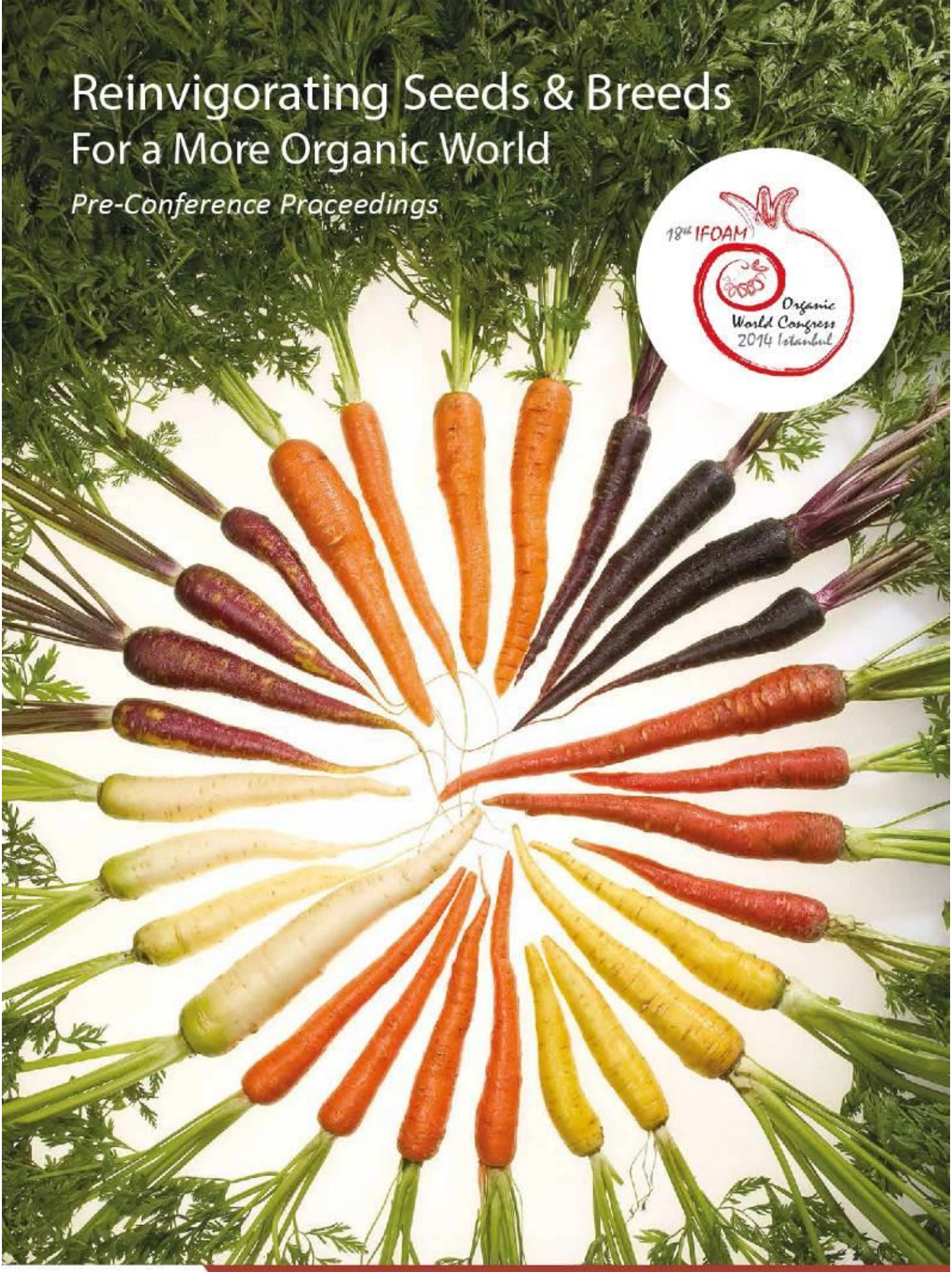
Reinvigorating Seeds & Breeds
For a More Organic World

Pre-Conference Proceedings



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REINVIGORATING SEEDS AND BREEDS FOR A MORE ORGANIC WORLD

Pre-conference proceedings

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THE WORLD WE WANT

Participants in the Pre-Conference Meeting and Seeds Workshop during the IFOAM Organic World Congress in Istanbul this past October shared a common vision from different perspectives.

Forty participants attended the pre-conference meeting from 12 different countries, and over 50 conference-goers attended the seed workshop. Participants came from a wide variety of backgrounds, including farmers, NGOs, civil-society representatives, seed businesses, organic retailers, consumer groups, breeders, academics and many more.

The diversity contributed to a vibrant discussion and many critical challenges and opportunities surfaced regarding the future of organic seed and public plant and animal breeding.

This report attempts to capture and analyze the current status of seed breeding and conservation today as described by the participants at the IFOAM events, with the aim of providing a platform and "to-do-list" for advancing towards a more sustainable future for organic seeds.

Andre Leu, President of IFOAM, Australia.

"Participatory breeding is probably the best example of what we do instead of the open market model where farmers just buy seeds. We should allow farmers to develop seeds that are the best for their specific conditions. Saving these seeds is the best model for most world farmers"

Michael Sligh, Rural Advancement Foundation International, USA.

"The model that needs strong encouragement, is one based on farmer-centered, regionally focused, participatory cultivar and breeds development. One, which can tap the genius of the farmers and the breeders, and one which protects farmers and breeders rights to seed savings and germplasm improvements. There is also urgent need to develop stronger ties to seed banks to ensure that stored seeds are screened, evaluated, utilized and restored, as they represent our collective global heritage, which is critical as we continue facing climate change"

Sue Edwards, Institute for Sustainable Development, Ethiopia.

"This is about farmers' rights. The farmers [in Ethiopia] are still very much their own decision makers, but change is coming. We have to commercialize and bring the farmers into the monetized economy – for children to go to school, for them to have better housing etc. – but how you do it is important, and it has to be fair."

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THE WORLD WE HAVE

Seed Regulations: Spectrum of Freedoms and Restrictions

The regulatory situation for seed production and marketing varies dramatically from country to country. The significant point of this for the purposes of this report is that the diversity of regulations and legislation might make cross-cultural organizing for public plant and animal breeding more complex, as not all farmers face the same challenges, and different opportunities exist in different contexts. It appears that a clear understanding of which models for Participatory Plant Breeding (PPB) work in which legislative contexts is an important step towards understanding how to promote PPB internationally.

To briefly summarize, internationally there are two dominant systems for seed regulation. These systems combine seed laws regarding marketing and testing of seeds with legislation governing Intellectual Property Rights (IPRs). In Europe, the Union for the Protection of New Plant Varieties (UPOV) Convention, which was established first in 1961, is strictly linked to the Seed Legislation and seed marketing is heavily regulated in all aspects, to the point that if you want to sell seeds at all they must be registered in a national catalogue and meet certain testing criteria. The basic criterion is known as DUS, for distinct, uniform and stable, and is referenced in many different schemes regarding international seed trade.

The other major system was established in the United States, where the process of patenting plants began as early as 1930. The US has signed on to several of the same conventions (such as UPOV) as European countries to allow for international trade, certification of seed and to agree upon testing criteria. However, in the US these controls are voluntary. Seeds do not have to be registered in a national catalogue, for example, and thus several of the marketing restrictions experienced in Europe do not apply to farmers in the US. Nonetheless, the broad-reaching protections built into plant patents in the US are more limiting in some ways than the UPOV system, and thus have gone a long way to limit farmer and breeder access to germplasm.

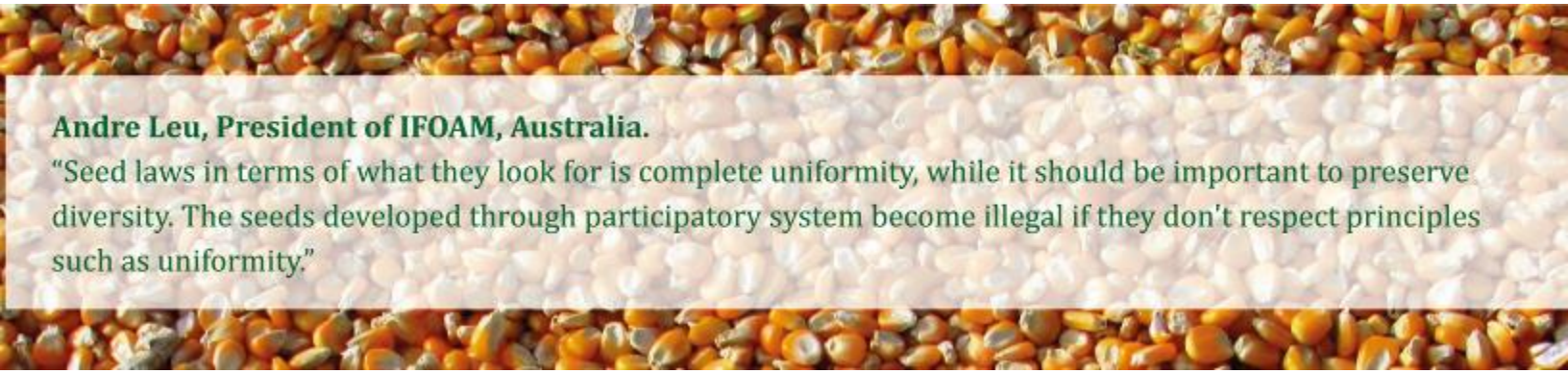
Outside of the US and EU, most other countries have established their own seed law, but the majority have set up something similar to the EU model with a national registration system and catalogue. Many have signed on to one of the two versions of UPOV, which requires a national registration system and requires that seeds be tested according to the DUS criteria for protection, so there has been an international trend moving in this direction.

