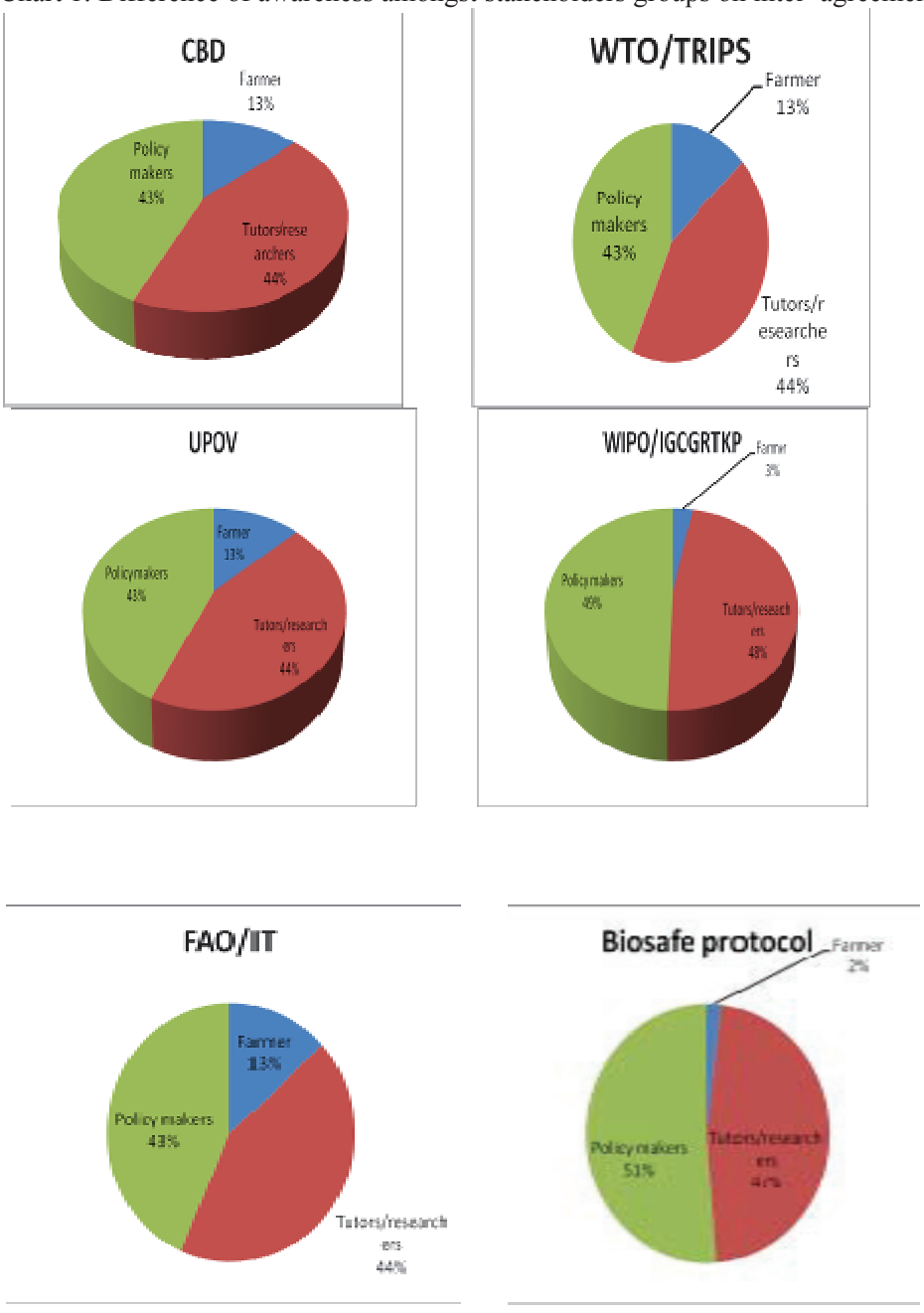
Table 1: Summarized tables on results of investigation and interview to Vietnamese stakeholders

	CBD	WTO/ TRIPS	UPOV	WIPO/IG CGRTKP	FAO/IT	Biosafe protocol
Yes	77%	77%	77%	56%	77%	50%
No	33%	33%	33%	44%	33%	50%

In the table 1, the intel' agreements/conventions like CBD, WTO/TRIPS, UPOV, FAO/IT, Biosafe protocal are mentioned and represented to interviewees. Whereas, 77 % of total interviewees answered that they heard and had concepts of the terms of CBD, WTO/TRIPS, UPOV, FAO/IT and to

WIPO/IGCGRKP. Similarity, Biosafe protocol are 54% and 50 %, respectively. There were some international agreements/conventions that was more popular than another one because they may be hot global issues and are propagandized and educated by media and press as well as number of issued document figures. However, the rate in every group is big differences. The difference is showed in chart 1.

Chart 1: Difference of awareness amongst stakeholders groups on intel' agreements/conventions



Data of chart 1 is showed that awareness and understanding of different stakeholders groups is so big difference. Firstly, the rate of farmers group to intel' agreements/conventions that issued by law is not high, maximum is 13% in term of CBD, WTO, FAO, UPOV and other is WTO, Biosafe protocol are 3%

and 2%, respectively. Although, that is closely to them but they just heard of items. Conversely, their content and articles is unknown by the farmers. The results is reflected a fact of the climate in Vietnam, the farmer is a key stakeholders of GRs and IPs sector but their understanding is so weak in the sector. About tutor/researcher and policy marker one, the rate is so high, minimum are 43% and 44%, respectively. For these groups, their concepts and awareness on the agreements/conventions are so good but the application is almost not possible to their climate. All these is delivered a big question, why Vietnamese stakeholders is ignore to the issues meanwhile legal corridor and infrastructure are already. Even if, the appeared lesson on dispute of commercial and copy rights, ect in Vietnam. Whether do not Vietname stakeholders aware fully and understand fully in the issues? Or sanctions are not enough strong to stakeholders have concerns and application to their sectors. The answer just has if results and recommendation of PoCs is needed to authority and donors.

Lesson learned -way forward

GRs and IPs are new and strange terms in social and legal living in Vietnam although their impacts will be so huge to the future of Vietnam integration and development. Furthermore, there were a lot of documents that related to the sector issued by Vietnamese government but these are not popularized to and are in mind of stakeholder. In stakeholders, farmers will be most vulnerable object by their limited aware in the area. This will restrict their right of GRs and IPs. According to statistics' Worldbank, there are 80% new crop varieties in presently production originated by farmers but almost of them is not applied for the protect of new plant variety. Moreover, there were 80% lost traditional crop varieties today. Just 75% of traditional crop varieties is maintained by PRC. Then education, training for strengthening awareness and action of stakeholders in the area in Vietnam is crucial for farmers' benefit in particular and institution development in general. Finally, Vietnam is rich of genetic resources and is a agricultural country with 70% population involved in agriculture sector, a leading exporters on agricultural products in the world such as rice, coffee and seafood, ect so that understanding, aware and right implementation of Intel agreements/conventions during integration and development works is crucial meaning Therefore, 1. stakeholders and people should be educated/popularized the sector in the schools/ universities and communitie;.2. legislative system in the sector also should strengthened and consolidated; 3. Role of media and press in the sector are so important.

PBR/PVP-UPOV, FAO-IT

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Potential benefits for Tanzania's membership to UPOV while implementing mutually compatible Intellectual Treaty on Plant Genetic Resources for Food and Agriculture (IT-PGRFA)

Background and Rationale

Tanzania is a United Republic made up of the former Tanganyika (Tanzania Mainland) and Zanzibar. Since agriculture is not a union matter, there is no a unified Plant Breeders' Rights Law that has been enacted. Presently, Tanzania – Mainland has a Plant Breeders' Rights Law (2002) which came into force on the 2nd February 2004. In spite of having the plant breeders' rights protection in Tanzania, the numbers of protected varieties is still very low. This can be partly due to lack of awareness among breeders and

lack of financial motivation to most breeders due to poor marketing of their new product as they are only restricted to the local market. The other reason is believed to be due to non-compliance to the most effective system of plant breeders' rights which many believe to be the UPOV system. There is a need to ensure the raw materials for plant genetic resources for food and agriculture are indispensable for crop genetic improvement, whether by farmers' selection, classical plant breeding or modern biotechnologies are used within the country and or at international level to ensure are adapting to the environmental changes and the ever rising human needs.

Based on this fact Tanzania has acceded the International Convention for the protection of new varieties of plants and has initiated a process to become a UPOV member. The move is expected to encourage and motivate local and international breeders to participate in development of improved varieties of plants for agricultural development.

In order to meet one of the conditions for UPOV membership, Tanzania Mainland has enacted a new plant breeders' rights law of 2012 which is complient to UPOV 1991. Zanzibar which has no plant breeders' rights law until now, has initiated a process of enacting UPOV 1991 since 2012, so as to have compliant legislation that will enable the United Republic of Tanzania to comply with UPOV conditions and become its member as soon as possible. The Project of Change has actively participated in the final processes of ensuring that Tanzania fulfils the given conditions for UPOV membership. It is hoped that this process will be finalized by 2013.

Tanzania is also a signatory to the International Treaty on Plant Genetic Resources for Food and Agriculture (IT-PGRFA) and is in the process of domesticating the treaty by enacting a law for this purpose. Tanzania believes that the two treaties are mutually compatible and beneficial. Therefore the Project of Change (PoC) played a greater role in domesticating the IT-PGRFA. We have already initiated the proces of domesticating IT-PGRFA of which the proposed bill has already being approved by the Cabinet Secretariate and is waiting for further steps. The Tanzania government specificaly the ministry of agriculture have addressed the importance of having the Plant Breeder' Rights complient to UPOV 1991 and domesticate the IT-PGRFA of which both are compactible for protecting the country genetic resources.

In addressing the PoC objectives the ministry of agriculture in Zanzibar has to work together with the ministry of agriculture in the Tanzania mainlad so as to ensure the whole country adresses the need for protection of genetic resources and the breeders' rights. Since agriculture is the backborne of most african countries like Tanzania, putting in place the law and regulations that will aid improvement of agriculture is of importance for the economic growth of the country.

Objectives

(a) to establish how Tanzania will potentially benefit from joining UPOV

(b) find out whether Tanzania's membership to UPOV is compatible with provisions of International Treaty on Plant Genetic Resources for Food and Agriculture (IT-PGRFA) which Tanzania is a signatory since 2004.

(c) to raise awareness among breeders and other stakeholders

(d) to encourage Tanzania government to speed up its resolve to domesticate IT-PGRFA by enacting legislation as soon as possible.

Activities and Methods

Establishing the potential benefits of Tanzania membership to UPOV 1991, the study was carried out in Tanzania by reviewing available literature indicating the benefit that Tanzania expects to get by joining UPOV and enacting legislation for domestication of the IT-PGRFA. The study was performed by reviewing of literatures in hard and soft copies include web based searches to get experiences of other countries who have tried to domesticate the UPOV convention and the IT-PGRFA and learn benefits and challenges faced in the process. The research was conducted by studying neighboring countries compliant to UPOV (Kenya) and those none compliant and we found out that among other benefit the number of released varieties were high compared to the number of released varieties in our country. I spite of that the compliant countries has more room for exchanging plant materials as compared to the country which are non compliant.

After identifying the benefits, the PoC, through the Office of Plant Breeders' Rights participated in a number of activities aimed at creating a greater understanding of the benefits and challenges of becoming UPOV member. These activities included creation of awareness among researchers, breeders, scientists, politicians and the public in general. This activity was performed through seminars, workshops and through participation in the annual agricultural show, popularly known as Nanenane Show. As a result of such events, Tanzanians are now aware of the process and its importance to advancement of the agricultural sector and the national economy in general. Awareness of the importance of a UPOV compliant to Plant Breeders' Rights legal framework helped in raising understanding and confidence of the members of the Parliament in passing the new PBR Bill of 2012 into a new law in November, 2012.

The same process of creating awareness in Zanzibar has been initiated by the two Ministries responsible for agriculture in Mainland and Zanzibar. The Project of Change has been actively involved in this process were by the researchers, farmers, seed companies and the cabinet members were targeted. Tanzania already submitted Zanzibar Plant Breeders' Rights Bill in the UPOV Council meeting which was held in March 2013 for examination, of which the results was positive and hopefully this will allow the United Republic of Tanzania to deposit its instruments of accession as soon as possible.

During the same period under review, the Project of Change (PoC) took part in the process of awareness creation on the importance of finalizing the government decision making machinery on domestication of the International Treaty Plant Genetic Resources for Food and Agriculture (IT-PGRFA) which Tanzania is signatory. The main objective of awareness and lobbying process was aimed at having a legal framework for regulating access and benefit sharing of Tanzania's plant genetic resources. In the process the question of compatibility UPOV Convention with the IT-PGRFA was critically address where it was found that the two international legal frameworks are mutually compatible.

Awareness creation in Zanzibar

Awareness creation in Zanzibar was also performed so as to ensure the researchers, breeders, scientist and politicians are well informed about the importance of PBR so as to easier the acceptance of the PBR bill (complient to UPOV) in the Zanzibar parliament.

The PoC also participated in providing Tanzania Zanzibar with all the assistance that thought will speed up their process, such as;

-Providing the method Tanzania mainland has used to easier the acceptance of the bill to the Tanzania Zanzibar parliament.

-Put pressure on each parties to play its role in enacting PBR act which is complient to UPOV by 2013.

-Work together with the Tanzania Zanzibar regarding IT-PGRFA by raising awareness so as to easir its domestication.

Outcome and deliverables

The identification of the potentil benefits for Tanzania Complient to UPOV also provided a room for more understanding of the Plant Breeders' Rights issues in the country especially for the breeders, researchers and the farmers.

The awareness creation made the process of understanding about UPOV very successful because it enable the influencial people, the breeders, resarchers, cabinet members understand the importance of having the PBR act complient to UPOV 1991 hence the pass of the Bill in the Tanzania parliament of october 2012. Hopefully this will provide a greater help in the Tanzania zanzibar parliament as well. It also enabled the targeted group to be able to differentiate various agricultural Acts (Seed Act, Plant Protection/Phytosanitary Act) that are in agriculture sector. The were also able to know the need and importance of each in the agriculture sector development for the country and the world at large.

The PoC also played the role in infuencing the domestication of IT-PGRFA in Tanzania because among other issues it was also adressed very well in the awareness creation in both Zanzibar and Tanzania mainland.

This PoC was of importance to the Ministry of Agriculture Food Security and Cooperatives as it provides a greaty deed for the agricultural sector in general. Having complient to UPOV is one of the major role because it will aid in increasing the number of quality seeds in the market hence increase the production of the country. Domesticating the IT-PGRFA is also of value to the country for protecting the natural genetic reources.

The successfull of the PoC will also provide room for our researchers to exchange materials, technologies for development and strengthern of research in the country in general.

Lesson learned and way forward

Tanzania has a need for complient to UPOV so as to be able to increase the number of protected varieties in the country since the current number of relesased varieties are stil very low compared to the countries complient to UPOV. The country being complient to UPOV and also domesticating IT-PGRFA will be of importance for both the breeders, researchers, farmers and the country in general. This is because it will give a room for the country to protect it genetic resources and a room to share with other researchers for development of agriculture.

Since the process of enacting PBR law that is complient to UPOV has reached a good steps. Way forwad is to ensure the domecticating of IT-PGRFA is also in place as soon as possible, the initiatives for domesticating it are already in place hopefully the finalizing of the process will be achieved soon.

Agriculture development is a non stop process in the world due to the climatic changes, therefore it requires a close follow up in every step so as to ensure the farmers have inputs in place regardless of the climatic changes. This can be ensured by having desirable law, materials and techincal people in place for handling those climatic changes. A country can have material, technical people in place but without the law for the protection of their work they might lack the moracle of producing new varieties for the betterment of their country. Therefore Intellectual Property play a greater role in various displine and it has to be in place for the success of that particular discipline.

The Genetic Resources and Intellectual Property Rights cource is of importance to the world due to the growth of knowledge in agriculture and other displine since it aimed at strengthern that particular displine. Accomplishment of the PoC, addresses the need to raise fund so as to be able to train others the

importance of Genetic Resources and Intellectual Property in collaboration with other Tanzanian who also participated in GRIP training programme. This will ensure sharing of what we achieved during the training and come up with a way forwad for development of Genetic Resources and Intellectual Property of the country and world at large.