There are significant aspects of seed regulation that go beyond UPOV and patents. There are basically 5 pillars in the international seed regulation framework: 1) individual country-based seed laws, 2) seed certification schemes, 3) seed testing, 4) phytosanitary measures, and 5) plant variety protection and intellectual property rights.

Country-based Seed Laws

Today seed laws are present in most countries of the world. A country's seed laws determine how seeds are managed inside the country, in terms of their marketing, which basically includes registration and certification.

Seed laws vary on a wide spectrum globally, but there are many trends and some commonly used elements that have had dramatic impacts on farmers' rights and biodiversity. These mostly are modeled after the European approach to registration and certification of seeds.



COMMONLY USED ELEMENTS:

- Compulsory registration of varieties
  - If a variety is not registered, it cannot be legally sold
  - This often applies not only to sale of seeds but to donation or non-monetary exchange among farmers (Ex: in Europe with some exceptions, and in Latin American and Turkish seed laws)
  - To be registered a seed must comply with certain criteria, including DUS standards and for agricultural species the VCU criteria (Value of cultivation and use)

- Compulsory registration of seed breeders, multipliers and dealers
  - If someone is not registered, they cannot produce or sell seeds
  - There are often difficult requirements in order for someone to become a registered seed breeder/multiplier

Pedro Mendes Moreira, ESAC-IPC, Portugal.
"The legislation [in Portugal] abides to the EU regulation on the matter of seeds. There are some derogations with regards to the conservation of traditional varieties, but it is limited both in quantities and type of seeds. Otherwise the farmers can organizse in cooperatives to get the supervision necessary for registering new varieties, but the impact is also limited."

Olowe Viktor, Nigeria.
"It is difficult for farmers to save seeds in a condition of purity and it is therefore difficult to approach the National Seed Service in order to obtain a certificate of registration."

Roberto Ugas, Professor of Agroecology at La Molina University, Peru.
"[An improvement in Peru:] is the new law on seeds which allows the registration of what they called non-certified peasant seed producers. This is a new category, we don't know yet what will come out of this legislation, but at least the government wishes to implement the law to have current information of who and where these people are, people who have improved their capacity for seed production and might eventually enter into a market for non-certified."

- Compulsory seed certification
    - If a seed is to be sold or traded, it must also be certified which means formally tested in national field trials.
    - Example: Recent Latin American seed laws requiring certification of seeds also require governments to delegate at least part of the certification duties to private companies.

Some impacts of these common elements:

- Farmer inspections and "illegal" seed dealers – As a result of seed laws utilizing these common elements in Latin America, farmers may face a new wave of inspections and potentially fines for being illegal seed dealers. "That is, if they keep seed for their own use without registering or officially testing it, they will be only able to keep the seed for their own replanting and the inspection will verify whether the amount saved is no greater than what the authority deems reasonable." (From GRAIN article "Latin America: The

Mantra of Privatization" July 2005).

- Destruction of peasant or farmer-based seed exchange systems – Especially in countries where breeder and multiplier registration are required, farmers will not be able to exchange seeds unless both the seed is registered and they themselves are registered. The result is that informal seed system exchanges become illegal.
- Loss of local varieties and landraces – Many local varieties cannot comply with the homogeneity requirement in seed certification. In order to make them comply with these criteria to register the seed, they will have to be bred and may lose the traits that make them valuable to their local climate and culture. These varieties either face illegal status, or alteration that may lead to their disuse under these laws.

Seed Certification Schemes

If a country law requires seed certification, most likely it requires certification that meets an internationally agreed standard. The idea of harmonizing seed certification in international standards was to facilitate trade, by removing country-specific barriers and giving seeds a "passport" that verifies their identity as the promised variety and guarantees certain quality characteristics. There are primarily 2 international systems in the world. The Organization for Economic Co-Operation and Development (OECD) has 57 countries signed on to its certification schemes, and has developed a mandatory/compulsory system for seed certification. (There is also a non-compulsory system developed in AOSCA.)

The OECD has developed seven certification schemes for different categories of seed species (ex: grass and legume seed scheme, and cereal seed scheme) with the aim of facilitating trade. Countries may sign on to individual seed schemes, therefore some schemes are more widely used than others.

- OECD certification can apply to seeds that satisfy DUS tests
- The schemes are all based on 2 key criteria:
    - Varietal Identity – the identity of a variety is defined completely by an official description of its characteristics
    - Varietal Purity – the proportion of plants or seeds within the population that conforms to the official description of the variety.

Seed Testing

In order to certify, register, and otherwise officially describe seeds, certain tests have been standardized. Two significant tests have a wide-reaching impact on the seed market are DUS testing and VCU testing. DUS is referenced both as a criteria for plant breeders rights in UPOV, as well as a requirement for the registration of a new variety. It is also a requirement for OECD seed certification, and is embedded in many country-based seed laws.

DUS Testing

- Distinction – demonstrating that the variety is truly different from others
- Uniformity – demonstrating that the variety performs and has homogeneity in genetically
- Stability – demonstrating that the variety performs in this manner

consistently
- Participants in the workshop at IFOAM have pointed out that DUS criteria limits the spectrum of commercialized varieties to primarily those that are "improved" in the formal system.

VCU Testing

- Value
- Cultivation
- Use
- VCU is a pre-requisite for *arable crops* in the EU, and certain crops in many countries internationally (Turkey, Latin America, and others that have adopted the EU model.) In order to be registered, a variety must prove to perform above average in these three categories. While some things such as resistance are also considered, the primary focus of VCU is yield – demonstrating that the variety is valuable for commercialization.

Interviewees point out that the homogeneity and yield-based focus of DUS and VCU tests have further driven the focus of breeding away from sustainable criteria.

Phytosanitary Measures

The fact that seeds may carry with them pests and seed-borne pathogens poses a significant international risk. The International Plant Protection Convention (IPPC) was thus established. IPPC is both a treaty and a standard-setting organization, approved by the WTO Agreement on the Application of Sanitary and Phytosanitary Measures (WTO-SPS Agreements). To be eligible for import, seeds will need to carry a certificate that they meet phytosanitary requirements, and that they were tested in an accredited laboratory.

Plant Variety Protection and Intellectual Property Rights

By far the most complicated aspect of the regulation framework is the different components of plant variety protection. In fact, Intellectual Property Rights for plants are relatively new in agriculture, as they were not broadly, internationally established until the 1960s, with the establishment of UPOV (exception being the US, where patents were in place since the 1930s). The general trend has undeniably been to increase breeder rights and plant protections, while decreasing both farmers' rights to save seed and other breeders' rights to access protected seed for different breeding work.

EUROPE AND INTERNATIONAL APPROACH: PVP under UPOV

The International Union for the Protection of New Varieties of Plants (UPOV) Convention establishes agreed-upon procedures for guaranteeing intellectual property rights to breeders. However, there are 2 versions of UPOV in common use – the older version, which allowed more farmers rights, and the newer version.