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Domestication of the International Treaty on Plant Genetic resources for Food and Agriculture

Background and objectives

The International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA also commonly referred to as the FAO Treaty) is the first legally binding international agreement focusing specifically on the conservation and sustainable use of plant genetic resources for food and agriculture. It seeks to ensure conservation of, access to and sustainable use of Plant Genetic Resources for Food and Agriculture (PGRFA), in harmony with the Convention on Biological Diversity (CBD), for sustainable agriculture and food security.
The Treaty establishes a Multilateral System (MLS) for facilitated access to a specified list of PGRFA including 35 food crops and 29 forages balanced by benefit-sharing in the areas of information exchange, technology transfer, capacity building and commercial development. For these genetic resources, which are listed in Annex 1 of the ITPGRFA, the Contracting Parties have agreed on standard terms and conditions that will govern their transfer for the purpose of research, breeding and training. The Treaty also contains sections on general parts that include; farmers' rights, supporting components, and financial and institutional provisions.
Kenya is a contracting party to the FAO Treaty having accessioned to it on 3rd May 2003. Consequently, as a party to the treaty, the country must strive to meet its treaty obligations. In addition Kenya is also a signatory to Conservation on Biological Diversity (CBD), International Union for the Protection of New Varieties (UPOV), World Trade Organization–Trade Related Aspects of Intellectual Property Rights (WTO-TRIPS)

Objective of the POC

Kenya is a signatory but has not ratified the ITPGRFA. Article 26 of the Treaty on ratification, acceptance or approval require that deposit instruments of ratification, acceptance or approval with the Director-General of FAO. Ratification instruments should ensure conformity to the provisions of the treaty. In Kenya, there is currently no legal framework to anchor the domestication of the treaty and no subsidiary legislation for the operationalization of the provisions of the Treaty.
The main objective of the PoC is therefore to facilitate the ratification of the ITPGRFA by Kenya through;

(i) progressing the finalization of the amendments to the Seed and Plant Varieties Act, Chapter 326 of the Laws of Kenya which anchors the establishment of the National Gene Bank for PGRFA; and,

(ii) the develop Rules and Regulations for operationalizing the provisions of FAO – ITPGRFA

PoC activities

PoC Targets

Four core achievements in realizing the PoC were identified and prioritized during the phase 1 of the GRIP training held in Uppsala, Sweden in September 2013. These were;

(i) The review of the Seed and Plant Varieties Act, Cap 326 of the Laws of Kenya,

(ii) Policy & legal framework dialogue with stakeholders to be undertaken through stakeholder workshops and retreats

(iii) Development of Draft Regulations on ITPGRFA

(iv) Adoption and Gazettement of Draft Regulations

Overall PoC Achievements

(i) Review of the Seeds and Plant Varieties Amendment Bill, 2012[39]

As at Phase I of the GRIP 12b training in Sweden, the Bill was already tabled on the Floor of the House and had undergone the 1st reading and 2nd reading on 7th April and 15th August respectively. This Bill underwent its 3rd reading on 11th December 2012 and was subsequently assented to by the President on Wednesday, 31st December 2013[40]. The review of the Seeds and Plant Varieties Act, Cap 326, is targeted at addressing legal gaps that exist in the Seed statute in order to facilitate the industry achieve the National Seed Policy objectives. Specifically the amendments to be introduced cover the following areas:-

(a) Reviewing the (PVP) provisions for conformity with International Treaty on Plant Variety Protection (UPOV) 1991 to which Kenya is a party and to which member countries within Kenya's trading block are acceding to;

(b) Authorization and registration of private seed inspectors to undertake seed testing services to supplement the services offered by the Kenya Plant Health Inspectorate Services (KEPHIS), thereby encouraging self-regulation in the seed industry;

(c) Enhancing of penalties and creation of new offences to deter malpractices in the industry;

(d) **Providing for legal anchorage and functions for a National Plant Genetic Resources Centre to serve as a repository for germplasm for plant and Agriculture and the making of regulations on the same by the Minister for Agriculture. This amended provision is made at Sections 27A of the Seeds and Plant Varieties (Amendment) Bill, 2012** (See relevant section of the Bill referred to under footnote 1)

(e) Expanding the jurisdiction of the Seed and Plant Tribunal to include matters relating to seed certification and compensation arising from seed production and sale in addition to introducing a new section on enforcement of tribunal decisions.

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[39] A copy of the Seeds and Plant Varieties Amendment Bill, 2012 can be accessed under the Bill tracker 2011 at Parliament of the Republic of Kenya website; or Kenya law reform website; http://www.kenyalaw.org/klr/index.php?id=517

[40] Check Parliament of Kenya Hansards for 7th April 2012 (1st Reading), 15th August (2nd Reading) and 11th December 2012 (3rd Reading) of the Bill at http://info.mzalendo.com/hansard/

During debate at the second reading of the Bill, Members of Parliament raised serious concerns on bio-piracy and the need to safeguard local genetic resources and indigenous community knowledge[41]

(ii) Stakeholder Meetings

(a) Breakfast Meeting of Stakeholders to Review Progress Seed Industry Bill

The breakfast meeting on the Seed Bill was held on 28th November 2012 – Serena Hotel in Nairobi. This meeting was attended by the following stakeholders; Seed Traders Association of Kenya (STAK) who were the conveners of the breakfast meeting; Seed Companies, Kenya Agricultural Research Institute (KARI), Kenya Forestry Research Institute (KEFRI), Ministry of Agriculture (MoA), African Seed Traders Association (AFSTA) and an observer Ethiopian delegation which was on a visit to Kenya.

The meeting agreed on the provisions of the Bill and recommended further review to provide for stiffer and more deterrent penalties for checking adulteration and faking of seed by merchants. STAK was given the mandate of engaging the Parliamentary Committee on Agriculture, Livestock and Cooperatives in lobbying for the change and hastening of the Bill process

(b) Meeting of stakeholders on Parliamentary Committee on Agriculture, Livestock and Cooperatives

Because of the busy Parliamentary Calendar STAK management scheduled but did not succeed in holding a session with the Parliamentary Committee on Agriculture, Livestock and Cooperatives. They however have written submission to the committee on the issues raised during the breakfast meeting at Serena Hotel

(c) Development of Zero-Draft Regulations[42]

The Zero draft Seeds and Plant Varieties (Conservation, Access and Benefits Sharing of Plant Genetic Resources for Food and Agriculture) Regulations, 2012 was developed by the committee of the

Activities undertaken after the Bangkok meeting

As at the mid-term review on Bangkok, Thailand, the outstanding major activity was the adoption and gazettement of the draft ITPGRFA Regulations. This was to be achieved through the undertaking of the following sub activities:-

(i) Hold a retreat to finalize the draft Seeds and Plant Varieties (Conservation, Access and Benefits Sharing of Plant Genetic Resources for Food and Agriculture) Regulations, 2012[43];

(ii) Hold a key stakeholders workshop for validation of final draft Regulations and harmonization of regulations with NEMA Legal Notice (L. N. 160) to exclude PGRFA ;

(iii) Preparation of briefing notes and submission of the draft Regulations to the Minister for Agriculture's approval;

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[41] Check Parliament of Republic of Kenya Hansard of 15th August 2013 and in particular, Hon. Millie Mabona Odhiambo's contribution at http://www.kenyalaw.org/klr/index.php?id=765 or www.**parliament**.go.ke/index.php?option=com...id...**bill**

[42] See attachment on ITPGRFA Regulations, 2012

[43] One of the 5-day retreats had been planned for 17th to 22nd December 2012 was postponed to 14th to 18th January 2013. It will now be held from 28th January to 1st February 2013 as it was affected by the delay in passing the GoK Supplementary Budget. This budget has since been passed.

(iv) Forward draft Regulations to the State Law Office for legal drafting and onward submission to the Government Printer; and,

(v) Publication of the Regulations.

Due to the delays associated with the formation of the Jubilee Government following the elections held in March and the subsequent election petition, not much progress has been realized. This is because the new government Ministries and the appointment of the new Cabinet Secretaries took place towards the end of May 2013. The following have however been achieved;

(i) One retreat to held to review the zero draft Seeds and Plant Varieties (Conservation, Access and Benefits Sharing of Plant Genetic Resources for Food and Agriculture) Regulations, 2013;

(ii) Draft Seeds and Plant Varieties (Conservation, Access and Benefits Sharing of Plant Genetic Resources for Food and Agriculture) Regulations, 2013, forwarded to the Ministry of Environment for comments and concurrence;

(iii) Briefing notes for submission of the draft Regulations to the Cabinet Secretary for Agriculture, Livestock and Fisheries ready and awaiting comments from Cabinet Secretary responsible for matters of environment.

Way forward

The following steps are outstanding but will be necessary to ensure adoption and gazettement of the Seeds and Plant Varieties (Conservation, Access and Benefits Sharing of Plant Genetic Resources for Food and Agriculture) Regulations, 2013;

(i) Forward draft Regulations to the State Law Office for legal drafting and onward submission to the Government Printer;

(ii) Liaison with the treaties and convention department within the Ministry of Foreign Affairs for concurrence; and,

(iii) Due to the new Parliamentary standing orders that created the Parliamentary Committee on Delegated Authority and the enactment of the Legal Instruments Act, 2013, it is now a requirement that all subsidiary legislation be subjected to consultations and broad census developed in addition to forwarding to parliament for approval before operationalization;

(iv) Publication of the Regulations.

This outstanding work is likely to take longer than earlier estimated and it is envisaged to be complete by end October 2013.

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Strength and Weakness of GR management and use in Tunisia

Background and objectives

Tunisia ratified in the last decades the most international conventions and treaties dealing with genetic resources (CBD, FAO treaty, Cartagena Protocol, Forest Biological Diversity (COP 6) and mountains (COP 7), The biological diversity of inland waters (COP 4), Marine Biodiversity, Coastal (COP 7) and islands (COP8), Biological diversity of dry lands (COP5) and sub-humid, …).

A number of institutions are working in these fields and a legal framework is established for a better management of national genetic resources and bio-safety.

Although the existence of these dispositions, the management of genetic resources are not enough strong to preserve and to ensure a best management and better intellectual property rights application.

A study of the administrative and legal dispositions and technical facilities in the country is the objective of this project of change in the target to highlight the strength and weakness of this system and then find solutions to a fair gene exchange with international institutions and ensure the good application of access and benefit sharing.

The institutional Biodiversity

The institutional implementation of the CBD and the Bio-safety Protocol in Tunisia is important. Institutions directly related to the implementation of the Convention include the National Commission for Sustainable Development, the focal structure and focus of the CBD, the National Commission on Bio-safety, the focal point of the Cartagena Protocol. In addition to these institutions departments and institutions related to biodiversity management and sustainable use of resources in general. These are the Ministries of Environment and Sustainable Development, Agriculture and Water Resources, Public Health, Higher Education and Scientific Research of scientific research institutions and institutions related to other protocols and conventions.

In an effort to coordinate all activities related to sustainable development, including monitoring and evaluation of the implementation of international conventions on various environmental components, Tunisia has established the **National Commission for Sustainable Development (CNDD)**, which was responsible design, validation and monitoring of the implementation of strategies and national action plans for sustainable development. This Commission is chaired by the Prime Minister. It consists of representatives of all stakeholders in sustainable development including public institutions, private sector, NGOs and research organizations. This Commission was established in 1993 and strengthened in 1995.

The Ministry of the Environment and Sustainable Development has appointed a focal point of the CBD in line with the recommendations of the Convention, a focal point of the Cartagena Protocol, and a focal point of Nagoya protocol. Its mission is to coordinate all activities for the implementation of the protocol, to prepare national legislation, to ensure capacity building in this area and to liaise with the secretariat of the Protocol.

Legislative and institutional framework

- In the management of natural resources land, is high on the text of Law No. 88-20 of April 13, 1988, recasting of the Forestry Code.
- Law No. 72 of 1992 of August 3, 1992. It relates to the revision of legislation on protection of plants;
- Law No. 95-70 of July 17, 1995. It concerns the conservation of water and soil;
- Law No. 30 of 1999 April 5, 1999. It focuses on organic farming;
- Law No. 99-42 of May 10, 1999. It relates to seeds, seedlings and plant varieties protection;
- The Decree of 11 August 2003 establishing a gene bank. She establishing a master plan for botanical gardens.

- Law No. 68-4 of 8 February 1968 on the protection of seals in Tunisian territorial waters;
- Law No. 95-73 of July 24, 1995 It is on the public maritime domain;

The environmental protection in Tunisia is provided by a quite important legal arsenal. Since independence a number of codes and laws relating to the protection of certain elements of the environment have emerged including ,for example, the Forest Code (1966 and revised in 1988), the Water Code (1975), the 1986 law on cultural property ....

The pace of preparation of laws and regulations on the protection of the environment has increased since 1988, when the creation of the first public institution in charge of environmental protection in Tunisia: the National Agency for Environment Protection (ANPE).

In 1991, for the first time in Tunisia, a ministry for the Environment was created. During the last two decades, several public institutions operating in the environmental field have been successfully implemented, such as the Agency for protection and development of the Coastline (APAL) created by Law No. 95-72 24 July 1995, the International Centre for Environmental Technologies of Tunis (CITET) created by Law No. 96-25 of March 25, 1996, and the National Gene Bank (BNG),established by Decree No.2003-1748 of 11 August 2003.

Similarly, a set of texts has strengthened the legislative and regulatory framework related to environmental protection and biodiversity preservation, These texts are largely influenced by international conventions ratified by Tunisia.

The transition from a purely environmental management to deeper approaches focused on sustainable development as a strategic choice to trace the public territorial and sector-based policies through wider participation of various public and private stakeholders is now the appropriate environment guiding the work of codification the Ministry has opted to engage over the next years.

The systemic level

- The physical achievements are part of the institutional framework of the implementation of the Convention to the example of the national study on biodiversity, the National Strategy for Biological Diversity, the National Action Plan for the conservation and sustainable use of biodiversity and reports carried out under the monitoring and evaluation;
- The National Study on Biological Diversity has identified 3,682 species and 2,137 species of inland wetlands and marine resources;

The National Strategy for Biological Diversity has identified four priority areas of intervention:

1. a better understanding of national biological diversity;
2. better planning for the sustainable management of biodiversity and ecosystems.
3. a consideration of priorities for action particularly with regard to ecosystems and species most at risk;
4. the integration of policies and programs for conservation and sustainable use of resources in plans for economic and social development of the country.

The National Action Plan identified the six programs of intervention:

1. the fight against genetic erosion;
2. protection of Natural ecosystems;
3. proper management of ecosystems;
4. the integration of biodiversity into sectoral and strategic choices;
5. establishing an institutional and regulatory framework;
6. training, information and improving knowledge on biodiversity.

Major achievements

The achievements in the thematic aspects of the CBD are very rich and very diverse. They include agriculture and agricultural biodiversity, forests and mountains, inland waters, coastal and marine resources, islands, dry and sub.

Among the major actions are mainly the creation of a gene bank for plant genetic resources, design and implementation of the agricultural map, the implementation of the Integrated Rural Development Program (IRDP), the Integrated Agricultural Development Projects (PDAI) and Natural Resource Management (PGRNI and II), the creation of national parks, the development of management plans and integrated development.

The major actions in the agricultural sector that have a direct impact on biodiversity are, essentially, as follows:

- The establishment of the gene bank
- The design and implementation of a national agricultural map
- The program of integrated rural development IRDP;
- Integrated projects for agricultural development and natural resource management. PDARI / PGRN;
- Project for the establishment of botanical gardens;

Various projects were carried out as part of the forestry strategy. It can include:

- Forestry Development Project PDFI, PDFII.;
- Proposed integrated forest management FGIF;
- Project to support the sustainable management of forest ecosystems GEF / GTZ;
- development of forest areas PDZF;
- Projects relating to the management of protected areas of forest aspect (Feija, Chaambi, Bouhedma, Ichkeul Jbil).
- The implementation of pilot integrated development (OPDI);
- The implementation of development activities in mountain areas of North West (PDZM);

Also, Tunisia has 1600 km of coastline (including islands), characterized by large diversified natural resources with 60 islands of different sizes and 100 coastal wetlands. Tunisian coastal zone is an area of concentration of economic activities and human (69.2% of the total population). The conservation of biodiversity and its sustainable use is a national challenge. Tunisia has a number of marine and coastal protected areas (Islands and Zembra Zembratta, biosphere reserves, SPAMI; the Galite and Galiton, nature reserves; Knaeïss the archipelago, nature reserve, SPAMI…)

The NGB (National Gene Bank)

The National Gene Bank (NGB) was inaugurated in November 2007, and its primary mandate is the conservation and evaluation of plant genetic resources, animal and micro-organisms as well as coordination between the various operators in the area and promoting conservation activities and sustainable use of genetic resources.

NGB, under the Ministry of Agriculture and the Environment (Environment), works with all facilities and operators in the field of genetic resources as part of a national network consisting of nine clusters. It has a storage capacity of 200 000 accessions

The national gene bank is the national focal and coordinating institution for the conservation and sustainable use of the biodiversity with the following roles:

- Development and updating of the national strategies and action plans including the implementation of international and regional agreement related to biodiversity conservation and sustainable use;
- Coordination of all activities related to genetic resources and sustainable use;
- Ex situ and in situ /on- farm conservation of biodiversity;
- Coordination of access and exchange of genetic resources;
- Monitoring and evaluation;
- Capacity building and development
- Increasing awareness through a website, a newsletter, media, and fairs
- international cooperation

Points of Weakness of the genetic resources management:

- Coordinating the bio-prospection in the country with all stakeholders
- Supervising the scientific research in the field of biodiversity
- Focal point for exchanging of the germoplsam within the country and internationally
- less synergy between all the convention at national level

FAO treaty

The loss of biodiversity is closely linked to land degradation, climate change and non availability of water. The combined effect of these phenomena affects, probably, well-being of humanity and especially rural areas.

Aware of the magnitude of the negative impact of the loss of biodiversity, Tunisia has ratified the three UN Conventions (CBD, UNFCCC and CCD) and was among the first signatories of the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA).