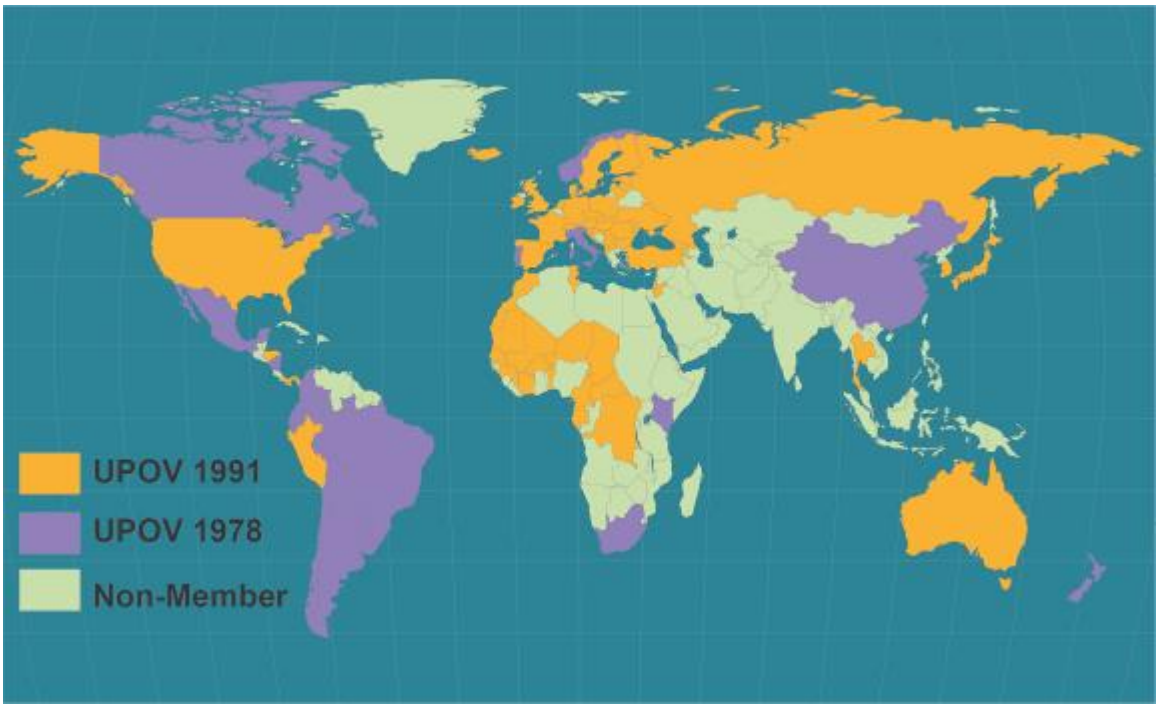
Until 1994 UPOV was a small organization with mostly developed country members. After 1994 and the creation of the World Trade Organization, and particularly the establishment of TRIPS (the Agreement on Trade-Related Aspects of Intellectual Property Rights), WTO member countries have been required to establish seed laws that offer some kind of effective "*sui generis*" system. Developing countries and especially those in economic transition seeking broader access to international markets (such as Turkey, for example) have thus turned to UPOV as a model to satisfy this requirement, rather than spend the extensive investment to develop a model of their own in-country. At the same time, the proliferation of bilateral trade agreements have pushed for or required membership in UPOV. Thus, since 1994 membership in UPOV 91 has been expanding throughout the developing world as well.

UPOV 78 (established in 61, but not changed much in the 78 version)

- The owner had the right to control commercial propagation and marketing, but no other uses. Farmers were free to save seed for their own use for as long as they wished, and use the harvest without restriction.
- There were no rights over the genetic content of the variety. Other breeders could freely use a protected variety to develop their own material.
- There was no novelty requirement. As long as the variety was "distinct, uniform and stable" (DUS) it could be protected.
- There was no requirement to prove invention. A pure discovery could also be protected.

UPOV 91

- Farm-saved seed is no longer automatically allowed. Only as an optional exception can a government legalize seed saving for the farmer's own use – and even then the seed company has the right to a royalty payment.
- The monopoly also extends to the harvest, and optionally even to products made from the harvest. If a royalty has not been paid on the seed, the variety owner can demand payment from the final consumer of the harvest.
- Other breeders are still allowed to use protected varieties for breeding, but if a new variety is "essentially derived" from an existing one, it does not qualify for a PVP of its own. This rule was introduced specifically to block genetic engineering companies from getting new PVP protection on varieties just because they added a single gene.
- There is now a novelty requirement.
- Double protection (PVP plus patents) is now allowed.
- The minimum term of protection is increased to 20–25 years (previously 15–18).
- All plant species must be covered (previously only a minimum of any 24 species).



UNITED STATES APPROACH: No registration, but PVP and Patents

1. **Material Transfer Agreements (MTA)**: bilateral agreements between two parties for use of germplasm, based on contract law.
    - In one perspective, they can be heavily restrictive. If a company or institution does not want to share something, there is very little recourse.
    - On the other hand, some say these pose an opportunity to be less restrictive and actually increase access. **EXAMPLE**: The International Agricultural Research Centers (IRRI, CIMMYT, etc) provide their materials from their germplasm collections using SMTAs agreed under the ITPGRFA, with the stipulation that they or their derivatives may not be subject to intellectual property protections.[1]
2. **Plant Breeders Right (PBR, essentially same as PVP)**: a type of protection for varieties that can be patent-like in application, but generally allows for certain exemptions.
    - Breeders' Exemption – gives statutory authority for using protected varieties in a breeding program – meaning the variety owner cannot control germplasm use.
    - Farmers have the right to save seed for re-use on their farm despite a PBR status.
3. **Patent Law:** patents provide the strongest level of protection and are the most exclusive. Farmers do not have the right to save patented seed for re-use on their farm. It is unclear if breeders can access patented genetics for use in their breeding programs, and it depends on individual case-law – making it unlikely that anyone can get access. Furthermore, US patents have been awarded for a variety of agriculture-related products, including research methods and tools, animals, plants (both genetically modified and traditionally bred), modified genes, gene sequences and Expressed Sequence Tags (ESTs). Some grants have provided broad scope, with the potential to interfere with research on a wide basis.

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1 Lesser, W., 1998. Sustainable Use of Genetic Resources Under the Convention on Biological Diversity: Exploring Access and Benefit Sharing Issues. NY: CABI.

International Treaty on Plant and Genetic Resources for Food and Agriculture

The ITPGRFA has been adopted by FAO in 2001, based on the previous non-binding resolution 5/1989 that recognized the existence of farmers' rights as mentioned by the International Undertaking on Plant Genetic Resources in 1986.

Among its objectives it is possible to focus on two general goals: promote a sustainable use of crop genetic resources and ensure an equitable sharing of the benefits. It also envisions ways to recognize and promote farmers rights through the protection of traditional knowledge, the benefit sharing principle, participatory decision making and the de facto farmer right of saving, using, sharing and selling farmers' seeds.

Source: SarahTz (Flickr)

The introduction of PVP and the idea behind UPOV 78 recognized the principle of free exchange of germplasm among farmers, thus including the breeders' exceptions and farmers' privileges. However, the 1991 version was designed to protect the products of commercial seed production, and farmers' privileges were curbed. The current international negotiation are still trapped between these two paradigms, one of industrial production of seeds requiring IPR (TRIPS), the other of traditional biodiversity conservation (Convention on Biological Diversity). The latter objective is based on the idea that genetic resources are property of the States under which they developed their features, as stated in the CBD.

The developing countries have tried to include farmers rights under the TRIPS by updating Article 27.3(b), but divergence still exist with this regard. The article refers to the patentability exceptions that are, for the moment, provided for "plants, animals and essentially biological processes for the production of plants and animals." This issue was discussed during the Doha Round of WTO when the Council was entrusted with the role of bridging TRIPS and CBD for protecting the traditional knowledge through farmers' rights. The issue of providing PVP to breeders and farmers alike does not find a widespread acceptance in many developed countries.

It was 2010 when the Nagoya Protocol on "Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization" (ABS) was added to the CBD. The utilization considered is research and commercialization of genetic resources and require the prior informed consent of the provider of that material. This is represented by the local communities in cases of farmers' varieties or wild relatives, or the Competent National Authority in the case of accessing gene banks. In that case, the access to germplasm is regulated on the basis of the Material Transfer Agreement that covers all the varieties developed by the providers or on material acquired before the CBD (1992). The recipient is in this case bound not to seek IPR over that germplasm, but can use the material for research or breeding purposes, as well as distributing it to third parties, provided that they also abide to the MAT.

COUNTRY PROFILES

The following section contains overviews of the individual regulatory and practical situations in seed production and trade in a sampling of the interviewee's countries. The data in these overviews comes primarily from the interviews. Each profile contains a series of examples of unique projects that are successful in that country. These examples were chosen because an interviewee is a part of them, or because they were mentioned in an interview. They are not representative of all the good work happening in these countries, but do serve to demonstrate innovative ideas within the IFOAM membership.

What may be useful for future reference is to notice which types of projects have taken root and become successful in which regulatory and cultural contexts.

Country Profiles in this section:


1.United States


2.India


3.Turkey


4.Canada


5.Peru


6.Europe

UNITED STATES overview

I. Particular challenges:

These are some of the key findings, as defined by the participatory 2014 US Seed Summit, which was sponsored by RAFI-USA and the US-based Seeds and Breeds for the 21st Century Coalition, which is composed of farmers, NGO's and public and private seed breeders working tighter to restore US public cultivar development.

The full report for this recent Summit can be found here - http://rafiusa.org/publications/seeds/

1. Our current agricultural systems are increasingly vulnerable to weather and pest disruptions due to the decline of agro-biodiversity in our commercial seed choices. This vulnerability is especially important as we face unpredictable climatic conditions.

2. Public cultivars developed through classical breeding techniques are an extremely successful and powerful public asset and critical to addressing the increasing vulnerability of our agricultural systems. The lack of adequate funding and loss of institutional capacity have significantly reduced our ability for this critical public cultivar development.

3. Consolidation and concentration in the ownership of seeds have caused negative impacts on cultivar development, genetic diversity and farmer choice.

4. The adoption of utility patents has caused a decline of farmer and researcher access to and innovation in the development and adaptation of elite cultivars.

5. The number of public cultivar developers continues its decades-long decline, increasing the urgency for renewed institutional capacity to support the next generation of public plant breeders.

6. New and innovative partnerships and models for collaboration are critical to address more regionalized and participatory approaches to public cultivar development.

7. Public germplasm collections and the genetic resource conservation system lack adequate funding to steward our genetic heritage, and facilitate democratic access.

II. Seed Market/breeding systems:

The US seed system is different from EU, in that it does not take the EU approach to required seed registration, but does have a greater predominance and importance of patents.

- US is signed on to UPOV 91
- Registration and certification of seed are optional
- Utility Patents are allowed for seeds, and even beyond seeds for research methods, genetic sequences, etc.

- **Formal:**
    - The US used to have a strong network of land-grant Universities and institutes funded to do plant breeding. Federal funding for these institutions has been dramatically declining, as noted in the problems above.
    - Private companies are steadily taking more control over breeding activities in the US.

- **Informal:**
    - Some new models for participatory breeding are starting to develop across the US, but traditional networks are no longer strong.

III. Seed saving, conservation, banking:

- **Formal:**
    - There are US Dept. of Agriculture regional seed collections stored in different parts of the country, but there is cause for concern. As Michael Sligh of RAFI-USA explained: "having come back from the largest seed bank back-up repository in the world in Ft. Collins Colorado, we do not know how long the seed collections will last. The back-up seed collections are in cryovac, and the seed bank themselves do not know how long they will last. The regional seed banks are also underfunded and behind on both grow-outs and characterization of the existing collections. The demand for samples is outpacing current resources."

- **Informal:**
    - There are numerous seed saving networks across the US, as well. More of the successful and longer standing models include; such groups as Seed Savers Exchange, Native Seed Search and Southern Exposure Seed Exchange. As well as, the newer models of community seed libraries and the growth of informal seed saving networks and "seed swaps" have grown and started to spread, but traditional on-farm seed saving of major crops has declined due to hybridization, patents, GMO's and lack of farmer capacity and support.
      However, there are now major signs that the GMO expansion seems to have peaked and farmers are now scrambling to find Non- GMO seeds as the markets are shifting toward non-GMO, as the faster growing Ag market sector, this year.

IV. Examples of unique approaches:

In the US, many strategies for reinvigorating seeds and breeds are aimed at closing the gaps between publicly funded institutional breeding programs, farmers, and companies or the marketplace. As mentioned, an enduring challenge has been to how to generate on-going funding for these programs and these types of projects, and how to ensure the outcomes are truly participatory and open without engaging protection for intellectual property rights in a way that limits access.

Federal Support dedicated to organic breeding work as has been created in recent US Farm Legislation, to focus resources and infrastructure to support the budding organic seed development in the US. However, these funds remain far below the demand and needs of the growing organic marketplace.

The Organic Seed Alliance, (OSA) has emerged as a major NGO center for talent, projects, trainings and conferences concerning the development of organic seeds in the US. - https://www.seedalliance.org. OSA, in collaboration with others has helped to launch a national on-line organic seed finder, which was developed between public and private sources – www.organicseedfinder.org.

V. Two examples of current Organic seed innovations

1) High Mowing Organic Seeds and the University of Wisconsin

In this partnership, High Mowing Organic Seeds, a small seed company based in Vermont that sells 100% organic varieties partnered with a University, NGO and a farmer to create a new open-pollenated sweet corn variety. The company sells these commercially, and PVP royalties associated with them are returned to the University sweet corn breeding program breeder, the farmer and the NGO partner. This is an innovative approach to funding organic public cultivar development that does not rely on federally designated or grant supported funding.

2) Breeding for Organic Production Systems (BOPS) – Project of RAFI-USA and North Carolina State University

This is a multi-year effort to develop new regionally adapted organic cultivars to meet the unique needs of SE US organic farmers. Currently, the overwhelming

majority of US seed breeding is by the non-organic industry with the use of pesticides, and for corn and soybeans with transgenic technology. Pest management challenges and weed control specific to organic production are not addressed in these breeding protocols, nor are the seed selections and trials conducted under organic conditions. Additionally, Southern US organic producers are also often pressured to use organic varieties inappropriate for the Southeastern climate because of limited seed options permitted under organic certification guidelines.

As public breeding efforts continue to shrink while private breeding and use of patented genes expand, available germplasm for organic producers or even non-GMO producers is limited and often outdated. There is a great need to expand public breeding programs to address the regional needs of non-GMO and organic producers in the Southeast USA. Farmers participating in the development of this organic breeding project have identified several limitations to currently available varieties for SE organic production of soybean, corn, wheat and peanut.

This project is based on building an on-going dialogue between plant breeders and farmers through NGO facilitation. Breeders will expand their field trial programs to include multiple organic sites, which are based organic farmer feedback and RAFI is working simultaneously with organic farmers to conduct organic on-farm trials of wheat, corn, soy and peanuts that can be compared to University trials. Breeders and farmers are using this new data to make more realistic assessments of which new breeding lines will perform best under actual SE organic conditions. *

More details can be found at - http://rafiusa.org/bopscoalition/

VI. Partnerships & Collaborations

Just as these two examples above show; there is a burst of new such partnerships and collaborations emerging in the US, in response to demand for more regionally appropriate organic seed choices and the need to find creative solutions.

One additional example of public / private cooperation is the Seed Matters Initiative, http://seedmatters.org, which brings organic businesses, NGO's and University organic seed breeding programs together to support next generation of public plant breeders, through a Graduate Student Fellowship Program and a newly announced Organic Endowed Chair Program for major US universities, to better stimulate organic plant breeding activities in the US.

INDIA overview

I. Particular challenges

The Indian agricultural sector is a pluralistic and dynamic reality that has dramatically changed over the past decade. Since 1929 the Department of Agriculture, through the proactive involvement of the Indian Council of Agricultural Research (ICAR), has been promoting a political agenda for modernizing the sector according to the Green Revolution paradigm. One of the instruments used for catalyzing this transformation has been providing input subsidies to the farmers and, until thirty years ago, the government was directly providing high yielding seed varieties to farmers in order to boost productivity. Now the farmers still have access to these varieties, but have to purchase them at a high price from the private actors operating in the sector. The paradigm shift that occurred in the last century has helped the country reduce its food deficit but, at the same time, it has led to the erosion of the traditional knowledge that farmers had developed and preserved in the form of seeds.

As per the International seeds federation, Indian seed Industry was the sixth largest globally, and accounted for approximately 4% of the global seed market during the year 2012. The organized sector comprising both private and public sector accounts for about 15 to 20% of the total seed distributed in the country. The remaining portion is contributed by the unorganized sector comprising mainly of farm saved seeds.

The national seeds corporation was established in the year 1963, and the government of India enacted the Seeds Act in 1966 to regulate the growth of the seed Industry. The Seeds Act stipulated that seeds should conform to a minimum level of physical and genetic purity and assured percentage germination either by compulsory labelling or voluntary certification. Further, the Act provided a system for seed quality control through independent state seed certification agencies which were placed under the control of the State Departments of Agriculture. However, with the easing of the government regulations and the implementation of a New Seed Policy in 1988, the private sector seed companies started to play a major role in seed development and marketing.

The Seeds Bill, 2004 has been enacted to overcome the limitation of the Seeds Act, 1966 and for the regulation of seed quality and planting material of all agricultural, horticultural and plantation crops with the view to ensure availability of seeds, increasing private participation in seed production, distribution and seed testing, and liberalization of import of seeds and planting material.

The modifications in the government regulations in the late 1980s led to the enormous development in seed industry by attracting several foreign seed companies to India. The private sector companies identified potential crops for hybridization and initiated research activities, Private sector concentration focused on developing hybrids for corn, cotton, sunflower, vegetables and flowers for export and currently they account for a major share of the commercial production of these seeds in India

The private seed industry is now undergoing transition following the Indian government‘s focus on biotechnology research as a means of increasing agricultural production and also driven by the trends in the domestic and world seeds market.

Most large multinational seed companies now have their presence in India (either as joint venture or with 100 percent equity) with their main focus on biotechnology. These include Monsanto, Bayer crop science, Syngenta, Advanta, Hicks Muse, Tate, Emergent genetics, Dow Agro, Bioseed genetics International Inc, Tokita seed Co., Nunhem Zaden BV.

Another factor that attracts seed companies is the country's varied agro climatic conditions and abundant skilled and unskilled labor, as seed production, particularly hybrid seed production, is highly labor intensive.

Both the government and civil society actors have been trying to find new ways to express this potential through the Protection of Plant Variety and Farmers Rights Act in 2001 (PPVFRA), a law developed based on the UPOV model, but with the clear recognition of farmers and researchers rights, alongside with the breeders rights on plant propagating material. This provides intellectual property rights for the actors involved in breeding operations, which are mostly represented by private companies and research departments of the State Agricultural Universities. In those institutions breeders are mostly focused on producing lines for commercial purposes, and they include the farmers only during the multiplication of the seeds before their treatment and packaging. The farmers, producing seeds in a contract-based manner, are not allowed to save or exchange the seeds they are producing, but can only sell them to the contractor at an extremely low price. The strong dependence on the private sector and the extremely high market price of seeds constitute a major bottleneck in the sector. With the promise of higher yields farmers are pushed into buying the commercially available seeds and invest in the necessary inputs and infrastructure that they require. By getting into debt for purchasing agricultural inputs, farmers are more exposed to financial risks and, in case the crops fail and their revenue becomes insufficient, they are often left with no choice other than suicide.