Two proposed project were approved by the secretary of the treaty:

- First project for NGO " Sauvegard of the Oasis Gafsa"
- Second project for NGB Tunisia for the on-farm conservation of the durum wheat and barely
- Other projects with Agronomic research Institute are already approved and will be activated during this year, dealing mainly with Leguminosae.

Problems and Obstacles

The big problem consist in the multitude of institutions dealing with the subject, these institutions belongs to different Ministries and most of the time there is no enough coordination between each other to solve problems of GR management.

In other side, the legal framework is not enough coherent, and presents a lot of luck and complication which result in the impossibility to make in application recommendations and obligations of international conventions and treaties. This is very clear now in the action of GR transfer and exchange. Although Tunisia ratified the majority of international conventions and treaties, it doesn't dispose on a specific National low which makes in order the transfer of GR and the exchange with other countries and international institutions. This weakness makes the use in a proper way of the genetic resources by foreign campanies and the insurance of benefit sharing very difficult.

The BNG(National Gene Bank) created in 2007, still have difficulties to overcome administrative problems, luck of technical stuff and clear legal dispositions on Genetic resources management. Gene exchange and transfer with foreign institutions is still the responsibility of Ministry of Agriculture (General Directorate of control). Ministry of Environment, the first responsible on GR has no legal disposition to control these exchange actions.

It was noted that some native GR were transferred out of the country without any authorization, and there is no dispositions to stop it and ask for benefit sharing.

Actions to overcome problems

To have a clear idea about how genetic resources are managed, it was necessary to contact the institutions implicated in this matter. The major part of GR activities are related to Ministry of environment and its institutions.

Institutions directly related to the implementation of the Convention include the National Commission for Sustainable Development, the focal structure and focus of the CBD, the National Commission on Bio-safety, the focal point of the Cartagena Protocol. In addition to these institutions departments and

institutions related to biodiversity management and sustainable use of resources in general. These are the Ministries of Environment and Sustainable Development, Ministry of Agriculture and Water Resources, Ministry of Public Health, Ministry of Higher Education and Scientific Research and scientific research institutions and institutions related to other protocols and conventions (FAO treaty, Forestry, ...).

In the other hand, Tunisia signed the Nagoya protocol, and the Ministry of environment starts the process of ratification. A national fund is attributed to develop the genetic resources management and starting the application of Nagoya disposition for access and benefit sharing (ABS).

The most important action to be prepared is to sensibilize persons dealing with genetic resources management and explaining the importance of ABS for a sustainable and fair use of these resources.

In the same way, Ministry of environment in collaboration with United Nations Organization projects is preparing a study to detect institutions and NGO's working on GR., and persons and experts in different fields(scientists, managers, loyers,…) dealing with the use of GR.

So, Funds from Nagoya protocol funds are allocated to developing countries for a better establishment of Nagoya protocol.

- Small scale funds: are mainly used for sensibilization
- Large scale funds: PNUE (United Nation Environment Program) regional program for the reinforcement and establishment of Nagoya protocol.

This latest project, will help to identify institutions implicated in this activity and precise the role and its contribution in the GR management. This study will help to overcome the fragmentation of actions, and contribute to create a unic focal institution which will have the responsibility of delivering authorization of GR use and ask for benefit sharing.

This work will contribute also to:

- The establishment of legal framework;
- To develop procedures for GR management and ABS;
- To clarify the NGO's contribution.

Conclusion

Although Tunisia ratified the most important conventions and treaties (CBD, FAO,…), and established many institutions involved in this field, management of GR faces many problems related mainly to a luck of organization and cooperation between different institutions. Also, it was detected that the national regulation is not enough strong to ensure a better GR access and use. Civil society starts to be active, but association acting in this subject still not to be very efficient and need to be more involved and getting more possibilities to ensure better access and benefit sharing for the local communities in the country. Some National institutions are not efficient. The National Gene Bank still have a very weak position in GR management. It needs reorganization at different levels to become efficient.

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Are the inventors benefiting from IPR's in Ecuador- A study for government employed breeders (INIAP-case) to negotiate a percentage of royalties from their inventions.

Background

In the world since the beginning the agriculture have used more than 7000 species for food, but today the humanity is fed with 150 cultivated species; 30 crops provide 95% of our energy consumption, of which only 12 species of plants provide more than 70 percent of food, and just four: rice, corn, wheat and potatoes, supplying more than 50 percent of human food.
Related to the genetic variability, Ecuador being a small country in area (275,830 km^2), is one of the countries with a high number of plant species per unit area in South America. The flora comprises about 25.000 vascular plant species. In Rio Palenque Scientific Forest, province of Los Rios is considered among the most diverse forest in the world, having more than 1250 vascular plant species, belonging to 136 families in less than one km^2 (Tapia *et al*, 2008).
There are several institutions, such as national institute, universities, foundation, herbarium or scientific forestry that are conserving genetic resources being those in situ or ex situ. The Instituto Nacional Autónomo de Investigaciones Agropecuarias (INIAP) in Ecuador keep several collections, in situ, ex situ, in vitro, crop seeds, etc; locally collected in the past (at the present the Environmental Ministry have regulation for collecting local or regional germplasm) or imported from partner countries.
While food sovereignty depends largely on state policies, INIAP must have enough to meet institutional technology demand, especially of those related to the production of items for domestic consumption, having priority items such as rice, potatoes, corn, beans and Andean grains, as a main research programs, but also works with species such as cocoa, coffee, fruits, oilseeds, legumes, oil palm, rubber, forestry, pasture and livestock, piñon, banana, plantain, cassava and sweet potato, etc. From all these species INIAP keep around 17.920 accessions. In Ecuador, mostly of the bred species used by the farmers are coming from INIAP, however there is some universities and private companies which use to improve material to sell at the local market. In the case of rice, corn and soybean cultivars, more than 80% of the area is cultivated by INIAP's seeds. But this institution still does not adopt a strong position to register the new cultivars to IEPI (Ecuadorian Institute of Intellectual Property). Usually those cultivars are released immediately after obtained, being the private companies which will propagate new INIAP's cultivars, having not any royalties for the institution. At the moment the government has decided to handle seed production instead to provide to the private companies, but those laws are still on preparation. However, even that Ecuador have signed those related agreements such as UPOV or FAO-IT, etc, there is not an institutional legislation or mechanism applied as INIAP when new varieties are obtained for sharing benefits from the breeding work and is still unclear the IP process to exchange germplasm or new crops. INIAP have to looking for the best way to have a functional IP policy for the coming improved crop to be applied to exchange material. As an example, cocoa trees bred at INIAP have been donated to France and Papua New Guinea through collaboration projects mainly for research in their countries, but those cultivars are not granted yet by IEPI having some kind of risk to be used as new commercial cultivars in those countries.
Registration of new varieties takes some years to get the approval and depends on the type of crop to be registered. However, according to experts IEPI-Ecuador (Troya E. 2013, personal communication) they can start their protection procedures before releasing their material, or having the time of a year in

between to register. It is the researcher who originally had the idea; he seeks the methodology and budged, and conducted the study, ending in an improved variety. These inventions should be recognized to the inventor for his intellectual contribution, although it is a government employee, he or she has been the one who is keeping in a permanent renewal of varieties for the Institute, allowing a high annual demand, where INIAP is receiving a merit nationally and internationally.
This study aims to determine the approximate percentages that a company or an individual breeder receiving state when it generates and delivers a new variety. This data will be used to prepare a proposal for an incentive program for INIAP's scientists involved in plant breeding.

Objectives

• To identified that the new granted varieties registered by IEPI belongs to private companies or government institutes.
• To evaluate in which percentage these new granted varieties keep in generating the expected profits, and;
• To identify conflictive cases where the inventor has to incurring legal's demands to protect their rights.

Activities and Methods

Through visits to the Ecuadorian Institute of Intellectual Property (IEPI), they were very collaborative and provided the information necessary to carry out this investigation. Files were reviewed having the information such as name of variety, botanical taxon, the application number, the certificate number of the breeder, date of issue, expiration date and reason, applicant and owner's country. This information was used to accomplish the first objective, as is stated in the project.

For the second objective, polls were prepared to be applied for individual companies or breeders who have obtained the intellectual property rights, performing the following questions.

1. The varieties or inventions that have being conferred intellectual property rights remain still generating expected earnings?.
2. Are some percentage of the profits used to continue generating new cultivars?.
3. How long times the varieties remain in demand and if the company stop using once is not longer required?
4. Do the company have the breeders participating in the genetic improvement of new cultivars and how much percentage of royalties they receive?
5. The utilization of a new cultivars belonging to the company, has faced problems by unauthorized persons who were using it?, and what mechanisms were used to solve the problem?.
6. In which countries were conducted the studies of distinctness, stability and uniformity of the new cultivars?.
7. How long will take since the genetic improvement until to obtain the granted IPR?.
8. Are the new cultivars well accepted abroad, in which countries has a greater impact?
9. Are there some countries that have requested permission from the breeder to use the new material as a source of genes for breeding or for commercial production? Which countries?
10. Permanent breeding companies can keep steadily in international markets?.

Finally, to address the third objective was interviewed the technicians responsible for the statistical area of IEPI who handled administrative guardianships, which are legal entities to enforce the right of the breeder, when third parties without your consent is exploiting a protected variety.

Outcome and deliverables

Related to the objective 1, in Figure 1, A shows the results of the varieties registered since 1995 until 2010. Note that in 1995 there were 212 applications, of which only 28 of them years later received the Intellectual Property Rights, the rest were annulled for breach of Article 35 b) D345 of IEPI. Varieties that were not obtained the IPR, after several years passed into the public domain (cases were highly variable, some lasting from 7 to 10 years). The same Figure shows that from 1996 to 2002 declined the requests, but there was a balance between conferred and not conferred certificates. From 2003 through 2010 shows that most of the requests were conferred the IPR. The Figure 1, B, data from 1995 through 2012, it shows that there are several countries that have requested to be granted in Ecuador, the main observed countries were: Netherlands, Germany, France, United States and Israel, mainly for rose cultivars or floriculture species, that because Ecuador is one of the major producers and exporters of these species. Netherlands and Germany have 186 and 104 granted varieties, respectively, compared with Ecuador that although they have not granted certificates, the applications are still pending. According to IEPI information, the analyzes to confer rights such as checking for distinctness, uniformity and stability are mainly conducted in Holland, although they have presented a new plan for tropical species to be conducted in Ecuador, so that the screening can take place in impact areas from which the new cultivars are from. Figure, C shows the number of certificates issued and not specifically conferred, applied for several species in Ecuador. It is observed that the IPR mostly were requested in Roses. In Figure 1, D is a description of the main species that Ecuadorian breeders have requested for their rights at IEPI. Application data are from 2001 through 2012. There is not variety with right granted, there are some that have not been certified, however, shows that most are still waiting. With these results, proposed in the objective 1, has been identified that the most granted inventions at IEPI come from the private sector and few come from government sectors.

The results related to objective 2, it show that in Ecuador there is very few companies that have obtained the IPR, so there was little chance of reaching the objective. This means that the companies are abroad, making it difficult to perform the respective surveys. However, we contacted with Ecuadorian Brown Breeding Co. where the survey was conducted. Even if it is just one company, their answers can give an idea through their answer to explain this objective. Summarizing their answer they mentioned that they are just new in developing new varieties, and recently start to commercialize the new varieties expecting good profit, but is still earlier to mention it. All the incoming at the beginning will be used to generate new varieties. Their cultivars are only in the national market and they keep the new variety for a minimum of 6 years or some cultivars can be for 20 year, it is depend on cultivars. The breeders are well paid in his company but didn't mention about the royalties that the researcher could receive. They have faced some problems because some other companies have been using they rose's cultivars, they are in the administrative tutelage to complain their rights. Holland is the country where they use to do the DUS evaluation. IEPI have granted their cultivars 7 years after application. Still there are not companies which want to use their cultivars from abroad and finally they mentioned that about 20 to 30% of the genetic material must be renewed every year to keep the rose's business in the market.

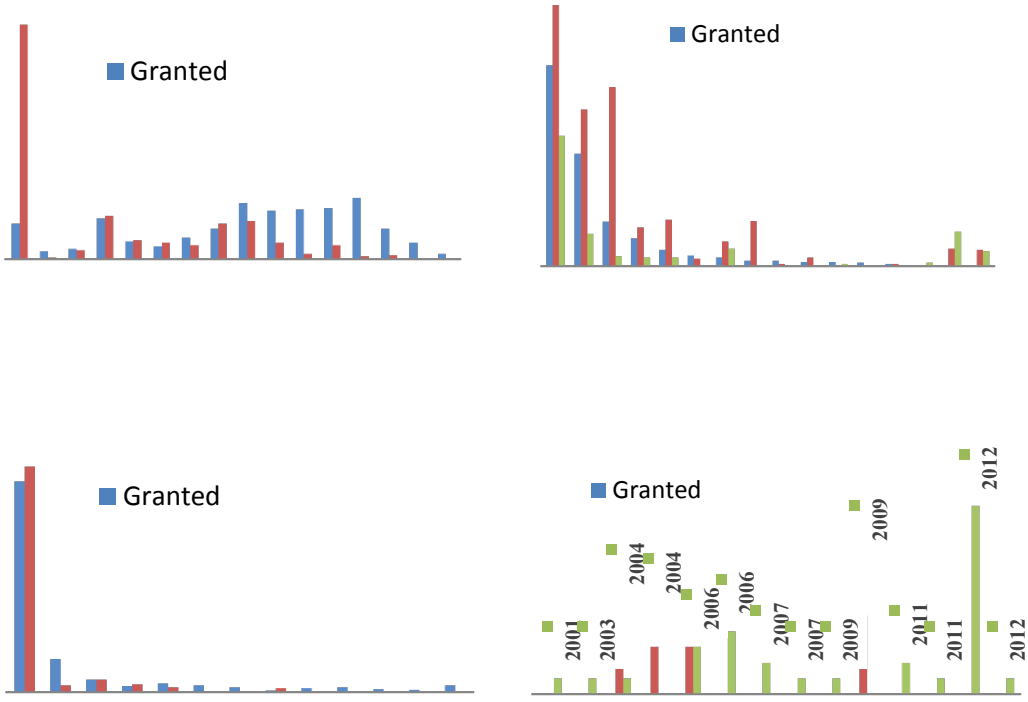

Figure 1. Granted and non granted species registered from 1995 to 2010 in Ecuador (A), countries applying for IPR from 1995 to 2012 (B), improved species applied for IPR (1995-2010) (C) and species that Ecuador has requested IPR (D).

Regarding to the objective 3, as is called "Administrative tutelage" at IEPI, which are problems originated primarily by unpaid royalties from contracts with international companies who had the granted IPR in Ecuador. There were 470 cases and all claims were resolved, according to information provided by the IEPI.

It should be mentioned that using this generated information together with the data from several countries such as Argentine, Uruguay, Mexico and Colombia, will serve to prepare a proposal that may lead to breeders working at INIAP to get a percentage of royalties for new varieties as an incentive for their efforts and dedication.

Problems / Obstacles / support needed

It was just one survey able to be performed, because IPR were conferred to international companies which are difficult to access the respective contacts.

Preliminary conclusions of work done so far

Ecuadorians breeders does not have any cultivar granted the intellectual property right at IEPI, despite being a predominantly agricultural country, and there are many varieties of different species grown

commercially throughout the country, and even many of them correspond to the releases made by INIAP. Although the private seed companies, that sell many introduced varieties such as rice, soybeans and corn, even them do not make the appropriate register in IEPI. From the observed statistic, in recent years there is a boom for soliciting the intellectual property right and most of them have been granted the rights, which mean that there is already interest from breeders to have protection for their inventions, and INIAP must be in the future the most users of IPR to grant new cultivars.

Lesson learned and way forward

Genetic resources of new cultivars in Ecuador are not being effectively protected, being one of the weak points that can affect to the escape of genetic material and important genes to other countries. IEPI should make a more aggressive campaign among research institutes, universities, private industry or other institution dedicated for breeding, to apply for intellectual property rights for their inventions. IEPI could be a connecting institution that can provide insights about how to manage the steps to get the IPR before and after registration to make it easy for the users. Finally, I would like to mention that since IEPI and INIAP are government officials, they must be find a way for working together for saving time to grant IPRs to the new cultivars in a short time, coordinating actions and following the request steps at the time when the new varieties are in the process to be obtained.

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IP-TK databases National legal frameworks databases

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Creation of the legal frame for sustainable use of agricultural genetic resources

Background and objectives
Rich gene pool of Montenegro represents an important natural resource for food production and agriculture in general. The richness and diversity of Montenegro's flora and fauna is recognizable feature of Montenegro, especially if a relatively small size of country is taken into account. In Montenegro 3600 species and subspecies of wild vascular plants have been recorded so far. Index of number of species per unit area in Montenegro is 0.837 and is one of the largest in Europe, determining the territory of Montenegro as one of the most important centers of floristic diversity in Europe.