II. Seed Market/breeding system

In a recent attempt to join UPOV, the Indian government has written the Seed Bill as part of the National Agricultural Policy of 2004. Its aim was to facilitate the provision of quality seeds to farmers, with a focus on private participation in the production and distribution of seeds complying with the DUS criteria. The Bill was rejected, especially because of the deep rooted farmers' culture of saving, re-sowing and exchanging planting material. It is estimated that the farmer seed system comprises 75% of the Indian seed market, the fifth largest in the world. It is therefore clear that a legislation requiring seed registration in order to sell seed would have a significant impact on the sector. The current PPVFRA recognizes this

element and has proposed a legislation that balances the rights of the breeders and the farmers, making it a model for other South-East Asian countries.

- **Formal market**

  - The registration of a plant variety meant to provide an incentive for breeders to develop new commercial seeds in compliance with DUS criteria. The PVP is provided by a *sui* generis system since both agricultural methods and living species are considered non-patentable subject matter. The breeder right is exclusive but it is subject to the limitations derived from farmers and researchers' rights. The legislation also denies the registration of varieties obtained through conventional – or natural – breeding techniques (such as crossing) and enforces a system for sharing the benefits when a farmers' variety is used for commercial purposes through the National Gene Fund.

- **Informal market**

- Farmers are *de facto* considered cultivators, conservers and breeders in India. They are entitled for the registration of a plant variety in their name or in the name of their community, they can save, sow and sell their farm produce, including seeds. The system is weakly regulated and the only provision in the PPVFRA is the exemption to provide technical information and pay fees when registering a farmers' variety. This right does not apply when it comes to seeds of a variety protected by the Act, identifying that as "branded seeds" sold in clearly labeled packages. However, the public response to register farmers' varieties has been poor and the practice of saving and exchanging seeds in the informal sector is still dominant.

III. Seed saving, conservation, banking

India has been identified as a country of megadiversity with a strong cultural and religious linkage to conservation practices. Local communities have been maintaining this biodiversity by identifying ecological niches to protect, for example, by worshiping sacred grooves, seeds or species. Alongside with this positive cultural attitude towards biodiversity conservation, the government has created National Gene Banks operated by the National Biodiversity Authority, to collect and conserve genes *ex-situ*. While this has achieved remarkable results in terms of seed-saving, it had the unintended effect of removing seeds from their natural evolutionary process and has restricted the access for farmers to the varieties they have been selected, improved and conserved for centuries. To counter this process, NGOs have been committed to the reinforcement of community intellectual rights. This has led to the creation of community seed banks that by developing Community Biodiversity Register to document this indigenous knowledge and conserve the biodiversity *in-situ* in a participatory fashion. The model of Community Seed Banks is spreading across the country, with their main tasks being conservation of identified landraces and their maintenance through field trials. Another emerging activity is the technical support to farmers or communities to register their varieties in order to enforce the sharing of the benefits principle in accordance with international legislation.

IV. Examples of unique approach

The Genetic Resource Energy Ecology and Nutrition Foundation (GREEN Foundation) is a community-based organization operating since 1994 in dry land regions of Southern India. Its mission is to reviving the local agricultural biodiversity through the empowerment of small and marginal farmers, with a specific focus on women empowerment.

GREEN Foundation – Community Seed Bank Network. Quotes from Vanaja Ramprasad, Founding Trustee of the organization

1) We are committed to *in-situ* conservation, but we have not committed yet to breeding activities.
2) We are concerned that documenting the indigenous knowledge in biodiversity register without enabling the communities to protect this knowledge could accelerate theft of resources.
3) The future of Community Seed Banks lies in the hands of the communities who see the value of farmers' varieties.
4) Green foundation can help create seed-savers networks in different eco regions to enable farmers take control of their seed banks.

TURKEY overview

I. Particular challenges:

Turkey is a unique example of a country in transition. It still has in place a strong traditional system of seed saving and exchange that represents a unique wealth of diversity. However, efforts to join the EU and harmonize country laws have posed serious threats to farmers' rights in the past 10 years. A law passed in Turkey in 2006 for example established a "recommended list" for what farmers could plant in certain regions, out of the list of registered seed. If a farmer is found planting seed not on that list in that area, or using their own seeds, they can be fined.

Furthermore, organizing for seeds and breeds in Turkey is restricted by government limits on funding for non-profits. Bugday Association was given a permit to raise $15,000 USD only last year for their seed project, and it was the last year they would be given the permit. Going forward their activities in promoting seed exchanges will have to be self-funded somehow.

II. Seed Market/breeding system:

- Turkey has signed **UPOV 91**, and many of its country laws reflect the system in place in the EU as a result of their efforts to join.
- **Seeds must be registered** in a national catalogue to be sold legally
- **Unregistered seed is illegal for exchange** as well, since a law passed in 2006, unless it is only for personal/non-commercial use.

- **Formal**:
    - Companies control commercialized seed in Turkey. Most formal breeding is done by the companies, the government also partially funds some research institutes. But as Mahmut Gurmen of Bugday Association explained: "There are independent institutes doing seed breeding, but they are bound to the Ministry of Agriculture. They have more responsibility and area to take action, they are relatively independent. But after the period of R&D for the seed, they also give the IPR to the company."
- **Informal**:
    - Turkey has a very strong traditional use of seed on-farm. On-farm selection and seed saving is common, but it is decreasing as a result of country seed laws. Gurmen notes that farmers lack knowledge sometimes about how to breed seed safely.
    - There is not a strong movement for participatory breeding yet in Turkey – the formal and informal systems are very separate.

III. Seed saving, conservation, banking:

- Formal
    - The Ministry has a national seed bank, but Gurmen notes this is not what they support because there is no system in place for keeping the collection active.
- Informal
    - Seed saving is traditional and ongoing in villages, they keep the seeds in walnut wood chests on their farms.

IV. Examples of a unique approach:

Bugday Association – Seed Exchange Network. Quotes from Mehmet Gurmen, Director of the project.

- We try to bring those farmers nationwide together in a seed network, and have them declare what they have in their local varieties, as well as what kind of data they have. We collect all this information in our **online database**.

- We set up **online meetings, experience and knowledge sharing, and some specific technical seminars for the farmers**, especially for how to do seed breeding, safely.
- We use our laboratories to analyze fungal, viral and bacterial analysis. If the seeds are clean, we **facilitate an exchange between farmers** based on what they have requested. We have to call it exchange because of the laws in Turkey.
- We have an academic committee, with people from the universities, and that committee decides which varieties are rare and urgent to get into the network.
- **EXAMPLE:** There is a special kind of wheat, 5000 years old from Anatolian lands, Kavilca. We discovered this in the eastern part of turkey, and then we were able to bring that variety into the northern part of Turkey. And now it is spreading out. It's a very small-scale village with lack of access to resources, so they would not have been able to make these connections/exchanges on their own.

PERU overview

I. Particular challenges:

Peru is unique because in some ways the country has a very underdeveloped commercialized seed sector, but maintains a strong traditional/informal seed system. In potato seeds, less than 1% of the total seed used in the country is certified despite country seed laws requiring certification. As Roberto Ugas of La Molina University explains, this is partially because implementation is weak, and also because potatoes are basically a smallholder business. Peru is a country of smallholders, with **90% of farmers having less than 10 acres**. Though other crops such as maize have had more commercialization, the strong traditional seed practices in Peru have allowed rural farmers to preserve hundreds of unique varieties. However, the **problem now is less with conservation and more with establishing farmer-led improvement** and adaptation. Ugas explains that farmers lack technical capacity for on-farm breeding and need training in order to advance the seed collection: "It was interesting to know that not many farmers were interested in the issue of seed production because they thought that their own seed was ok despite the data we found which showed the old system was not working that well and could be improved with some modern knowledge."

II. Seed Market/breeding system:

- Peru has signed **UPOV 91**
- **Seeds must be registered** in a national catalogue to be sold legally
- **Breeders and multipliers must be registered** as well, BUT there is a new law passed that allows for the **registration of a "peasant-breeder."** This is unique and may allow farmers to participate more in the seed production system but it is new and has not been fully implemented.
- Seed exchanges continue to happen thanks to the strong traditional seed system that is family based, despite registration requirements for commercialized seed. But the degree to which this is true depends on the crop.

- **Formal**:
    - In some areas (such as potatoes) the formal seed market is very small, b/c Peru is mostly a small farmer country.

- **Informal**:
    - Breeding and selection has traditionally been done on farms – but the research project conducted by La Molina University also highlighted the lack of technical capacity for breeding and selection today.