Thanks to financial support from the Swedish International Development Agency (SIDA) in 2004 in the Biotechnical Faculty in Podgorica National Plant Gene Bank was founded and activities on inventorying, conservation, regeneration, characterization, genetic identification, documentation, and creation of a data base were significantly revived, as well as the establishment of regional cooperation.
After independence (2006), Montenegro became a member of important International organizations (FAO, 2008, ECPGR, 2009 and AEGIS, 2010) and adopted very significant International regulations, such as the UN Convention on Biological Diversity (2006) and the International Treaty on Plant Genetic Resources - ITPGRFA (2010). In 2007, the National Programme for conservation of genetic resources in agriculture (2009 - 2013), and Action Plan on Conservation of Genetic Resources in Agriculture (2009 - 2013) in 2008 were adopted.
Intellectual property right is still unknown instrument in genetic resources. This area is covered with national IPR legislation, but the procedure is still This area is covered with national IPR legislation, but the practical application of the Law is facing many difficulties and obstacles. Until now, we didn't have any request in genetic resources area.
Although the development of Montenegro is based on the principles of ecological and touristic country and thus based on the sustainable development concept, the strategies of sustainable use of agro biodiversity are not yet defined. Priceless wealth of gene pool in Montenegro deserves far bigger attention that it currently has, so the necessity to develop acceptable development patterns trough witch the abundance of indigenous material and numerous traditional biotechnologies would be used in development of the country.
In the crop production in Montenegro the absolute primacy have high yielding imported varieties and the situation will probably stay the same in the future. However, a better use of agro-biodiversity, which includes the development of agro tourism and everything that follows this activity, would create the conditions for more intensive rural development. Such concept would (by producing unique agricultural products of high quality, partially based on the usage of old varieties of agricultural plants) give a chance to less developed regions of Montenegro to compensate their low economic development rate. In this way, diversity of cultivated crops would increase and bigger security of food production would be ensured.
Plant genetic resources for food and agriculture are in the scope of responsibilities of the Phytosanitary Directorate of Montenegro and Biotechnical Faculty is authorized institution for activities related to PGR. With adoption of the Law on Ratification of the Treaty for Plant Genetic Resources, provisions of this Treaty shall be automatically included in the legal system of Montenegro. For these reasons, as a programme leader for plant genetic resources in my county, I have chosen the adoption of appropriate legal acts for implementation of this law, as the main goal of my PoC. Trough this system the Montenegrin Plant Gene Bank will be introduced into the legal system.

Activities
After my return from Sweden I had a meeting with management and the administrative stuff of Phytosanitary Directorate with the aim to find a legal basis for the implementation of the proposed activities and I've received full support. With the aim to introduce Montenegrin Plant Gene Bank into the legal system it is decided to immediately start drafting relevant secondary legislation and concluded that Montenegro, as a signatory of the International Treaty for Plant Genetic Resources - ITPGRFA doesn't need a law on plant genetic resources.
For this purpose, in October, a two-day workshop was held in Phytosanitary Directorate with participants from management and administrative service of Phytosanitary Directorate, leader of programme for plant genetic resources, leaders of working groups of Montenegrin Plant Gene Bank, representatives of the University and other institutions involved in genetic resources and NGOs. With profound review of all legislation covering this area, it is concluded that the legal basis for the realization of my PoC is in the Law on Agriculture and Rural Development, Article 56. At the workshop other issues on plant genetic resources were discussed as well. Proposal, to include in the Programme of activities for 2013, in the part

related to the adoption of legislation, development of *Rulebook on Plant Gene Bank*, and to establish in the Programme of phytosanitary measures, a budget line for plant genetic resources, was sent to the Phytosanitary Directorate of Montenegro.
Phytosanitary Directorate promptly responded to these proposals and on 16th November 2012 formed a Commission for the preparation of the Draft of the *Rulebook on Plant Gene Bank* (Decision No. 320/12-0101-907). As the deadline for this task it is indicated:

- The first quarter of 2013 for Draft of the Rulebook
- The second quarter of 2013 for public discussion and proposal of Rulebook

The draft of the Rulebook will be on the website of the Phytosanitary Directorate of Montenegro (http://www.fito.gov.me), and adopted Rulebook in the Official Gazette of Montenegro.
All information and activities related to plant genetic resources will soon be available as the information system of the Phytosanitary Directorate of Montenegro - "phyto-info" is currently in the development phase (for this purpose, the tender was announced in December 2012.).
In order for the *Rulebook on plant gene bank* to be fully implemented and to create a legal framework within which the Montenegrin plant gene bank will function in full capacity and be prepared for the implementation of ITPGRFA, it will be necessary to thoroughly study all other laws and documents related to the field of genetic resources:

- Law on Ratification of the Treaty for Plant Genetic Resources
- Law on Agriculture and Rural Development
- Law on Seeds
- Law on Planting Material
- Law on the Plant Varieties Protection
- Strategy for Food Production and Rural Development
- National Programme for the conservation of genetic resources in agriculture
- Action plan for the conservation of genetic resources in agriculture etc.

All accessions deposited in the Montenegrin Plant Gene Bank are available at EURISCO basis, as well as some other bases around the world. Although the plant genetic resources of Montenegro are virtually internationally invisible, exchange of material with foreign countries has so far been done only on the basis of personal contacts. As a signatory of the ITPGRFA, Montenegro is committed to make available to the international community all species included in Annex 1, through the multilateral system of access and benefit sharing (MLS).
During the preparation of this PoC we received new requirements for samples of plant material from Annex 1 and the Montenegrin Plant Gene Bank was able for the first time since it was founded to transfer conserved material via standard material transfer agreement (SMTA).
As the lack of knowledge about the conserved material is a serious problem and the main reason why the breeders rarely ask for the deposited material and, nevertheless there is an obligation that all data on conserved material must be made available to the MLS, we made a detailed plan and specific target species (olives, potatoes, pomegranate) for evaluation in 2013. These activities will be funded from the agricultural budget.

Outcome and Deliverables
In late April, as it was planned Draft of the Rulebook has been made. Regardless the lack of human resources in the field of plant genetic resources, and the obligations that the state administration has in negotiations with the EU, we believe that in the second quarter of 2013 public discussion will be held and drafted proposal of Rulebook will be made. The adoption of the *Rulebook on Plant Gene Bank*, which will be executed according to the planes, will create a legal framework for its operation and raise the quality of work at a higher level. The aim of this Rulebook is to define the unclear position of the Plant Gene Bank at the moment and to further support it trough the budget. In this way, conditions will be

created for the full implementation of the International Treaty for Plant Genetic Resources - ITPGRFA. Implementation of this treaty will mean both implementation of Multilaterals system (MLS) and access and benefit sharing of the germplasm (ABS). All mentioned will lead to better conservation of biodiversity, sustainable use of genetic resources and strengthening of institutions responsible for genetic resources. Montenegrin plant gene bank will be ready to become a part of international activities and commit to all obligations arising from ITPGRFA.
Bearing in mind that the Montenegrin Plant Gene Bank to the very beginning of this PoC did not have any full time employees Phytosanitary Directorate hired one full time employee (graduate from the Biotechnical Faculty) trough the Programme of training of young professionals in Montenegrin Plant Gene Bank. This is considered as a very important activity of the project. The downside of this approach of solving the problem of full time employees in the MGB is that the individual will soon become trained (after 9 months) and will have to leave the gene bank and its location will occupy the new intern. Thanks to this program Phytosanitary directorate included a component related to plant genetic resources in the Programme on Phytosanitary Measures for 2013. Funds from this program (5500 EUR) will predominantly be spent on activities in vitro conservation of potato and procurement of the equipment in the laboratory for tissue culture.
Due to project activities SEED Net 2007, Montenegro has established programme of budget measures for Genetic Resources (Support program of conservation and utilization of genetic resources) for the first time. Unfortunately, after only two years the funding terminated due to the global economic crises. Encouraged by all above mentioned activities, we directed our activities toward Ministry of agriculture and rural development. As a result of these activities, couple days ago we managed to renew budget programme for PGR (established as activity of the SEED Net project). In 2013, 40000 EUR are approved that will be used for: support of animal genetic resources, proceeding of characterization and evaluation on target plant species, maintenance of field gene banks, support for on farm growing of local varieties and activities of public action.
Since the establishment Montenegrin Gene Bank has sent samples in number of countries (Italy, Slovenia, Albania, Bosnia and Herzegovina, Croatia, and Macedonia). All samples were sent on a friendly basis, without signing any additional documents. In March 2013 we've sent through SMTA 18 samples to Norway (Norwegian University of Life Sciences). It was the first SMTA filled out by the MGB. We plan to sign SMTA afterwards for the previous transfers.
As the validity of the current Program and the National Action Plan for Genetic Resources ends in this year, activities were initiated to develop new ones.

Conclusions and lesson learned
In addition to the activities initiated by the adoption of Rulebook on plant gene bank, the project has significantly revived other activities on PGR. In addition, it is responsible for providing two budget lines for PGR and obtaining full time employee in MGB. During its implementation FAO ITPGRFA started to apply first and SMTA filled out. Also it is important for the beginning of the development of new Programme and Action Plan for genetic resources.
Activities done in the phase of development of the PoC enabled a comprehensive and realistic look at the situation in the field of plant genetic resources, understanding the importance of existing international conventions, finding clear boundaries of their competence, recording our own weaknesses and defining priorities in the future. Defining and implementing the policy in this area will provide a significant contribution to the concept of sustainable agricultural development based on the liaison of economic development and environmental preservation.
With the *Rulebook on Plant Gene Bank*, Montenegrin Plant Gene Bank will be ready to make existing germplasm available to all institutions and individuals (domestic and foreign) who express an interest (in recent months increased the number of requests from abroad for the material deposited in the Montenegrin gene bank).

Montenegrin Plant Gene Bank, as an important factor in the national policy, will have a key role in these processes in the future.
Regardless the fact that Montenegro does not have a clear vision of how to use conserved material, all activities of its preservation will continue in the future.

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Revision of existing national and international legislation in Serbia related to PGRFA

Background and Rationale

Serbia is characterized by a huge geographic and biological diversity reflected in the richness of its indigenous flora which exists as various vegetation formations of terrestrial and aquatic ecosystems. Dominant ecosystems (biomes) in Serbia include deciduous forests, steppes, coniferous forests, meadows and alpine "tundra".
Serbia is considered as one of the 158 world biodiversity centers, based upon the total number of plant species (including mosses) and territory size (biodiversity index of 0.718). The main factors of such floral diversity are: historical background of vegetation development, geographical position, climate, relief, presence of streams.
According to the most recent estimates the flora of Serbia contains 3662 taxa, i.e. 3272 species and 390 subspecies, making Serbia a country with very high floristic diversity and density per unit area compared to other European countries. All plant species are included in 141 families and 766 genera. Considering the vegetation diversity of Serbia, over 600 individual plant communities have been identified, including forests (deciduous and coniferous), steppes, meadows, pastures, vegetation of sand dunes and saline soils, swamps, alpine tundra, etc.
Maize and wheat are the most widespread crops in the country. Other important cereals in country are: barley, oat and rye. Main industrial crops grown in Serbia are: sunflower, soybean, sugar beet**,** o**il turnip**, tobacco, i**ndustrial pepper**, and h**op. From fodder crops, the highest** importance has**:** alfalfa, c**lover, sweet-pea, forage peas**, f**orage (silage) maize**, f**ields**, g**rasslands** and f**orage beet.** Out of vegetable, significant areas cover: p**otatoes,** t**omato,** p**ea**, c**abbage and kale**, o**nion**, pepper, b**eans**, m**elons and watermelons**, c**arrot**, and c**ucumber**. Regarding fruit, high number of trees was recorded in a**pples, pears, plums, nuts, cherries, sour cherries, apricots, peaches, and quinces. In this group could be added grapes, strawberries, and raspberries.**
The decision making system in Serbia, currently separates economic, social and environmental activities at the policy, planning and operational level, among several ministries. Awareness of the policy implications regarding PGRFA conservation and sustainable use among all stakeholders needs strengthening, especially in the Ministry of Agriculture. Better understanding is needed about international agreements and treaties related to genetic resources, their interconnections and effects on bio-policies, genetic resource management and seed production systems, in the context of globalization. The importance and necessity to harmonize national legislation derived from these and other regulatory systems such as seed laws, is often underrated. This Project of change will address these issues.
It is clear that the CBD convention and ITPGRFA, as well as UPOV and Nagoya protocol are extremely important in the development of national PGRFA legislation. But legislation for national implementation

is not supposed to be developed in the international arena and then imposed on national governments. Each country has its own history, politics, traditions, legislation, institutions and resources, all of which will affect its strategies for national laws. Any new law must be developed with these factors in view, in order to ensure that the law reflects national needs and national circumstances but at the same time enables compliance with the country's obligations under international law.
Before developing new PGRFA legislation, it is essential to identify and analyze the existing institutional framework and the variety of legal provisions which apply. This helps determine the range of reforms that will be necessary, while outlining the parameters within which any new legislation will function. An analysis of the existing framework should begin with the constitution, as it serves as the supreme law of the country and defines how the legislative, executive and judicial functions and responsibilities are assigned within the country. It may allocate some powers to the national authorities, some to the state governments and some to the local authorities. The constitution contains an explicit reference to natural resources, although it may indicate which areas of concern are to be regulated at which level of government, which will affect both how new legislation is developed and how it will be enforced. If the constitution establishes a hierarchy between international obligations and national legal provisions, then this will be an important consideration in the design of a national law.
After a review of the constitution and the international context, the analysis turned to the country's existing legislation which may affect the design of new PGR law.

Objectives

Serbia has ratified a number of international conventions, and adopted a number of national legislative acts associated with PGRFA. These documents will be listed later in the final report, where their significance will be described in more details. During the coming period Serbia needs to prepare and adopt legislation that is directly focused on the PGRFA. Our experiences gained in previous work on PGRFA and also other countries experiences, especially in the region and Europe, which have already adopted pertinent legislations closely connected with the conservation and use of PGRFA, provided good basis for this task.

The objective of this Project of Change is to identify, review and analyze different national regulations governing the management of plant genetic resources, in the light of international obligations and to promote discussions conducting to an efficient implementation of those regulations at Ministry of Agriculture.
The institutional framework in Serbia that can effectively contribute to strengthening of conservation and use of PGRFA already exists. A prerequisite for the effective engagement of these potentials is the interconnection of stakeholders who should focus on solving specific problems related to PGRFA.
My focus was to achieve a comprehensive report on the existing laws, policies, strategies and regulations in the PGRFA area in Serbia. My first idea for PoC was to draft the PGRFA management law, but after the GRIP international training I realized that my plan was a bit ambitious for the 6 month period. I did not give up at all and I expect that after the first phase I will reach my goal in the next period. After the revision of the national and international legislation I had a clear picture of what we miss in reality and include it in the new law. I managed to prepare the elements for a new law, taking into consideration all the activities performed.

Activities and Methods

Effective planning requires good knowledge of the current situation. Activities contributing to this objective include identification of available resources and capacity, allocation of present responsibilities and network of all stakeholder groups relevant for the conservation and sustainable use of PGRFA.

According to the new Constitution Act, the Republic of Serbia shall organize and provide sustainable development, the system of protection and improvement of environment, and protection and promotion of plants and animals.
Protection of environment and plants also includes the PGRFA management. Issues which are in relation to PGRFA are regulated by several laws, bylaws and strategic documents i.e. National Programmes, Strategies and Action Plans.

Activities and progress made:
- Work plan for the assessment of the study developed

- A number of meetings and discussions organized

- A number of existing policies/strategies/laws related to PGRF management identified and collected from different sources

- Existing relevant documents mapped

- Database establishing on collected material finalized

- Presentation of the idea/concept to the management and stakeholders provided

- Discussion initiated and Law on acceptance of ITPGRFA in the National Assembly presented

- List of ideas and concepts of different solutions produced

- List of existing relevant policies/strategies finalized

- Data base on collected documents finalized

- Review of legislation finalized

Methods
The absence of necessary political will to ensure effective implementation may also be related to the manner in which the new law has been formulated and adopted. Necessary collaboration may fall victim to institutional jealousies and passive resistance of government officials or stakeholder groups which feel their interests were not taken into account in the enactment of the new legislation.

Widespread participation of all affected stakeholders as part of a policy of good governance is vital to the process of legal change. As a practical matter, the participatory approach can be ensured through consultations with a wide range of stakeholders during the drafting process as well as consultative workshops where the legislation is presented and the government commits to implement the recommendations and monitor their application.
Discussions in country referring different issues were organized:

- National collection/national interest/national legislation
- Exchange of material
- Intellectual property rights/ Plant breeder's rights/UPOV
- GMO issue, several cities pronounced moratorium
- Two public discussion in Parliament involving ministries, scientific community – geneticians, lawyers, political parties, NGOs, farmer's organizations
- Gene bank mandate
- Collection of PGR
- FAO Treaty implementation

Actors and target groups involved
Main actors involved in discussion were Representatives of stakeholders in country: Institutes, Faculties, Ministries, NGOs, botanical gardens, members from National Working Group for National PGRFA Programme (that are seen as members of future National PGRFA Committee). Consultations and discussion were made also during the workshops supported by FAO TCP project during past two years.

Outcome and deliverables

Upon my arrival from Sweden, the change of management occurred in the Ministry of Agriculture and Directorate for National Reference Laboratories. Despite this change and new reorganization of jobs and priorities, no particular problems were faced.

Deliverables and results:
- Document with all important parts/paragraphs related to PGR produced/compiled and analyzed

- Ideas of this concept through all interested groups disseminated

- Public discussion on this issue in the National Assembly organized

- Public awareness about PGRFA in National Assembly raised

- TOR for National PGRFA Committee prepared

- Article about Gene Bank official establishment for PGRFA Law drafted

- Elements for the first draft of National PGRFA management Law prepared (complementary with other relevant laws and strategies and will cover the following issues: Gene Bank status, collecting, national PGRFA committee establishment, ABS, multilevel system, SMTA, farmer's rights).

Some longstanding problems still persist such as:
- Lack of National PGRFA commitee as responsible consultative expert's body,
- Lack of public awareness on governmental level,
- Lack of coordination between different ministries
- Lack of financial support for conservation and sustainable use of PGR in past three years
- Lack of priority given to the Gene Bank and PGR issue at national level
- Lack of human resources

On the other part, strong stakeholder's network and National Working Group for preparing a Draft National Programme are established, so this group people will represent a good basis for future National PGRFA Committee and PGRFA Management Law preparation.
In some instances, a particular activity that is anticipated in the new law may be directly prohibited by an existing law. A review of the country's existing legislation specifically addressing biodiversity, natural resource, sustainable development, agriculture and rural development - matters is the next step. The relevant instruments will consist not only of parliamentary-level legislation but will also include subsidiary legislation, such as ministerial regulations, as well as laws enacted by lower-level governments. The review required an assessment of the legislation itself: is it consistent with the principles of the CBD and the FAO Treaty as outlined above? Does it cover all the subject areas identified in relevant international conventions and treaties? Are there sufficient implementing regulations to ensure that the requirements can be undertaken and enforced? Carrying out an analysis of the existing legal framework served an important purpose: if it leads to the determination that the current legislation is sufficiently comprehensive, time may be better spent on other matters such as improving implementation and enforcement of the existing legislation. The institutional framework also has significant implications for the review process. For example, there may be contradictory provisions within the applicable legislation that appear to give the same or overlapping powers to different entities. Biodiversity matters,

for instance, are located within the ministry responsible for environment and nature protection, while the PGR issues fall within the ambit of the seed law and other laws enforced by the ministry responsible for agriculture.

Lesson learned -way forward

The objective of the PoC was to prepare a comprehensive review and analysis of existing legislation which will represent a good base for new law and effective management of PGRFA in a Serbia. Elements for Draft Law will be prepared and used accordingly.
The activities within this Project of Change included a descriptive analysis of existing regulations at different organizational levels as a necessary substrate for the subsequent normative study of the existing management practices at different ministries and stakeholders that involve the conservation, use, protection and exchange of plant genetic resources.
Database of relevant legislation will be connected to the web-site of the Ministry of Agriculture and also available on FAO web-site through the National Information Sharing Mechanism.
Results of this PoC will be also disseminated and available to all interested parties in the process of setting new PGRFA management legislation, with both short term and long term effects.
This PoC will represent a good start point for the future National PGRFA Committee and future planning of actions in PGRFA Management in Serbia. Good knowledge base for both administrative and technical part of Gene Bank establishment.

Serbian priorities and long term objectives

- National policy/legislation on PGR harmonized with EU regulations/directives and international conventions/treaties
- National law and policy on PGR adopted and status of the National Plant Gene bank secured
- Functional national network of all PGR stakeholders in place
- Conservation of plant genetic resources and national gene bank operational
- PGR information and documentation system established
- National collection regenerated
- Material of old cultivars collected
- PGR *in situ* and on farm conserved
- Use of PGR in farming and agriculture broadened
- Regional cooperation established

What can be achieved in short term and midterm on cost effective way
Short term

- Documentation: old and new database/GRIN GLOBAL
- Base collection in Gene Bank started/established
- Germination tests

Midterm

- National PGRFA committee
- National PGRFA Law
- National Inventory
- Repatriation of samples from other gene banks

Conclusion
Modern PGR legislation is at the crossroads between agriculture and environment as well as the international trade. The international legal framework calls on countries to create an enabling national framework for the implementation of international obligations dealing with all three areas. Finding a balance between the protection of natural resources and the encouragement of international trade is a

difficult task, especially in countries with limited human and financial resources. Nevertheless, the increasing volume of international trade in agricultural products requires countries to strengthen their controls and at the same time make them more transparent and reliable. In all of these tasks, the future PGRFA Management Law has an important role to play.
Good laws establish institutional mandates on a firm ground, create new rights, impose obligations on individuals and formalize cooperation between government institutions, the public and private stakeholders. These guidelines have attempted to identify the elements set out in the international agreements governing trade, environment and PGRFA management which our country will need to consider in the revision of the legislation. After designing the basic framework, we will need to adapt the specific text to our individual requirements, tailoring the new legislation to the national needs. In this way we can hope to comply with our international obligations, promote our own agriculture and environment, and foster international trade.

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Documentation of Existing Knowledge in Turkey

Background and Objectives

Turkey is located in a geographically and climatically favorable place which harbors diverse ecological regions. Thus, the country is rich both animal and plant biodiversity. Over 75 % of the 12,000 plant species that occur in Europe naturally occurs in Turkey over 9000 taxa. Turkish flora includes many wild relatives of important domestic species (e.g., wheat, barley, chick pea, lentil, cherry, pear, apricot, chestnut, pistachio, etc.) as well. Additionally, the Turkish flora also includes many economically important timber species, and medicinal, aromatic, industrial and ornamental plants. Besides, Turkey is one of significant country with its rich plant genetic resources/plant diversity. Two of the Vavilov's Center of Origin (i.e., Near Eastern and Mediterranean Centers) extends into Turkey. This, of course, indicates that Turkey is the one of the Center of Origin and/or Center of Diversity of several crop plants with wild weedy and cultivated forms and many plant species.

Speaking of protection; there are several protection areas in Turkey for in-situ and ex-situ. If we look at for the in-situ protection facilities; there are 39 national parks, 32 nature conservation areas, 22 nature parks, 104 natural monuments, 80 wildlife development areas, 14 special environmental protection areas, 1000 natural sites, gene conservation and management areas (Bolkar, Ceylanpınar), 12 wetlands of international importance. There are also many areas for ex-situ protection like national gene bank (was established in 1972, has 600 genus spread on 50000 materials), field gene banks (consists from 16 research institutes and mainly collect fruit species), Osman Tosun Gene Bank (has 11000 seeds samples), seed gardens, seed plantations, clone parks. And, 350.000 line biodiversity data take place in the date base as of today.

Turkish National Program focuses on availability of national collection as part of its goal of maximizing the utilization of breeding resulting from its breeding and research activities, facilitating the access and ensures the continued free exchange of genetic materials. So the national collections are available worldwide for the scientist. These valuable collections preserve the vast genetic diversity of these crops and serve as a source of characteristics that can improve crop production throughout the world. The feed back of results are documented for the information exchange. The Legislation on “Collection and

Utilization of Plant Genetic Resources" which exist since 1992 regulates the principles of conservation, access and utilization of plant diversity. An MTA is also used for dispatch of material from the National collection. By feed backing the further access could be possible.

However, there isn't any system to trace the material and determine whether a species is obtained legally or not. Besides, since there isn't also any system (such as databases) contains both genetic resources and traditional knowledge, this kind of information can be subject to patents. And since they pass down orally, patent examiners can not consider this information during substantive (novelty and inventive step) examination and it causes granting of wrong patents. To prevent such cases, documentation of existing knowledge and establishing a database that can be accessible by patent examiners is essential. The best example for this issue is Traditional Knowledge Digital Library (TKDL). TKDL provides information on traditional knowledge existing in the country, in languages and format understandable by patent examiners at International Patent Offices (IPOs), so as to prevent the grant of wrong patents. Thus, it acts as a bridge between the traditional knowledge information existing in local languages and the patent examiners at IPOs. The project TKDL involves documentation of the traditional knowledge available in public domain in the form of existing literature related to Ayurveda, Unani, Siddha and Yoga, in digitized format in five international languages which are English, German, French, Japanese and Spanish. Traditional Knowledge Resource Classification (TKRC), an innovative structured classification system for the purpose of systematic arrangement, dissemination and retrieval has been evolved for about 25,000 subgroups against few subgroups that was available in earlier version of the International Patent Classification (IPC), related to medicinal plants, minerals, animal resources, effects and diseases, methods of preparations, mode of administration, etc.

Besides, South Africa will be launching on 24 May its National Recordal System to catalogue its indigenous knowledge. Among the challenges faced in setting up the system were technical challenges, such as the fact that unlike the Indian Traditional Knowledge Database Library, the NRS is an interactive database, and information was to be available in English and the 10 other official languages of South Africa. Another technical challenge was to ensure the security of the data so that it not easily found and taken away, but rather accessible only by following a specific process.

Some of the objectives of the NRS are: empowering communities and related stakeholders; building and supporting networks; enabling the discovery, cataloguing and utilization of the national indigenous traditional knowledge heritage; enabling and maintaining a secure, accessible national repository for the management, dissemination and promotion of indigenous traditional knowledge; and achieving national intellectual property objectives for the protection of indigenous traditional knowledge.

Objectives
Due to the facts explained above, the two main (future) goals of my PoC are:

- Making genetic material traceable
- Include existing knowledge into prior art

And my objectives within the context of this Project is:

- Determination of existing studies about folk medicines and medicinal plants in Turkey
- Determination of existing databases

Activities and Methods

First we reviewed “Decision of Intellectual Property Rights Coordination Commission” which is dated on May 2010 and actually a roadmap to achive these goals. The decisions of the commission are listed below:

- Determination of existing studies and coordinating them with IPR
- Determination and combination of existing databases
- Starting studies for increasing awareness about GR-TK and IP issues
- Following international developments
- Determination of technically adequate institutions and establishing a inter institutional commission
- Establishing a strong information network system between Turkish Patent Institute,
- Ministry of Environment and Urban Planning, Ministry of Food Agriculture and Livestock
- Providing b2b co operations and bilateral co operations with India, China etc. for establishing a database
- Establishing an effective protection system for GR, TK and CoE
- Ensuring new academically studies on the subject

Considering first two subjects, i decided to start from searching existing studies and databases if any. Some of the important results of my literature search is given below.

Folk Medicine Studies

History

Turkey is one of the countries with richest plant diversity in the Mediterranean. A number of human races and tribes have settled here during different periods bringing in different cultures and customs. As a result of this we come across a great accumulation of knowledge of traditional medicine in the country. Dioscorides (1st century A.D) from Anazarba or Asia minor; the Mediterranean part of Turkey; used the healing properties of different plants from Anatolia thus establishing it as a science. In 78 A.D. he wrote monumental volumes of “Materia Medica” which included 950 drugs of which 600 were of plant origin. A recent survey of traditional and folk medicine in Turkey has revealed that most of these plants are still use by the local inhabitants. Therefore, Materia Medica may be assumed to be the oldest comprehensive document of Anatolian folk medicine. This knowledge is surviving until now and an array of herb shops are found in the markets of modern cities. The number of flowering plant taxa distributed in the country is estimated to lie around 10000. These taxa are distributed in different phytogeographical regions and spices, beverages and cosmetic products have been estimated to lie around 65 billion US dollars/year and it is expected to grow.

Nearly 2000 taxa of plants are evaluated for medicinal and aromatic purposes and approximately 500-1000 plant taxa are used in traditional medicine. Nearly 350 taxa of higher plants and pteridophytes are sold at the shops of Attar’s, the traditional herbal drug dealers. These plants include 290 taxa belonging to 170 genera and 70 families.

Studies

The aim of these studies is to reveal the plants used as traditional folk medicine in Turkey. For this purpose, the field works have been done. During these researches the settlement centers (including villages) have been visited, the specimens of the plants used as folk remedies have been collected and the information such as local names, ailments treated or therapeutic effects, plant parts used, method of

administration, dosage, duration of treatment have been recorded. The collected plant specimens are generally kept in the research centers that carried out mentioned studies.
An example of the forms that was used for collecting information is can be seen below.

Date: ---- Research area (District/Village):---- Informants name:---- Age: ---- Addresses/Telephone number: ----

1. Local name of plant: ---- 2. Part of plant:---- 3. Usage purpose of plant:---- 4. Dosage: ----
5. How to use it (powder, pulp, tea, etc.) ---- Internal / External
6. Usage period of plant: ---- 7. Side effect of plant :----

In an ethnobotanical survey, demographic profiles of the informants were evaluated. Subsequently, they were asked to state whether the plants were used for therapeutic or other purposes; then detailed information, i.e. local names, parts used, methods of preparation (decoction, infusion, poultice, ointment, etc.) was recorded; and finally the plant materials were collected for authentication. The questions that was asked to inhabiants are listed below:

- Do you have any knowledge of the benefits of plants?
- Do you consume plant materials?
- Do you have any reason for not consuming plant materials?
- Since when have you used plant materials?
- From where do you obtain the plant materials?
- From where do you purchase the plant materials?
- What time of the day do you prefer to gather the material from nature?
- What is the source of your information?
- For what purposes do you utilize plant materials?
- How frequently do you use plant materials?
- Did you witness any side effects due to utilization of a plant remedy?
- Do you think that plant remedies are beneficial for health?

Turkish Freshwater Alge Image Database

Turkish Freshwater Alge Image Database has been developed in 2006, in order not to fall behind the countries that have already established their image databases for many plant and animal groups

Data Bank of Turkish Folk Medicine

For the evaluation of results obtained during the field studies on the folk medicine in Turkey performed between 1986 to 1995 we set up a new “Data Bank of Turkish Folk Medicine”. Each information form contains the following records; herbarium/ or information number, Latin name and scientific group or family name of the material, name of source person and date of the record for the information, definition of the locality (village, town, province names), local name of the material or plant, part(s) used, preparation of drug and way of application and scientific possible group of the defined activity or disease.

FLOTURK

FLOTURK (FLOra of TURKey) is a database compiled and maintained by the Anadolu University Medicinal Plant and Drug Research Centre (TBAM). It contains botanical, phytochemical,

chemotaxonomic and pharmacological activity-related data as well as information on production and commercial potential of Turkish flora.

Preliminary conclusions of work done so far
Following my literature search, it became possible to reveal existing publications, studies and databases on the related subject. Also we were able to designate the relevant instutitions, universites, organisations and experts studying in the field which is given as below:

- Ministry of Food Agriculture and Livestock General Directorate of Agricultural Research and Policy
- The Scientific and Technological Research Council of Turkey Healt Sciences Research Comittee
- Turkish Patent Institute
- Aegean Agricultural Research Institute
- Ministry of Culture and Tourism
- Ankara University, Faculty of Pharmacy
- Hacettepe University, Faculty of Medicine
- Marmara University, Faculty of Pharmacy
- Ministry of Health
- Ministry of Justice
- Ministry of Foreign Affairs

Lesson learned and way forward
While discussions are ongoing about establishing a single legal instrument about genetic resources and traditional knowledge associated with genetic resources in the presence of WIPO; establishment, improvement and use of databases for the defensive protection of mentioned topics is very important to prevent wrong patents on related subjects.

Especially when considered with Turkey's draft national patent law which includes disclosure requirement, they are tought to work coordinately with each other.

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Construction of a Comprehensive Database of National, Regional and International Laws Applicable in Colombia about IPR's, Genetic Resources and Biosafety, under the Regional LAC Agricultural Biosciences Platform

The CGIAR Consortium is an international organization that, together with the CGIAR Fund, advances international agricultural research for a food secure future by integrating and coordinating the efforts of those who fund research and those who do the research; it integrates the research of the 15 centers which

are members, one of them is CIAT. In the CGIAR, one of the main drivers for its reform has been to take a strategic view of how change evolves, what we can do about it, and to make a difference.

The United Nations Population Division has stated since 2008, that by the year 2050, the world population is expected to surpass 9 billion people. That means that the population will be 34 percent higher than it is today, and nearly all of this population increase will occur in developing countries. This implies a future demand above current levels, and even higher if we are to maintain any expectations of meeting the Millennium Development Goals regarding food security and poverty alleviation.

"…the required increase in food production can be achieved if the necessary investment is undertaken and policies conducive to agricultural production are put in place. But increasing production is not sufficient to achieve food security. It must be complemented by policies to enhance access by fighting poverty, especially in rural areas, as well as effective safety net programmes." How to Feed the World in 2050, FAO,http://www.fao.org/fileadmin/templates/wsfs/docs/expert_paper/How_to_Feed_the_World_in_2050.pdf

We know that we have more people each day, less water, less arable land, huge climate change, and more value of agricultural production[iv]; so the challenges we are facing now as humankind are radically different than before. These changes have an enormous impact in agricultural R&D and in general, in how we should get ready for the future.

Given the sizable volume of land and water resources that could effectively be mobilized, it is important to locate the regions which most likely can have a positive impact to achieve the required global food/feed/fuel balances of the future, while enhancing environmental sustainability.

CIAT, having its headquarters in Cali, Colombia, a country located at the epicenter of Latin America and the Caribbean[v], has for a long time recognized the importance of the Latin American and the Caribbean (LAC) region as one of the world's biodiversity hot spots with vast land resources, which makes it a key player and gives it a distinctive role to play.