III. Seed saving, conservation, banking:

- Formal
    - Weak in functionality – the strength of seed conservation is truly in the local/informal system.
- Informal:
    - Seed saving is very strong in the traditional sense in Peru, and is maintained primarily at the family level. While there has not been enforcement of regulation to curb this, as Ugas explains, "with regards to exchange of seeds among communities: there is no regulation restricting this. We are currently very open in terms of seeds. But the thing is society has changed, the importance of rural populations have

decreased, so the importance of these exchange systems have been impacted as well."

IV. Examples of a unique approach:

La Molina University in Peru facilitated potato selection with village potato farmers in the Andes:

- We started with a germplasm collection – we went to all potato growing areas in Cuzco (highest diversity of potatoes in world) – established collection of samples from fields, markets, etc
    - For 3 years we **grew this collection in farmers' fields**, and we analyzed it in different ways
    - We took an ethnobotanical point of view, made a **participatory selection with particularly women**, from this large collection of 3000 samples, we narrowed it down to 509 morphologically distinct types
    - Some male farmers are more inclined to pay attention to frost resistance or disease resistance, but the women are also interested in local uses of potatoes, depending on the varieties some are used for cooking methods and others for different methods. Several are for dehydration for conservation, others have ritual uses. In order to make a selection better, we included men and women in the process – and women were particularly interested in the culinary uses of the potatoes. This is important because these populations are severely food insecure. **So any investment in native women is easier to have consequences on what the family eats, faster than with men**.
- In potato we don't have strong issues dealing with intellectual property. We have **problems with capabilities for seed production and the need to develop more fair value chains.** Without more fair value chains, there might not be more incentive for improved seed production.
- At the same time we established the process of **farmer field schools** - interest was to increase capacity of farmers to grow potatoes organically, but also to have better production of potato seed.
    - It was interesting to know that not **many farmers were interested in the issue of seed production because they thought that their own seed was ok** despite the data we found which showed the old system was not working that well and could be improved with some modern knowledge.
- Finally – we proposed to **include them in the national register of seed producers**. [according to the new law allows registration of "peasant breeders"]
    - Also some potential problems with this new law – the national research institute mentioned their intention to register themselves the varieties

that have been kept for ages by the farmers. [Law has not yet been fully implemented, we have to see how it works out.]

- The market for traditional varieties is increasing. This is a double-edged sword. The gastronomic sector can really help us of raising awareness of seeds and importance, but restaurants themselves cannot manage a very large diversity in their kitchens. **There is a schizophrenia in the gastronomic sector, because when they speak about diversity they speak big but when they buy they only buy a few varieties.**

V. Regarding South-South sharing of knowledge and methods:

- Project demonstrates importance of knowledge sharing, and importance of local culture in designing model for addressing seed sovereignty

"We brought Vanaja [GREEN Foundation] from India because we wanted them to share their experience about establishment of community seed banks. But the way they establish those in India turn out to be different from what farmers wanted in Peru. In Peru, it's done at the family and extended family level. When it comes to potatoes, you trade seeds with your neighbors that happen to be from your family. So seed banks have a different more familial definition here.

We didn't manage to establish community seed banks for potatoes as we intended because farmers didn't want it. Most community seed banks that you find out there have not been established by farmers themselves but by civil society organizations, NGOs, etc – there has been a very clear push from the outside for the establishment of community seed banks – it shouldn't surprise us that farmers are confused at first about what a community seed bank is. It can be complicated, keeping records, etc – and sometimes when a project of civil society ends it can be disruptful because the project was subsidized, etc.

For the potato case, these family level seed banks are working well. There is much room for improvement though, to help them implement better methods for seed production and conserve the varieties.

The south-south exchanges about seed production and seed conservation are essential. There is very little information we are getting particularly in LA because of English barriers. I would make a case for a stronger interaction between these initiatives worldwide."

EUROPE overview

I. Particular Challenges:

Europe is an example where seed marketing and plant breeder's rights legislations go hand in hand: they are designed and tested in order to create a unique and common policy framework. These legislations, developed within the European Union, are adopted by the Member States and are being taken as a model by those countries interested in having access to the European market. As a result, both agricultural biodiversity and farmers' rights have seen a steady decline, while power in the European food system has become concentrated in fewer hands.

In absolute terms, the EU seed market can be described as highly diversified since more than 7000 companies are operating in it. Its size in monetary terms reaches around € 7 billion and it has a strategic importance at the international level since it represents 20% of the global market. However, half of this enormous market is controlled by five seed producing companies that in some cases, such as in the case of vegetables' seeds, reach 95% of market share. This constitutes a major problem in the European seed market, where the process of consolidation has been facilitated by several regulations put in place in the last 15-20 years.

Along with market concentration, lobbying efforts from large scale seed producers emerged, creating a legislation geared towards the protection of specific interests. The extension of breeders' rights to cover both reproductive and harvested material has drastically curbed farmers' rights to save and exchange seeds. Traditional seed saving practices and informal seed networks are now limited by a set of exceptions and derogation to breeders' rights, rather than through the recognition of specific rights for farmers.

Some of the most recent challenges to the European seed sectors are represented by the attempts to simplify regulations and open the market to overseas investors. The European Commission attempt to create a single legal framework to regulate the seed market in Europe was met by strong opposition from seed savers and many farmers across the EU. The complex set of laws referring to the marketing of seed and plant reproductive material has been the focus of a long debate involving both farmers, civil society organizations and policy-makers. There is a general agreement on the need to update the legislation, but there is no consensus on how the new legislation should look like.

Among the proprieties identified one refers to the need of creating a legislative structure to meet the needs of organic farmers and breeders. Since 1998 the EU allows derogations to the VCU criteria for Member States, and many European countries (Austria, Germany, Netherlands and Switzerland) have considered adapting these standards for the marketing of organic crop varieties. The new seed law proposed in 2013 also derogated to Member States the ability to set specific VCU criteria and recognized the need to have more flexible DUS specifications. However, the requirements to register the plant varieties as 'conservation' or 'regional'

varieties strongly limited the potential to expand organic agriculture beyond its existing niche. The legislation did not set the conditions to support agricultural biodiversity, but rather created a structure that hindered the breeding and marketing of plant varieties under flexible DUS standards. The proposal was eventually voted down by the European Parliament based on the concerns over concentration of power and loss biodiversity in the agricultural sector.

Other attempts to lower trade barriers as part of the Transatlantic Trade and Investment Partnership (TTIP) have met similar opposition. The concerns over a further erosion on seed standards as a consequence of trade liberalization between the EU and the US constitute one of the major concerns for the parties opposed to the treaty. The two systems rely in fact on different tools for ensuring intellectual property rights on plant materials, especially in the case of patents on genetically modified crops. Within the EU a separate legal framework is dedicated to the commercialization of GMOs. It is in fact based on a different and more stringent process for authorization and evaluation of GMO's to allow their cultivation, as well as regulation on the procedures for releasing GMOs into the environment.

II. Seed Market/breeding system

The requirements for marketing seeds within the European Union are defined by 12 Directives, 11 of which directly regulate seed marketing through their implementation by national governments. The structure in place relies on two main pillars: the registration of plant varieties and the certification for commercialization. Seed varieties and plant reproductive material must be listed in the EU Common catalogue. This is done through the identification and demonstration of the DUS for all plant varieties and VCU criteria for agricultural crops. Lots of seeds and plant propagating material are then tested through a pre-market certification system before being legally commercialized.

The biggest difference is determined by the set of standards required for the commercialization of agricultural crops and vegetable seeds. There is in fact a set of categories under which seeds can be marketed depending on the level of testing and the numbers of generations tested. This mostly applies to agricultural crops, since vegetable seeds can be marketed under the category of "standard seed", a definition that exempts the seed from inspection and testing during production. A harmonized labeling system within the EU allows the free movement of the material from the Member State where the seed is produced to any other part of the Union.

The recognition and protection of intellectual property right on the registered varieties is enforced by a self-financing decentralized EU agency, the Community Plant Variety Office (CPVO). Plant Variety Protection thus figures as a *sui generis* patent system that entitles breeders to use protected varieties for breeding programs, but prohibits the agricultural production of such varieties by farmers (with few exceptions).

The complex system that has been created to protect breeders' rights is subject to major flaws, most importantly the absence of a framework for cost and responsibility sharing. The testing and certification of seed varieties are in fact carried out by public authorities that carry the financial burden of covering the costs of running this system. On the other hand, the registration process is often too lengthy and costly for being carried by small seed producers or farmers, leaving the seed market in the hand of few seed producers that can afford the investment.