Nevertheless, its past and present productivity performance in terms of agriculture is far from the levels that could sustain this role. This cannot be accomplished without making full utilization of the huge potential that advanced biosciences offer in terms of

moving technological options beyond productivity frontiers. Unfortunately many countries in the region, and particularly those in most need, face serious lack of human resources, lack or excess of regulatory systems, and infrastructure limitations in this area.

But since good progress has been made from an economic point of view in several of the countries in the region, and an overall considerable progress has been achieved, the other remaining problems are not that obvious, more so when at a global scale you see how there is still extreme poverty in sub-Saharan Africa (SSA) and parts of Asia[vi], for example. It is the lack of unfulfilled basic needs in other areas of the globe that have shifted in some degree the attention of donors and international organizations away from the LAC region.

As such, the PROJECT OF CHANGE (POC) is one component of the REGIONAL LAC AGRICULTURAL BIOSCIENCES PLATFORM that CIAT started working on for the first time in the year 2009. The Platform's aim is to establish an operational mechanism to improve LAC countries' capacities to access and utilize state of the arts biosciences applications in support of local, national and regional food security and improved agricultural competitiveness. In pursuance of this objective CIAT proposes to bring together its long standing experience of research, together with its state of the art laboratory infrastructure, human resources and extended network of institutional relations with all the major actors in the development cooperation area. We think that these resources offer a unique opportunity for a concentrated "leap-frogging" effort to strengthening capacities, a top priority of countries in the region.

The above objectives will be pursued through an integrated approach bringing together four (4) different components or Pillars, the third one being:

(iii) Policy and regulatory capacity building services focusing on access to bio-safety and intellectual property regulatory-IPR databases, technical assistance and training.

This pillar did not exist from the beginning of the project for the Platform. As the world's vision evolved through the years, the vision of the Platform also evolved to include other areas of knowledge that support and complement biosciencies.

Currently, a legal database of all applicable law on the subject matter of genetic resources and intellectual property rights and other related issues does not exist. It is a subject that is almost unknown to the general public. As a first step, based on the participation in the Programme, the construction of such a comprehensive database will help strengthen the implementation of IPR/genetic resources and biosafety regime in Colombia.
Between the end of 2012 and during 2013, the working group within CIAT met continuously to put together a proposal to search for financial support for the REGIONAL LAC AGRICULTURAL BIOSCIENCES PLATFORM. We started working toward presenting a proposal to IDB (Interamerican Development Bank). After several exchanges and re-drafting, it was made clear to us that in the particular subject of Pillar 3, the activity that would possibly get funded would only be for training. Up to the submission of the final report, we do not know in which area such training will be funded. Henceforth, an outline for the training was included in the draft proposal and in the POC, as follows:

TARGET AUDIENCE: Directed to scientists that are currently doing research related to genetic resources, who are in a decision level making at their respective institutions.

PROPOSAL: To offer an Advanced Training in Genetic Resources and Intellectual property inside the following objective framework:

- Give general information about the basics of the different intellectual property rights applicable.
- Help participants to understand the multilateral and bilateral legal systems about Genetic Resources and Intellectual Property, applicable in Colombia, and their implications.
- Give basic tools for the management of Intellectual Property related to genetic resources.

At the end, the decision about the scope of the Project of Change (PoC), was to do both activities: developing a database and designing a training plan. Within this particular pillar, a clear knowledge and consequent construction of a database of all applicable laws in each country (national, regional and global), will be the starting point to develop a component that will help in the management of genetic resources through "freedom to operate" for Latin American and the Caribbean countries, starting with Colombia in its initial phase. Also, such a database would give a clear scope of the training to be proposed.

Since Intellectual Property Rights are specific to different jurisdictions, a "freedom to operate" analysis should relate to particular countries or regions where you want to operate. Determining whether there is freedom to operate in any particular jurisdiction is a major reason why databases of all kind of intellectual property related information are so important.

The end results that should be achieved are:

a. Database: applicable in Colombia, of :
    i. International Treaties: bilateral and multilateral.
    ii. Supranational legislation: Andean Community of Nations
    iii. National legislation
b. Training Plan:
    i. Design of training plan.

Although the first identified step in the Policy and regulatory capacity building services stated in the Project of Change (PoC) was to do a comprehensive database of national, regional and international laws applicable in Colombia about IPR's, genetic resources and biosafety, due to IDB's position for funding the project, we had to change our activity to training in the proposal to IDB.

A database can go a long way, and it will be a work in progress, as legislation is a living entity that is in constant change. The first form of a database will be the recollection of the applicable legislation to Colombia as described above. I envision the next step to be to put it all together in a single body, and add a table of contents for an easy access to the information.

Afterwards, what I would like to do is to turn the database into an e-book, which is a step up from a simple pdf: the most important feature is that it can be manipulated by the reader, in the sense that fonts, sizes, spacing and other features can be changed. The idea of an e-book is to make this work available to everyone interested, and the most effective way to do so nowadays is by using this format, which is more elegant than the pdf and whose market grows day by day.

The last step that I envision for this database is to develop a "how to guideline", a manual or implementation guide, which helps people to use the knowledge contained in the proposed database and which goes in depth into the applicable legislation and explains to the users how it will affect their operations, how to do things, and give examples.

As for the Training part, depending on the funding that CIAT finally gets, a training plan (schedule of courses, contents, contributions from other platform partners) will be developed.

My vision of the next steps for Training also has to do with technology: if the Training is successful, then we should turn it into e-training, using a knowledge management platform so that anyone in the world with internet access would be able to take the course; in this way we will be making it replicable.

Many lessons were learnt from the PoC.
The most important one was that it is very hard work to make all actors understand the importance of the legal component of any subject, more so if it has to do with intellectual property linked to research and science. In general, people do not consider it necessary or indispensable, including scientists and donors.
We have confirmed it in different scenarios: as a result of an independent audit of this PoC or the Platform in which we participated at a national level, we learnt that scientists in general do not take into account Intellectual Property as important for their work. This means that there is a lot of background work in the sense of raising awareness of the importance of having an understanding of it, as a tool or means to effectively produce impact with scientific work. It also means that as an under explored territory, there is much work to be done and a lot of possibilities and scenarios to do it.

There is a very large gap between what the academia knows is needed and what is "acceptable" for funding in the international arena. There is a lack of understanding from funding organizations about the importance of other components besides training. There is a chain of components that form a whole formula to impact and solve issues, and each component has its own value in and by itself. This is another great challenge that raises again the need to create awareness at all levels. Our world is one of interconnectedness, not only in communications, but in every aspect of life, and that includes areas of knowledge, that have to work together to really achieve the end result that we are all looking for.

Having the information (in this case the applicable legislation) organized in one place, is an indispensable resource to be able to know the "rules of the game".

In the specific subject of the PoC, since it is almost unknown to the general public, and most of the target audience, an effort needs to be done to correctly UNDERSTAND the playing field.

The greatest strength and the goal of further development of this work, and the Platform in general, is to create, maintain and strengthen networks. Networking will be a turning point to get a pilot programme going, as new ideas or new ways of doing things need to prove themselves before they get backup funding.

The results of the PoC will help improve capacities to take advantage of emerging opportunities to better and adequately exploit the region's biodiversity resources. Having clarity of the rules of the game helps build more up to date regulatory systems in the country, and/or solve current issues that make the existing legal systems inoperable in practice; thus policy and institutional systems, and the target audience will be better equipped in their decision making.

The PoC is the first step of a big chain that contributes to create a supporting environment for effective use of biosciences-based technology solutions for agricultural development and food security, to face the challenges that humanity will have on the course of the next 50 years.

By participating in the GRIP programme, all of us become agents of change everywhere we go, so that by replicating what we learnt, we help create awareness of the importance of Genetic Resources and Intellectual Property.

Publ univ-IP and commercialization

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Implementing Intellectual Property (IP) at Makerere University

Background and Rationale

Intellectual Property (*hereinafter referred to as 'IP'*) is a term that refers to creations of the mind. Any creative work or invention considered to be property of its creator [Wikipedia, the free encyclopedia]. Under Intellectual Property Law, owners are granted certain monopoly rights which include exclusive rights to: make; use; vend (sell) the IP; publish to various markets; license the manufacture and destruction of inventions and, sue in case of unlawful or deceptive copying; license other manufacturers / users; preclude any person from exploiting the IP without authorization, and to sue for infringing acts. Common types of intellectual property rights include: Patents; Copy rights; Trade Marks; Industrial design rights and Trade Secrets. (http://en.wikipedia.org/wiki/intelectual_property)

Article 27(2) of the *Universal Declaration of Human Rights* provides: *"*Everyone has the right to the protection of the moral and material interests resulting from any scientific, literary or artistic production of which he is the author." *–This justification goes for all forms of IP.* IP law aims at providing incentives to the creators. It recognises and rewards the creators for the time, money and efforts and by so doing, encourages human creativity and development of new talent. IP Law confers exclusive rights on the owner and as such anyone doing an act, which is in the exclusive domain of the owner, without the owner's consent may infringe the right.

Makerere University was established in 1922 and is the now ranked the 8th, best University in East and Central Africa. The University has since its establishment had many innovations especially in the desciplines of sciences. Such innovations are not well reflected in the University's records due to the non capture of some of the processes and the Innovators' data.

There is need for the members of staff at Makerere University who have come up with variuos innovators to get exclusive rights as the owners of intellectual property and also to benefit from the property they have created. Therefore, there is a need to create a data base of existing IP and Owners at Makerere University by establishing a Technical IP Management Office at every college and where possible, at departmental level to enable the university and its staff register and benefit from the IP regime. Once the above has been achieved, the university, its staff and stakeholders will be able to realize benefit of proper documentation of their IP.

Objectives

The main objectives of this project are, as were advanced by Doris Schroeder and Peter Sunger and they include: Financial incentive; Economic growth; Morality; and, Giving exclusive rights to the owners of intellectual property to benefit from the property they have created; providing financial incentive for the creation of an investment in intellectual property; and, in case of patents, pay associated research and

development costs. (Prudential Reasons for Intellectual Property Rights Reform (http://www.unclan.ac.uk/schools/school_of health/research_projects/files/health_innova_IPR_reform_report.p' University of Melburne, Doris Schroeder and Peter Sunger May 2009).

Accordingly, my project objectives are as follows:

- To create awareness on how to handle IP matters within and outside Makerere University.
- To review IP Laws and, the IP Policy of Makerere University and establish how the same can be used to benefit the University and its Stakeholders.
- To assist the University Management in establishing a Technical IP Management Office (TLIMO) at every college to handle IP matters in the University.
- To register all the University's and its Stakeholders' innovations and IP.
- To explore ways of how the University and it staff can benefit from their IP.

Activities and methods

In accordance with objective one, visits to some colleges were made and consultations with members of staff (especially the academic staff) held and, are still on- going. So far, various meetings have been held with some staff from College of Health Sciences and College of Agriculture, Environment and Natural Resources. Regarding objective two, re-viewing the University laws and Policies is on-going and once it is completed, an appropriate action will be taken in that regard. The University operates in accordance with its strategic plan and staff recruitment policy and procedure. Apparently establishing an IP office at every college was not envisaged to be a useful avenue through which the University would capture all its IP and harness the benefits that accrue from such a venture. However, an IP technical desk has already been set up at College of Health Sciences and is doing a good work. Measures are underway to establish IP desks at other colleges. The registration of all the University's and its Stakeholders' innovations and IP is ongoing. In accordance with the last objective, after the processes highlighted above are completed, an analysis will be made on how to explore ways of how the University and it staff can benefit from their IP.

Outcome and Deliverables

The outcome and deliverables can only be realised after the activities as set bout in 3 above have been accomplished. Creating a data base of existing IP and Owners at Makerere University is a process that will be completed after a clear semblances of information about innovators at Makerere University is done and critically analysed to avoid any disputes that may arise out of such information. So far, some data was captured and is being processed for possible use.

Sensetization of all University staff and stakeholders about the importance of managing their IP Coupled with registration of all University IP Stakeholders is still ongoing. Once Technical IP Management Offices are established at every college and all the innovators data, their innovations captured and IP registered, then shall the University pride in its IP. Once the processes are completed and the registration effected, IP holders at Makerere University will be enabled to benefit from their IP legal rights. Accordingly, Makerere University and its Innovators will benefit from Improved prestige and use proceeds from IP as another source of income.

Apparently, though establishing an IP office at every college was not envisaged to be a useful avenue through which the University would capture all its IP and harness the benefits that accrue from such a venture, the University Management is in the process of assigning some officers at colleges with an extra role of capturing IP related issues at college level. This is a positive development which, once effected will enable the University to have an IP data base at every college and later, at the center. Of-course, the will, readiness and support of the University Management at this material stage is very important**.**

Problems/Obstacles/Support Needed
Lack of a budget line out of which some money could be secured to mobilize staff for and organize workshops on IP issues has proved to be a big obstacle. Outreach to the colleges and other University departments to sensitise them about IP has not been easy for various reasons including: the nature of my work which does not allow me ample time off to visit colleges and sensitise them on need for capturing all thier IP now than ever before. (My appreciation to the Principal Maker ere University College of Health Sciences (CHUSS) who on 27.03.2013 allowed me a 4hrs interaction with his staff to sensitise them about the need for IP now).
Lack of a gazetted office(r) at the university to handle IP issues has greatly hindered the move towards proper utilization of IP at the University. It is still a big challenge as to how the University's IP will be managed without Officers gazetted for the purpose.
Lack of trust amongest some staff who have continued to question the genuiness of the process and, are suspicious as to how the infomationm required would be kept secret- given the fact some sensetive documents find their way to the media. Hence, creating a fear as to why at this very time. This is still a big obstacle to the implementation process because some innovators do not want to give information about their innovations.
The urgency by some staff to publish their work for promotions and other academic work also creates another problem which is complicated further by selfishness of some staff who wished to keep information to themselves.
The dire need for support of IP Officer (s) to carry out the sensitization drive is required now than ever before if this project is to realize tangible results. Facilitation to carry out the sensitization project to its logical conclusion was not forth coming which greatly affected the pace at which the sensitisation was carried out.
In short, institutionalisation and appliciation of the entire IP project is still a big challenge.

Conclusions
A lot of sensitization is still required but so far, some members of staff especially teaching staff are beginning to realize the importance of protecting their innovations. Though very many questions are still being asked of me especially as to the reasons why I am preaching implementation of IP at this institution now than ever before, all indications are that some members of staff have so far been brought on board and are slowly but surely coping up. There is no doubt that by the end of this calendar year, given the support of the University Management, staff of various colleges would have embraced the implementation of IP at Maker ere University project.

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Application of Electronic Media for Raising IP Awareness in Thai Researchers

Background and rationale
Many controversies about the access and benefit sharing of genetic resources and intellectual property rights in Thailand have been reported. One of the well-known cases is the Jasmine rice. For this case, there are several kinds of aromatic rice grown and commercialized in United State of America which Thai people believe that they are developed from Thai Jasmine rice seeds without any notice or permission. Moreover, there was a dispute of the United States Patent of genetically modified aromatic gene in Thai

Jasmine rice certified for National Science and Technology Development Agency (NSTDA). This reflects that Thai people lack of the concern about genetic resources and intellectual property rights.
The Jasmine rice is not an only case. Thai people are also disadvantageous in many cases due to the low awareness in the issue of genetic resources and intellectual property rights along with the personalities of Thai people that are usually generous and compromised. There were many events that Thai people allow foreigners to access the genetic resources without any awareness of subsequent impacts or potential benefit sharing. Therefore, the issue of genetic resource and intellectual property right is necessary to be informed to Thai people.
The issue of genetic resource and intellectual property right is also important for Thai researchers. Due to the problems such as growing population, climate change, and disease incidents, researchers are challenged to find solutions for not only food security, but also better quality of life. Because a great number of researchers are trying to do researches such as creating new varieties for agriculture and seeking for new medical treatment, the access of genetic resource and intellectual property right is involved to these researches. Therefore, Thai researchers should have the awareness in this issue.
Currently, it cannot be denied that social network plays an important role in our lifestyle. Electronic media such as website is an important alternative for reaching masses. Therefore, a website informing about the genetic resources and intellectual property right issue with simple language should be useful for Thai people including researchers.

Objective
The aim of this Project of Change is to raise awareness and educate Thai people, especially researchers, about genetic resource and intellectual property rights by using electronic media. The website should be not only a source for information, but also a place for discussion.

Activities and methods
To inform and raise awareness about genetic resource and intellectual property rights via electronic media, a website is created. With simple Thai language in the website, it would be easy for Thai people to understand. Moreover, due to Thai researchers being the main target groups for this project, the website should be composed of general information that should guide how to work with the consideration of genetic resources and intellectual property rights. It should help to reduce any controversies, problems and disadvantages from this issue. Therefore, the components in this website are:
1. Home page
The introduction and the objective for creating the website are in this section. Moreover, the acknowledgement and application for GRIP program are included.
2. Problems and Significance
This part intends to motivate the readers to be interested in the issue of genetic and intellectual property rights. The importance of this issue is also included. Moreover, the disadvantages, resulting from being unaware of genetic resources and intellectual property rights, are described. The case study of Thai Jasmine Rice is also briefly referred.
3. International Treaties
Due to the globalization, there are many times that Thai researchers are cooperated with people in other countries. It is useful for the readers to know and concern about the international law to make work going smoothly. In this part, it begins with the definition of genetic resources. Then, some international treaties: CBD, TRIPS, FAO-IT PGRFA, UPOV, WIPO –IGCGRTKF, Cartagena Protocol on Biosafety, and The Nagoya Protocol on Access and Benefit-sharing are briefly described.

4. Agreements

A great number of Thai researchers often work with their personal relationship without the awareness of potential subsequent problems. Therefore, agreements should reduce these difficulties. This part aims to help researchers by guiding how to do the agreements that they should have before starting their projects.

This part begins with the importance of agreements. Then, some useful agreements for Thai researchers including Material Transfer Agreement, Cooperative/Inter-institutional Agreement and Research Agreement are briefly described with some essential contents for each agreement.

5. Webboard

The objective of creating this webboard is to generate a place for asking, answering and discussing of any issues associated to genetic resources and intellectual property rights. It would be useful for any researchers when they would like to find the answer or discuss in any topics related to genetic resources and intellectual property rights.

6. Contact information

If any readers have any problems or questions that they would not like to post on the webboard, they can contact personally by using this contact information.

7. Other links

In this section, there are links to the websites of the units associated to this project such as the website of Institute of Biotechnology and Genetic Engineering, Chulalongkorn University and the website of GRIP program in Swedish University of Agricultural Sciences website.

Besides creating the website, one of the best ways to educate people is giving a talk. For this commutation method, the interactions between the speaker and the audiences are easily evaluated. Lectures in the topic of "Genetic Resources and Intellectual Property Rights" were set up twice (on November 26th, 2012 and March 25th, 2013) at the IBGE (Institute of Biotechnology and Genetic Engineering) researcher meeting with approximately 20 audiences. The significance of genetic resources and intellectual property rights, GRIP program activities, issues that Thai researchers should be aware of, and trends of the access and benefit sharing are included in the talks. The feedback about these two lectures will be discussed in the next section.

Outcome and deliverables

The aim of creating this website is to educate and raise awareness of Thai people, especially researchers, in genetic resources and intellectual property rights. At this time, electronic media and social network are very important tools to reach a mass of people. By making it simple, the website should be easy to understand and useful for Thai people.

The website for this Project of Change is created in the following address: http://gripthai.site90.net. The components of this website are already described in the previous section. Not only the website, but also the webboard, a place for discussing, exchanging opinions and asking questions, is constructed in the following address: http://gripthaiwebboard.netau.net/. There are links to the webboard in every page of the website.

Although the website is already done, it is required to be promoted to access as many people as it is able to. An achievement from this Project of Change is a raise of awareness in genetic resources and intellectual property rights which can be investigated by the discussion in the webboard. However, the main problem of this website is that not enough interest is received. Therefore, one of the future works is to find any methods to promote this website. After promoting, the website should reach and motivate more people to concern about genetic resources and intellectual property right issue. The plans for promoting the website will be described in the next section.

The other activity that has been done, as mentioned in the previous section, is giving a talk about genetic resources and intellectual property rights. The feedback from the two talks was good measured by the comments and the evolution of the lecture. Some comments were raised after the talks such as what should be concerned about intellectual property rights when a bacteria strain isolated from a laboratory having a potential to be commercialized, and trends of the access and benefit sharing of genetic resources that should be followed up. However, there were some big problems about genetic resources and intellectual property rights investigated from the comments of the talks which are:

1. The researchers neither know nor concern about national and international laws of genetic resources and intellectual property rights.

2. The researchers did not concern that the issue of genetic resources and intellectual property rights was important.
3. The researchers did not know how to apply that the issue of genetic resources and intellectual property rights to their works.
4. The researchers thought that that the issue of genetic resources and intellectual property rights was too difficult to understand.
One of the ways to solve all these mentioned problems is the education. Activities that have been done from this Project of Change should be a beginning step to educate Thai people, especially researchers to understand about the issue of genetic resources and intellectual property rights.

Lesson learned -way forward
With the globalization, we have to collaborate with people in other countries. Moreover, the ASEAN (The Association of Southeast Asian Nations) Economic Community or AEC, the regional economic integration, will be established by 2015. Therefore, there will be a lot more cooperation between Thailand and other countries in AEC. However, in Thailand awareness in the issue of genetic resources and intellectual property rights is still low. It is important to raise awareness about genetic resources and intellectual property rights, so it will reduce any controversies and disadvantages, especially, in the situation that we have to work together with other nations. Moreover, during the time of doing this Projects of Change, there are several problems resulting in low awareness of the issue of genetic resources and intellectual property rights which can be listed as:
1. Not many media inform and educate about this issue.
2. Thai people, even the policy makers, do not think the issue of genetic resources and intellectual property rights is the first priority. Therefore, they do not pay attention to this topic.
3. For the Thai researchers, most of them concern that publication is the first priority. They try to get as many publications as they can. Therefore, concerning about the issue of genetic resources and intellectual property rights may waste their time or delay their work.
4. The personality of Thai people that always generous, so they do not realize about potential consequences.
One of the solutions for these problems is educating Thai people by using a powerful tool. Then, as the objective of this Project of Change, a tool to inform and educate Thai people, especially researchers, about genetic resources and intellectual property rights is created as a website. The website with simple Thai language is an option to reach a mass of Thai people. Moreover, the webboard is also created for the discussion. Although the website and webborad are already created, the promotion is very important to reach as many people as it can. There are several future plans to promote the website. For example, it can be promoted via the Thai researcher network and other websites such as the website of Institute of Biotechnology and Genetic Engineering, Chulalongkorn University. Furthermore, permission to promote the website via the websites of other units will be asked for.
On February 1st, 2013, SocialBakers, the most popular provider of social media analytic tools, report that Bangkok is the biggest Facebook city. Therefore, if the information about genetic resources and intellectual property rights is publicized by Facebook, it can reach a mass of Thai people.
One of the powerful ways to educate Thai people is lecturing. For this semester, there will be a class set up to teach graduate students in Biotechnology Program. This is a good opportunity to educate these students, as known as young blood researchers, about genetic resources and intellectual property rights. Moreover, the website and webboard can be promoted during the class. The knowledge from the lecture should be useful for these students when they have to work in the future.
There is a problem about the stability of the website because of the free hosting. In the future, the website may need to move to other more stable hosting.
Finally, with the website and webborad, they should be a tool for Thai people, especially researchers, to guide how to work in the situation that the access and benefit sharing of genetic resources and intellectual property rights are involved. Moreover, it is necessary to evaluate the problems and feedbacks to improve

the website. The raise in awareness about genetic resources and intellectual property rights will be evidenced in the questions and discussions in the webboard and also during the lecture which will be useful not only for improving any individual work, but also for the institute and government to see the significance of this issue and find a better solution in the future.

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National Intellectual Property Policy Formulation

BACKGROUND AND RATIONALE
Tanzania faces major challenges in the effective use Intellectual Property as a tool for harnessing technology for expediting the processes of socio-economic and cultural development. This means that the nation is not making effective use of Intellectual Property as a tool for enhancing economic growth and development. Lack of an appropriate policy and regulatory framework as well as poor coordination amongst the many institutions with a mandate on intellectual property issues undermines effective use of the various instruments of intellectual property, such as patents, utility models, geographical indications, copyrights, material transfer agreements and others are available for a wide range of use such as protecting the rights of innovators, marketing of unique products under value capture strategies and benefit sharing in the use of biodiversity resources.

The prevailing challenges include: limited awareness of the role of Intellectual Property in economic growth; limitations in human capital and socio-economic infrastructure to support the development, use and harnessing of intellectual property as a tool for socio-economic transformation; and limited capacity for innovation as well as appreciation of the need to take measures for effective protection of innovations, copyrights, traditional knowledge and other assets that are amenable to development and protection through intellectual property rights.

To address these challenges, Tanzania is implementing a project whose objective is to produce and secure stakeholder consensus and government approval for a National Intellectual Property Policy together with a National Intellectual Property Strategy and Program. The project, GRIP 12b 2012-2013, is generously supported by the EU.

OBJECTIVE OF THE PROJECT OF CHANGE
The Objective of the Project of Change is to have in place an effective and implementable Intellectual Property Policy that will stimulate and support the strategic development, promotion and protection of Intellectual Property as a tool for socio-economic development while ensuring fair returns to all stakeholders based on a competitive, efficient and equitable benefit sharing system. The policy that will provide the roadmap and guidelines for ensuring that the intellectual property policy, laws, regulations, strategies and practices supports the achievement of National Development Vision 2025:

"*..... create a strong, diversified, resilient and competitive economy, which can effectively cope with the challenges of development and which can also easily and confidently adapt to the changing market and technological conditions in the regional and global economy*".

ACTIVITIES AND METHODS

It is appreciated that this is a major cross-cutting project which involves about six Ministries with the mandate for key socio-economic sectors. These include: The Ministry of Industry and Trade with responsibility for management of the patent regime through BRELA; the Ministry of Agriculture, Food Security and Cooperatives with the mandate for Plant Breeder's Rights; the Ministry for Livestock Development and Fisheries with responsibility for Animal Breeder's Rights; the Ministry of Health with responsibility for all issues relating to access to health; the Vice President's Office with the mandate for environmental sustainability; and the Ministry of Natural Resources and Tourism with responsibility over the forestry sector; the Ministry of Communication, Science and Technology with its mandate over R & D that is in the hands of COSTECH; as well as a plethora of private sector stakeholders. The drafting process has been elaborate and time consuming because of the large number of stakeholders involved and the diversity of issues that have to be covered, and the fact that some of the stakeholders do not have adequate working knowledge of intellectual property issues and capacity building to bridge this gap has been part of the drafting process.

Yet good progress has been achieved. The first stakeholder's workshop was conducted at Ubungo Plaza on 29/12/2011 during which a team of national experts was appointed from among the afore-mentioned ministries and their agencies. The meeting commissioned experts from the agencies, universities and research institutes to prepare technical papers on all core IP thematic issues to inform the policy drafting process. Terms of Reference for the National IP Policy Committee were also discussed and approved during the same meeting. The policy has been able to produce four sets of documents as well as the following over the past 12 months:

i. Produced ten (10) draft technical papers on various themes of intellectual property to inform the policy drafting process. The papers are :

    i. Industrial Property
    ii. Copyrights
    iii. Emerging Issues:
        1. Technology Transfer
        2. Genetic Resources: Human Genomics and Access to Health
        3. TRIPS Agreement and Access to Health
        4. Human Organs Transplantation and Access to Health
        5. Traditional Knowledge and Medicinal Plants
        6. Genetic Resources and Animal Breeders Rights
        7. Genetic Resources and Plant Breeders Rights
        8. Global Value Chains and IP Value Capture
        9. Natural Resources and Biodiversity
        10. Technology Transfer

ii. A second stakeholder's workshop was conducted at Mbezi Garden on 8/2/2012 to receive and consider the foregoing technical papers. Participants included more approximately 40 members who had attended the Ubungo meeting and had been constituted into the Policy Drafting Committee. Members had the opportunity to comment on the draft technical papers.

iii. The Second meeting also established Sub-committee to consolidate the ten technical papers into one document, the National IP Policy Technical Papers. The sub-committees were supported by a Secretariat comprising of MIT personnel as well as technical experts from some of the stakeholder institutions. A copy of the Technical Papers document is attached herewith. The only pending work

on this volume is the need for final editing and inclusion of citations on authorities for many factual statements supporting the position taken on various technical issues. This work was kept pending the completion of the process of producing draft policy and strategy documents.

iv. Consolidated technical papers were edited by independent consultants reducing the volume from an average of 300 pages to 101 pages.

v. The Outline of the National IP Policy was produced and discussed to build consensus on the issues that would constitute the policy document and to identify the policy instruments applicable on each issue. This was quite a time-consuming process as many on the drafting team were either new to the policy development process or to the intellectual property field. It was a learning process for everyone.

vi. Drafting of the National IP policy in harmony with the National IP Strategy (NIPS) has been completed

OUTCOME AND DELIVARABLES

Despite the obstacles of financial and Time limitations the project is going on well, So far we have managed have to have three draft documents of:

1. Draft Intellectual Property Policy
2. Draft Intellectual Property Strategy
   (also, Draft Action Plan and Program to complement the strategy is still ongoing).
3. Draft Technical Background document

We have already undertaken consultative workshops to the five zones in Coastal zone, Central zone, Northern zone, Southern highland zone and Lake zone, involving almost the representation of the whole country for all public institutions in the Union Government and Zanzibar and private sector that did not participate in the drafting process. As a result of the stakeholder's workshops we have comments from stakeholders of the public and private sectors. These comments will improve extensively the policy and strategy documents, and make the policy implementable and effective.

Consultative workshops that have already been undertaken emphasized that consultations between all institutions with a mandate on IP issues and their agencies and departments to be incorporated into the policy development process to ensure ownership from the very beginning. Hence the consultations process has largely been an integral part of the policy drafting process and a significant proportion of the budget for consultations was used to facilitate this process. This strategy has been quite effective in the sense that it is the eight (8) experts from the institutional stakeholders who presented the draft policy and strategy to this consultative workshop.

LESSON LEARNED – WAY FORWARD

The main lessons I have learned in undertaken the project is the process itself and the steps of policy formulation. Not only that but I have learned how to plan the project in relation to time and resources utilization. Not to be over ambitious and set unrealistic targets.

The next steps to be undertaken on the basis of the draft Policy and Strategy documents (this process will not await the completion of draft implementation action plan and program).

i. Following completion of the consultative Stakeholder's workshops in five zones the comments obtained will be incorporated to update and improve the documents.
ii. Presentation of the policy documents to MIT management for approval, ownership and commencement of the Government approval process.
iii. Facilitate Government Approval Process of the Policy
iv. Publication of IP policy documents after approval by the Government

v. IP policy dissemination and awareness campaign within the public sector and private sectors through institutional workshops and stakeholder's zonal workshops. This would include workshops for the Western Zone; the Southern Highlands Zones; the Central Zone; and the Northern Zone.
vi. Meetings between the six Ministries with mandate on IP thematic issues to agree on implementation action plan and program. To the extent possible implementation is an ongoing process in certain areas and the purpose of the Action Plan is to expedite ongoing programmes, rolling out implementation to new issues and/or areas, and initiating the huge awareness and skills development actions that are key to successful harnessing of IP for socio-economic transformation.

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Technical application of disclosure of origin in patents applications

Background
The *disclosure of origin* is a statement containing the taxonomic and geographical origin of all genetic material or derivative products used to carry out an invention or commercial process. The purpose of this disclosure is to verify that any patent application fulfills with all the legal access to the resources.

The existing policies that regulate the use of genetic resources in Colombia are mostly derived from the joint decisions of the Andean countries. Therefore, it's regulated by the Decision 391 of 1996, Common Regime on Access to Genetic Resources and Decision 486 of 2000, Common Provisions on Industrial Property.

In patent documents is not common for the applicant to point out the genetic resource used from which an invention is developed. The patent system it's based on the good will of the applicant, because of this, the disclosure of the description of the invention is enough and does not include a mandatory requirement to indicate the name of the biological resources used to develop the invention, never the less the requirement to indicate the geographical origin where this resource was collected.

It is not easy to identify whether a given invention has access to genetic resources (GR) or derivatives products (DP), since each invention develops its products and / or processes using several biological materials and gives them a specific use. Besides all of the above, there haven´t been well established neither laboratory techniques nor analysis techniques involving access to genetic resources or derivatives. Governmental entities that handle this matter, have different internal criteria and also between entities, to determine whether a research project or invention makes use of GR or DP and if it requires access contract, which is a particular requirement of patent applications in Andean countries that make use of these resources.

Given the above, it is necessary to identify a system of patent applications that make use of genetic resources or products from countries of the Andean Community. This identification system should consider laboratory techniques involving the use of GR or PD and consider access criteria set by RG National Authority on the subject. Also, must be a user-friendly guidance to the examiner-user and easy implementation in the patent office.

Objectives
Principal Objective:
Identify the use of genetic resources or derivate products in patent applications.

Secondary Objectives:
- Identify techniques involving access to genetic resources or derivatives.
- Identify databases that store Colombia's biological resources.
- Determine the more adequate criteria for requesting access contract in patent applications.

Activities and Methods

Review criteria with ABS experts and disclosure of origin

In the country have developed different forums and workshops which addressed the issue of disclosure of origin and biodiversity protection. Some of these events have allowed experts to review criteria ABS issues, disclosure of origin and experiences in the field with patent offices. These events also have opportunities for discussion during the meeting, have publicly available information that summarizes the content of the event.

Search of databases of taxonomic inventories

Search was conducted to find databases and information systems of biodiversity inventories of the countries of the Andean Community.

Bibliographical review of disclosure of origin

Review the different information regarding disclosure of origin, mainly focused on techniques involving access to genetic resources, patent international classifications (PIC) and forms of disclosure of origin in patent documents.

Development of a guide for identification of patent applications that use genetic resources

Based on the gathered information and the guidelines all ready established in conjunction with the environmental authority was drafted guide for identification of patent applications that use genetic resources and /or derivate products. Once, there was socialization with the patent examiners, informing them of the procedure to identify applications that use GR or DP.