III. Seed saving, conservation and banking

Formal:

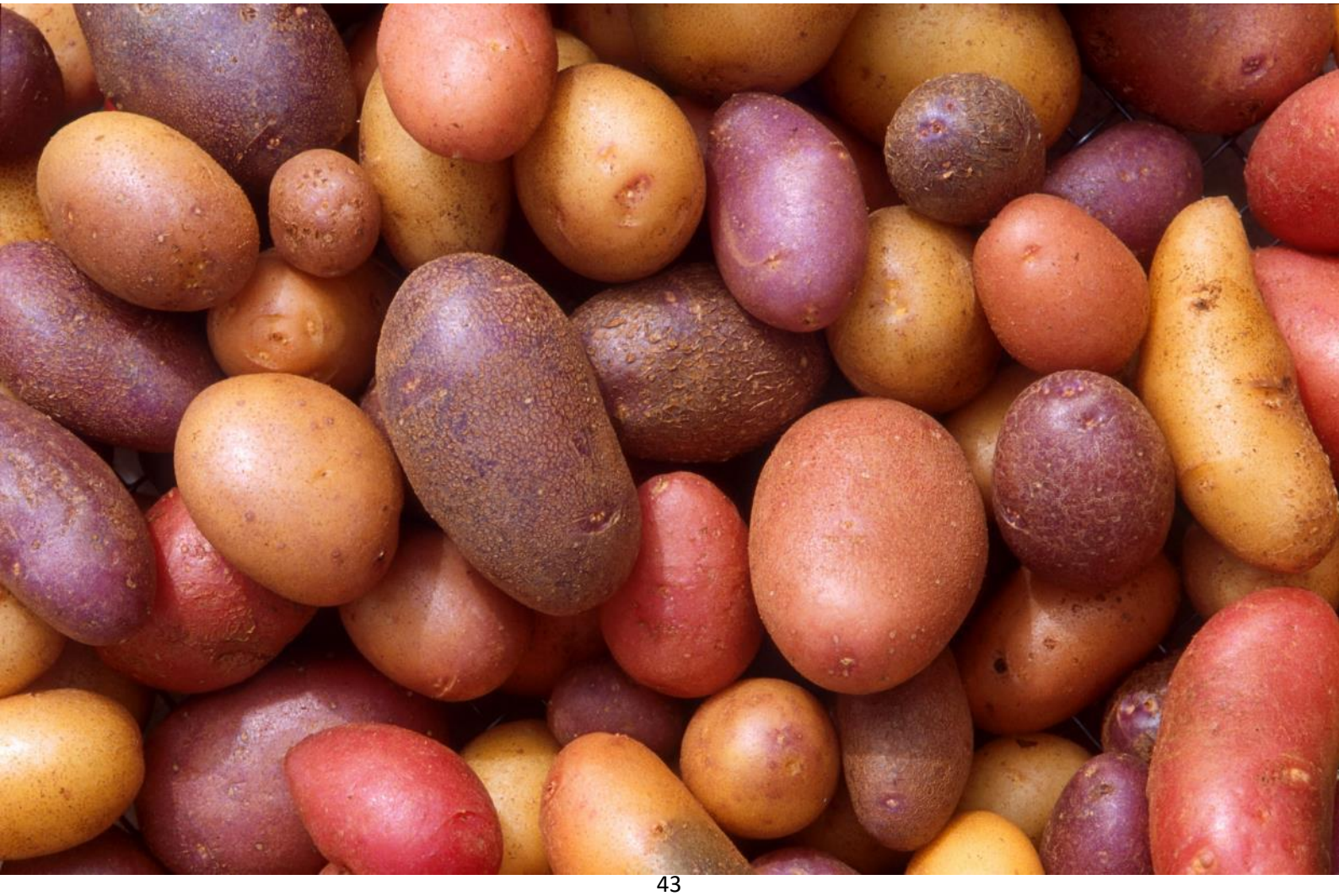
- The derogation to the commercial system of registration and certification is subject to three main Directives aimed at *in situ* conservation and sustainable use of genetic material. The varieties that qualify for these derogation are either threatened with

genetic erosion, or have to contribute to the public good. This is intended as the agricultural practices that benefit the environment or that aim at the conservation of traditional varieties with no intrinsic commercial value.

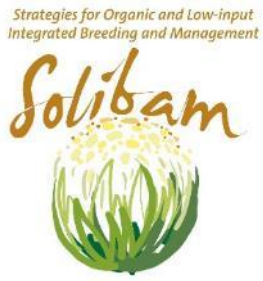
Informal:

- A further exemption is represented by the derogation to the CPVO legislation, entitling farmers to save and use seeds from their harvest, given the presence of safeguard to the legitimate interest of the breeder and the farmer. This provision does not entitle the farmer to exchange seeds with other farmers that should be required to pay an equitable remuneration to the holder of the property right.

- The presence of gene banks in the EU and in other European countries represents a great potential for agricultural biodiversity conservation. Farmers' access to such resources is often limited both in terms of the size and scope. The amount of seeds that can be used by the farmers is determined to allow *in situ* conservation, but does not serve the purpose of larger scale production. Breeding programs geared towards biodiversity conservation and farmers' inclusion could help establish a link between formal and informal production systems.



IV. Examples of unique approaches:



SOLIBAM: Strategies for Organic and Low-Input Integrated Breeding and Management
(Consortium with representative organizations from France, Italy, UK, Denmark, Germany, Portugal, Spain, Hungary, Switzerland, Austria, Mali and Ethiopia)

Information from the publication: Policy Recommendations to Sustain Diversity Strategies Within Food Systems, by SOLIBAM. More info: www.solibam.eu

SOLIBAM is a project carried out by a consortium of institutes, universities, crop breeding companies, and organizations with a focus on seeds and agriculture in Europe and Africa. The overall objective of the SOLIBAM project was to develop specific and novel breeding approaches integrated with management practices to improve the performance, quality, sustainability and stability of crops adapted to organic and low-input systems. The reason for this objective is to contribute to the overall goal of creating an integrated seed system, in which there is both: a) full integration and recognition of formal and informal systems, and b) seed sector development that takes place in a pluralistic manner. The project combined the implementation of participatory breeding with analysis of the outcomes of these processes.

Policy Recommendations:
This year the consortium released policy recommendations based on these outcomes in four areas: 1) seed marketing, 2) intellectual property rights, 3) access and benefits sharing, and 4) agrobiodiversity conservation. (see www.solibam.eu)

Breeding Findings:

The project created and evaluated the following categories of breeding projects: 1) Composite Cross Populations - CCPs for wheat, barley broccoli, 2) mixtures and evolving mixtures for wheat, barley, maize, 3) new populations from farmers' breeding for maize or synthetic population with several bred parents for broccoli and tomatoes, 4) hybrids of populations from PPB maize, and 5) hybrid of non-fixed lines for broccoli.
Within each of these projects, SOLIBAM associated professional breeders with farmers/researchers in a participatory way. Also, end-users took place in PPB projects in different ways, including quality evaluation or innovation in food products.

ECO-PB: European Consortium for Organic Plant Breeding (Members from France, Belgium, Portugal, Germany, Greece, the Netherlands, Latvia and Switzerland.)

The European Consortium for Organic Plant Breeding (ECO-PB) was founded in 2001 with the aim of promoting organic plant breeding and building up an independent expertise. As a non-profit association the main purpose is to foster organic agriculture, protect the environment and conserve agrobiodiversity through plant breeding programs designed specifically for the needs of organic farming systems. Therefore, the main focus areas of the European Consortium for Organic Plant Breeding (ECO-PB) include:

1) Initiating, supporting and maintaining organic plant breeding programs;
2) Developing and investigating the concepts, scientific basis and financial tools for organic plant breeding;
3) Developing and promoting appropriate standards, practice and legal frameworks for organic plant breeding;
4) Providing a platform for exchange of knowledge and experience on organic plant breeding to European breeders, farmers, researchers and policy makers, as well as other IFOAM organizations;
5) Carrying out meetings and workshops on organic seed and organic plant breeding issues;
6) Providing discussion papers on plant breeding issues to support decision making processes.

Netherlands:

Luis Bolk Institute, Potato breeding project

LBI has a farmer-breeder collaborative project that brings together farmers specialized in seed potato production with potato breeders at the institute. As Edith Lammerts van Bueren at LBI explained, the researchers do the complicated crossing and the farmers do the selection. After 3 years the most promising clones are given to a seed production company, who does further trials and markets the outputs. The profits from this are shared 50/50 between researchers and farmers if a variety goes to the market. They now have 14 farmers participating, and LBI provides the coordination of the farmers.

In addition to potatoes, LBI has started a consortium to address an urgent need for breeding of cereals in the Netherlands in organic. They bring together farmers, bakers and breeders to share concerns and interests, and organize variety testing.

1) First try varieties from surrounding countries in Europe
2) Then identify gaps in the breeding program
3) They might pitch an idea to a breeder to join the consortium if they have a clear need
4) In this case farmers may not be involved right at the start, because the crop (wheat) requires segregation, but after a certain point they could be involved in early selection
5) Part of the reason for this is: "We're looking for models that make it economically feasible for a relatively small sector, because commercial breeding is not interested in focusing on this yet" explained van Bueren.

A unique issue identified by van Bueren: "We're working with 2 retail organizations, biodynamic driven that want to have an assortment of open-pollinated varieties instead of hybrids for vegetable crops. It is interesting that also retail organizations and traders are interested in seeds. **Until now it was mainly farmers and breeders/institutes that were involved in stimulating organic seed/varieties. If retailers don't also recognize this problem, it is a hurdle**."