Outcome and deliverables
The overall results of this PoC allowed to know aspects of available information about Andean and Colombian biodiversity, the guidelines used by the environmental authority of the authorization requirement for access to genetic material or by-product and procedure that can be used to identify applications patent using GR or DP.

With respect to the inventory database, three databases that meet the biological information system of the Andean Community or Colombia have been identified. These bases are what we are now using to establish whether a particular biological resource is found in Andean and / or Colombian territories:

- Information system and environmental biodiversity of the member countries of the Andean Community. Administered by the Secretariat of the Andean Community. http://biocan.comunidadandina.org/especie/index.php

- Colombia's biodiversity Information System. Managed by the Alexander von Humboldt Institute. http://data.sibcolombia.net/species/

- Scientific online collections of the Natural Sciences Institute, National University of Colombia. http://www.biovirtual.unal.edu.co/ICN/

Regarding the criteria used by experts in ABS for implementing disclosure of origin issue, the following events allowed to know some positions on the issue:

- Workshop on Biodiversity and Bioprospecting. Ministry of Environment - Institute Alexander von Humboldt. Bogota- Colombia. 20 and 21 November, 2012.
There were presentations and discussions around the issue of bioprospection and the way to implement it as a national, institutional and educational policy, and existing regulations, facing research and innovations arising from bioprospection could be created.

- Regional Workshop on disclosure of origin and legal provenance of genetic resources and traditional knowledge in the patent system. Bogota - Colombia, 22 and 23 November, 2012.
This workshop conducted by the Secretary of the Andean Community, brought patent offices and environmental entities from countries of the Andean Community. We presented case studies of patent applications, discussed the difficulties identified in Andean patent offices. Similarly, the issue was presented from the perspective of the patent offices of U.S. and Switzerland. Training initiatives were proposed to improve and standardize the study of the subject by patent examiners and proposed modifications to the Decision 391. The summary of the meeting and the presentations are available on the website of the Andean Community[44].

- National Workshop on biopiracy and instruments recording traditional knowledge. 18 and 19 February 2013. Bogota.
This workshop conducted by the Peruvian Comission of Biopiracy, presented case studies of patent applications that use Peruvian Tradicional Knowledge, and showed the procedure to identify, track and require authorization for access and benefit sharing (ABS) to the patent applicant.

The deliverables of this PoC are two: a guide for the detection of patent applications that use RG or PD from countries of the Andean Community and a presentation-search guide biological material. The following sets out the content of this item:

Guide for the detection of patent applications that use GR or DP from countries of the Andean Community.

To establish whether a patent application using GR or DP from countries of the Andean Community, you must follow six (6) steps, which serve as a checklist and are neither complementary nor mutually exclusive. The six steps are:

1. Check the application form in GR declaration.
2. Check the IPC. Is in the class related with use of DP or TK?
3. The title of the application mentions a biological species?

[44] Andean Comunity web site. "Taller regional sobre desvelo de origen y procedencia legal de los recursos genéticos y conocimiento tradicional en el sistema de patentes". http://biocan.comunidadandina.org/biocan/index.php?option=com_content&view=article&id=129&Itemid=104

4. Check in claims the mention of biological species. This use requires access contract in accordance with the guidelines of the National Environmental Authority?
5. Check in the description if the use of biological species is essential for the development of the invention. This use required access contract in accordance with the guidelines of the National Environmental Authority?
6. Search the biodiversity information systems if the biological species is endemic to the Andean Community.

Analysis of the application of the checklist:

• If the first four (4) steps, the answer is no, it is concluded that the application does not use GR or DP. Therefore, it is not necessary require access contract.
• Step 2, if the answer is no, you must continue to step 3, then this step does not always reflect the reality of application.
• If in steps 4 and 6 the answer is positive, the patent office must request access contract to GR or DP (as appropriate).

In relation to the international patent classification, the following classifications were found to be relevant to detect inventions that use DP, GR or TK:

PIC	**Type of invention**
A01G 1/00	Horticulture; Cultivation of vegetables
A01G 1/04	Cultivation of mushrooms
A23L 1/221	· Natural spices, flavouring agents, or condiments; Extracts thereof
A23L 1/222	· · · from fruit, e.g. essential oils
A61K 35/00 (toda la categoría)	Medicinal preparations containing material or reaction products thereof with undetermined constitution
A61K 36/00 (toda la categoría)	Medicinal preparations of undetermined constitution containing material from algae, lichens, fungi or plants, or derivatives thereof, e.g. traditional herbal medicines

Presentation of identification guide and search of biological material.

He gave an overview of patent examiners, informing them of the steps to identify applications that use RG or PD and how to perform searches of biological material from Andean or Colombia. There was a good reception on the proposed procedure and the talk was shared in a document so that all examiners implement it.

Lesson learned -way forward
The development of this project helped achieve the objectives. Overall, the main objective was achieved. However, need to work on the implementation of the guidance within the organization, since not only lack socialize with a group of examiners but with other officials involved in the prosecution of the patent application, such as administrative and lawyers. Moreover, the directors of the entity must review the guide and approval it in the proceedings of procedure patent.

Moreover, from the development of this project identified the following issues that must be addressed to the present and future development of the subject:

1. Difference of opinion within the environmental authority. That implies that the criteria used by the technicians of the environmental authority and the legal office of the same entity are in some cases different and that leads to uncertainty about when we have to require contract access to a research project or a patent application. It also gives us little certainty about the guidelines that we all ready established along with the environmental authority regarding this matter.

2. Little information available on techniques involving access to genetic resources. We have two IUCN reports that define the topic and address some of the techniques that involve access. We also have some documents regarding CBD meetings discussing the issue of disclosure of origin; however, these papers do not discuss techniques involving access.

3. Different legislative initiatives that involve a reform on the issue of access contracts but that have taken extensive discussion times and the established guidelines have varied. Currently in Colombia the decree for the Andean Decision 391 it's being made, which seeks to clarify and facilitate the processing aspects of the access contract. At the time, they are conducting meetings of the committee of Andean genetic resources and regional meetings on the subject, also seeking to modify the Decision 391 and make adjustments to the Nagoya Protocol ratification in member countries.

Some relevant recommendations with regard not only to the subject of this project but the handling of the issue of genetic resources, derivatives and commercial use, are:

- All Andean patent offices have difficulty identifying patent applications that use genetic resources and derivatives. Which is evidence collected reports of meetings held between the Andean countries.

- The access contract requirement has been identified in most cases for domestic applicants (Andean countries) and on rare occasions for international applicants, since the last one do not disclose the biological resources used to carry out their inventions.

- The disclosure of origin in accordance with the interpretation given by the environmental authorities, is understood as the disclosure of employee biological resource and geographical origin of the biological resource collected. This definition as well as being very practical, avoids discussion of phylogenetic-geographical origin of the resource, according to which you want to find, the place of first occurrence of a particular biological species or variety and where usually the technicalities of the definition of the species or variety end up creating an uncertainty range on disclosure of origin.

- The local environmental authority defines the access contract requirement according to the use that is given to the biological/genetic resource collected. In the case of cultivated species, if the purpose of the use of cultured tissue is to procure plant propagation, it's understood then as a conventional use of the resource, therefore does not require access contract.

- There is a unified information system of Colombia´s biological resources; which provides a complete database to search if a particular plant or animal species is present in the country. This information system is also available for consultation on any species of the Andean countries.

- It is needed to make a disclosure requirement delimitation of origin in patent applications, to establish whether the use of genetic resources or derivatives should be part of the essential features of an invention and therefore be part of the claims of the patent application, or the mere indication of the use of a resource in the description, but not claimed a product or process that uses it, requires obtaining an access contract.

- Communication between patent offices and the environmental authority, which issues access contracts, it is essential to completely understand the requirement and also to unify criteria for the request of the contract. This communication channel should be permanently open and to have some sort of formality.

- Training is needed among patent examiners, so as to understand the extent of disclosure of origin and to the requirement established in the different technical areas and inventions that are developed. In addition, to have consistency in the application of the requirement of the access contract.

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Revising IP Policies and Strengthening IP Management at KARI with A View Of Improving Technology Dissemination And Commercialization Of KARI Varieties, Breeds, Formulations And Inventions"

Background

Kenya Agricultural Research Institute (KARI) is a national research institution established by the government to conduct research in agriculture for the benefit of the public. KARI is the institution mandate to improve the lives of farmers as well as consumers in Kenya by innovations that allow for more efficient ans sustainable use of land and natural resources. KARI is the largest breeder of agricultural plant varieties in Kenya further KARI produces innovations which are suitable for use by farmers in Africa to increase yields and reduce drudgery. By law, it holds its Intellectual Property on behalf of the public for public benefit and has a vast portfolio of intellectual property including plant varieties, breeds, formulations and inventions.

It is necessary for the institution as it grows and develops to become less reliant on funding from outside parties which would allow the Institute to exercise complete control in the direction of research activities. This is particularly important when dealing with crops that are critical to food security yet have low commercialization potential such as tubers, beans, subsistence agriculture. Such crops receive low research funding and private seed companies do not take up licenses to commercialize them due to issues such as low shelf life.

The institution therefore must find alternative sources of funding to conduct research which benefits farmers and the public by the direct transfer of the technologies to the farmers. This form of transfer has been supported by the government of Kenya which has been purchasing large volumes of cutting for distribution to the farmers around the country.

This gap in funding can be achieved by the institution's utilization of its extensive Intellectual Property portfolio as an income generation avenue.

In the past, the institution has been licensing varieties to commercial seed companies to produce ans market in exchange for royalties however the licenses did not generate income as companies underreported sales or failed to report any sales at all.

To this end the project of change seeks to set the ground work that will allow results in establishment of mechanisms for viable commercialization of Intellectual Property and lead to the eventual establishment of a separate company specializing in commercializing Intellectual Property for the Institution.

The Institutional framework for commercialising Intellectual Property exists in the form of a commercial unit known as **Agricultural Research Investments Services** which currently generates income from various sources including income from fixed assets and sale of produce however these revenue streams are finite in nature and to grow them would mean diverting resources from the core mandate of the institution which is not desirable.

National Legislation for Intellectual Property protection exists in the form of

1. The Industrial Property Act
2. The Seeds and Varieties Act and;
3. The Constitution under article 11 recognizes and protects Intellectual Property.

Kari being an institution whose mandate is to carry out research for public good is faced wit the need to balance sustainable research through commercial activities as contemplated in this project and public good. It is my argument however that the two can coexist as the commercial activities would fund the public good mandate. Further, it is noteworthy that the institution also transfers technology directly to farmers by distributing seeds, holding farmer field days and training farmers directly and through print and electronic media a good example of this is the recently introduced mobile phone application that allows farmers to consult the scientists directly and receive appropriate advice.

Activities

It was apparent from the onset of the project that there existed a dysfunctional relationship between the Institute and its Intellectual Property. In particular;

- There was no comprehensive record of the Intellectual Property held by the Institute it was noted that this data was scattered within the Institution with no mechanism for ensuring that the data on technologies is housed in one central location ensuring greater accessibility and management.
- The Intellectual Property Policy did not address the current needs of the Institute.
- The awareness program on Intellectual Property was carried out in a manner that was not uniform and key areas of interest were often ignored.
- The license agreement used allowed for loopholes through which royalties were lost.

These areas were identified as the areas in need of redress in order to rectify the dysfunction:

1. The first activity was to carry out a comprehensive audit of Intellectual Property held by the Institution. This was completed in December 2012 and a publication entitled “Innovations And Technologies Information” was published as result of the activity. This document enables quick and easy references to the portfolio.
2. a training manual for the awareness program which will standardize the format of training of staff on Intellectual property issues has been completed. This is expected to result in a uniform and relevant manual that will impart to the scientists generating the Intellectual Property with appropriate knowledge and procedures.
3. The review of the Institutional Intellectual Property Policy was a critical component to the successful completion of the project and this has been competed. The new policy includes procedures for identifying IP, the access and exchange of GPRs with other institutions and templates for all documents Including License Agreements, Non-Disclosure Agreements and MTAs. This will also include introduction of a ‘reward for innovative staff policy’ as part of the IP policy.

4. The license agreement used by the institution was revised and clauses requiring independent verification of the company sales reports included. This will ensure that the issue of underreporting is addressed. The format and language were also simplified to increase readability.

Challenges in implementing the project

1. The National Agricultural Research Systems (NARS) reforms that seek to harmonize and unify all the agricultural research bodies into one institution have been passed into law and will fundamentally change the structure of research organizations in Kenya. This has resulted in uncertainties as to the future of KARI indeed all research institutions as they currently exist, however it was agreed that the activities being carried out under this project of change will be useful to the KARI successor in title as the sustainable utilization of the products of research will remain an important issue.
2. Ignorance of the potentials of well exploited Intellectual Property.
3. Resistance by the public of the proposal to commercialize what is public goods in Kenya.
4. Unrealistic expectations of what the project could achieve given the time and resources allocated to it. .

Deliverables within the PoC

Despite this project focusing on aspects of commercializing intellectual property for purposes of income generation, Profit has not the immediate goal as it was viewed as an opportunity to effect a change in the way intellectual Property is viewed and related to in the Institute.

This project was intended to address the dysfunctional relationship which currently exists between the Institution and its Intellectual Property.

Part of the cause for this dysfunction has been the seemingly irreconcilable difference between commercial IP and the institution‘s mandate for conducting research for public good.

This project sought to offer a new point of view on commercial IP as an opportunity to gain more control on research activities thus creating greater public good, this new way of viewing Intellectual Property was intended to have the following out comes ;

1. Greater compliance with the Institute’s Intellectual Property Policy allowing the Institute to protect prior to publishing.
2. Identification of technology appropriate for commercialization.
3. Long term projected outcome transformation of ARIS into a holding company for KARI/KARO INTELLECTUAL PROPERTY along the lines of ;
    - Yissum Research & Development *Company* of the Hebrew *University of Jerusalem*.
    - RDA –South Korea
    - Embrapa – Brazil.

Conclusion

The single most important effect that this project has had has been that it has caused a shift in the attitudes that were held about the relationship between Intellectual property and the public good mandate. The project has resulted in greater understanding of the potential that commercializing intellectual property promises. The discussions on how to best balance the two objectives is an ongoing process but there is now an awareness of the potential.

The clear guidelines set out in the manual have enabled a more systematic training program for staff and currently training of trainer is ongoing.

For a research institution whose output is intellectual property, there must be a clear understanding of the importance of intellectual property both as a result of the research mandate but more importantly as an asset to be exploited. Intellectual property is nor protected just for the sake of protection rather it is to afford the innovator the opportunity to benefit from the innovation. Keeping in mid that protection is always time bound it is necessary to start benefiting as early as possible. For an institution such as KARI benefiting includes licensing, transferring technology and dissemination of information to the public and entering into partnerships with private companies.

This PoC will have a long term tangible change to the institution and that the same will result in more efficient and cohesive management of IPRS and GPR held by the institution. This will be in line with the mandate of the Institute of holding the same for public good.

In the eye of the storm

… Building Capacity to Manage Biodiversity, Food security, Trade and Regulation.

Since its start in 2003 the (GRIP)-program is located in the hub of crossroads: especially as regards international trade and development cooperation. For example: environment, biodiversity, climate change, food security, renewable energy, land management, genetic resources, traditional knowledge, bioscience innovation, patents, global trade, public-private partnerships and economic development.

GRIP –Genetic Resources and Intellectual Property Rights is an advanced international training program supported by Sida. Focus is on participation by senior practitioners in the "GRIP-arena" from Sub Saharan Africa, South East and Central Asia and South America/Andean community. So far 281 individuals at senior level have been trained including presiding judges, patent- and plant variety examiners, trade negotiators, gene bank curators and plant breeders, research leaders, IP-managers in academic and commercial institutions, managers of access and benefit sharing issues related to biodiversity and genetic resources. The ´genetic policy landscape´ is overloaded with acronyms. Many of them heavily loaded with emotional and political content and connotations. These acronyms can be "boiled down" to roughly three key issues, **Access**, **Knowledge** and **Innovation** which are transforming science, world trade and international relations and provide new rules for exchange and use of biological matter. In the GRIP-program we focus on training of professionals working at the national and institutional levels. Our ambition in the GRIP management team and among our lecturers/resource persons – is to try to provide a sober "navigation map" for a realistic handling at the national level trying to realize commitments made by the same nations in different international agreements and treaties.

This report is based on the GRIP-12 a and b final reports, which we find representative for the outcomes of the changing curricula we deal with since a decade. Close to 50 national reports give a broad overview of the complexities involved in dealing with obligations and implementation of multiple commitments under a number of different international agreements at the national and institutional level.

As this report is published in early 2014 we face a rapidly changing world in terms of geopolitics and technological leapfrogging. Asia and Sub Saharan Africa are rapidly catching up in science and technology and through heavy investments in modern infrastructures (physical and digital communications; hydro power captures; mineral and fuel explorations); rapid growth of a middle class and population increase leveling off. Local and regional markets in the "South" are expanding at fast rate. All this challenges the current GRIP-agenda and we are currently working on new initiatives building on the GRIP experiences. These new initiatives aim at assisting countries in the South to understand how these new trade regimes, agricultural innovations and the new biology can support the development of sustainable bio-economies and pro-poor economic growth.

Carl-Gustaf Thornström, Executive director