CANADA overview

I. Particular challenges:

- Access to seed and genetic diversity within the seed are being narrowed in Canada. On the access to seed side, there's a trend toward proprietary research and development.
- Breeding and registration are based on conventional seeds. Therefore:
    - Assessment information in the marketplace is based on use of chemicals, not useful to organic farmers
    - Breeding targets are set based on DUHS qualities and yield primarily, not necessarily things like attractiveness for beneficial insects, intercropping possibilities, diversity and performance in organic conditions, things that organic farmers need.

II. Seed market/breeding system:

- Canada recently passed legislation to sign on to UPOV 91.
- In Canada, you have to be a **registered breeder** to register a new variety in the variety registration system.
- If a seed of a crop that requires registration is going to be sold based on its variety name, by law, the variety must be **registered**.

- Formal:
    - **Private companies**: are doing more and more of the breeding in Canada. Their interests are in profit, thus they support legislation that would increase breeder property rights and decrease seed saving/exchange freely.
    - **Public institutions**: Agriculture Canada, federally funded. Produces varieties that are sold but can saving and exchanging of seeds is less severe. Royalties must be paid to Ag Canada.
- Informal:
    - **Participatory Breeding networks**: Experimental at this point in Canada. USC Canada has networks established doing breeding, and acknowledges the positive effects of Participatory Plant Breeding in other contexts and continents.

III. Seed saving, conservation, banking:

- Formal:
    - **National seed banks**: there are 2, they are functioning and successful. They interact with the NGO Seeds of Diversity in a successful partnership so that gardeners/farmers are renewing the seeds in the Seeds of Diversity collection, which in turn exchanges seeds with the national seed bank.
- Informal:
    - **Community seed banks**: USC Canada and Seeds of Diversity Canada have supported 17 community seed collections in Canada . Also, Seeds of Diversity has nationwide network of 1000 members (farmers/gardeners).
    - **Seed saving tradition/culture**:

IV. Example of a unique approach:

USC Canada

- Participatory seed breeding initiative. Work with multiple partners: farmers and public institutions, such as Agriculture Canada, to do participatory breeding and develop organic varieties that are appropriate for Canadian conditions.

- LESSONS LEARNED: (Quotes from Director Jane Rabinowicz)
  - They note that **intellectual property rights are among the most significant challenges** in the seed world at the moment. They are beginning discussions about this.
  - For example: "If the institution we partnered with to make a cross is interested in enforcing their rights to restrict distribution of that variety, that would be an issue for us."
  - Also: **Bringing together multiple stakeholders has challenges**. "Even farmers working together, some growers are interested in collecting royalties if there is a finished variety that emerges from our program, others really don't believe in that, so there are dissenting views." These conversations are still nascent but they will learn how to effectively engage and support the movement in the context of diverse points of view.
  - They **have not figured out yet exactly what will happen in terms of ownership once they produce a new variety**. They have to have one registered breeder name on the registration of the variety, unless the variety is not intended for commercial use. These can be stable populations that allow diversity while limiting the unpredictability for the growers.
  - "People like our organization are in a position to experiment. **There will be a fair amount of trial and error,** but this is an evolving and growing idea of a protected commons."
  - **Training** is a critical component that Rabinowicz notes is often not part of the policy approach for seeds and breeds, and that is vitally necessary.

Solutions and Next Steps

1) IFOAM's Role – Working Group on Seeds and Breeds, Assessing IPR for Organic

Andre Leu, President of IFOAM, Australia.
"One of the things that IFOAM will start to do is a seeds group. So we need to for that first, turn it into a formal part of IFOAM, self-organised structures. And make it part of the network. Once that is in place they can start looking at the issue, prioritizing, deciding and support what we can."developed through participatory system become illegal if they don't respect principles
"

- Compile and share information about successful projects, could contribute significantly to objective 2 by using the working-group as a knowledge-sharing group
- Create opportunities for greater knowledge sharing through workshops, events connected to IFOAM conferences, and online conferences or meetings
- Assess and provide forum for discussion on the critical questions about IPRs. Organic and participatory seed breeders must address this question, IFOAM working group can discuss best options. Specifically noted for a starting point for review by this group:
    - MTA's/contract-based licensing, example of IRRI – does that allow access without access without allowing further privatization?
    - Open source seed networks
    - Using PVPs in organic breeding, as they are now (before further revision and without patent-like implementation?)

Robert Quinn, Organic Farmer, USA.
"What the farmers need now are not the seeds, but the knowledge to breed seeds. This is difficult since it is different from saving seeds, it is using local seeds that are compatible with the ground they are planted in, making them more resilient to diseases. Local seed varieties should not only be readily available to farmers, but they should know how to breed the plant to be enhanced or suppressed."

Roberto Ugas, Professor of Agroecology at La Molina University, Peru.
"The south-south exchanges about seed production and seed conservation are essential. There is very little information we are getting particularly in Latin America because of an English barrier. I would make a case for a stronger interaction between these initiatives worldwide."

2) Training, Capacity Building, Knowledge Sharing

- Sharing success stories, comparing challenges between participatory breeding projects
- Establishing initiatives to train farmers and seed savers to build participation in the movement

3) General Awareness in Public and Value Chain

Edith Lammerts van Bueren, Luis Bolk Institute, Netherlands.
"Until now it was mainly farmers and breeders or institutes that were involved in stimulating organic seed production and varieties. If retailers don't recognize this need, it is a hurdle."

Roberto Ugas, Professor of Agroecology at La Molina University, Peru.
"In potato we don't have strong issues dealing with intellectual property. We have problems with capabilities for seed production and the need to develop more fair value chains. Without more fair value chains, there might not be more incentive for improved seed production."

Appendix

Participants to OWC14 Pre-conference and panel

First name	Last name	Organization	Country
Junaflor	Cerilles	Zamboanga Del Sur Wem-Ric	Philippines
Sanjay	Patil	BAIF, India/OFAI	India
Ashish	Gupta	Organic Farming Assoc. of India	India
Gebhard	Rossmanith	Bingenheimer Saatgut	Germany
Kjezo	Forsom	Zysk Pvologi	Demark
Nina	Baumgartner	ICEA	Italy
Denn	Spaner	University of Alberta	Canada
Olga	Keselj	Serbia Organica	Serbia
Mette	Maarst	Aarhus Univ. Dk + ICROFS	Denmark
Ibrahim	Alshahwan	King Saud Univ.	Saudi Arabia
Yuksel	Tuzel	Ege University	Turkey
Wayne	Nelles	Chala University	Canada
Suzanne	Morse	NMBU & COA	Norway
Roxanne	Darrow	Bugday	USA
Toue	Pedersen	UFL	Denmark
Sarah	Mader	SwissAID	Switzerland
Kirsten	Arp	BNN	Germany
Krishna	Prasad	Jahaja Samrudha India	India
Monika	Messmer	FiBL & ECO-PB	Switzerland
Thida	Klin Ko Ko	Empower Myanmar Consultancy Group	Myanmar
Pedro	Mendes Moreira	ESAC	Portugal
Fabian	Cruz	U.A.N.	Colombia
Anne	Macey	COG	Canada
Marja	Nwim	Organic Food Finland	Finland
Riccardo	Bocci	AIAB	Italy
Toshiaki	Takahashi	JONA	Japan
Bob	Quinn	organic farmer	USA
Dominique	Desclaux	INRA	France
	Schliephake	University of Applied Sciences	Germany
Omer	Agoligan	ORAD	Benin
Shi	Yan	Shared Harvest Farm	China
Nicolette	van der Smissen	National Technical Uni Athens	Greece
Yixin	Zhang	JYU	Finland
Jodi	Koberinski	Beyond Pesticides Campaign	Canada
Toshi	Oyama	Rikkyo Univ. Tokyo	Japan
M. Nazim	Uddin	Bangladesh Agricultural Research Institute	Bangladesh
Spencer	Leung	Go Organics	Thailand
Marcello	Cappellazzi	Revolve Media	Italy
Chris	Atkinson	Soil Association	UK
Bruce	Pearce	The Organic Research Center	UK
Bernd	Horneberg	Section Genetic Resources and Organic Plant Breeding	Germany
Yi-sung	Chen	ATOAP	Taiwan
Claire	Lamine	INRA	France
Gwen	Wyard	OTA	USA

IGM	Toncea	Romanian Association for Sustainable Agriculture (ARAD)	Romania
Sergi	Nutu	Turkey Green Thought Association	Turkey
Abel	Gouba	Helvetas	Burkina Faso
Bischof	Andrea	Helvetas Swiss Intercooperation	Switzerland
Frederic	Rey	ITAB	France
Sally	Howlett	ORC	UK
Estelle	Serpolay	ITAB	France
Mehmet	Gurmen	Bugday Association	Turkey
Pak	Chang Nam	OADA	Korea
Inci	Golimen	Guneskoy	Turkey
Nakorn	Limpacuptathavon	Towards Organic Asia Alliance	Thailand
Monorum	Chitolin	CEDAC	Cambodia
Marie-Eve	Levert	COTA	Canada
Hakan	Gonul	Bugday	Turkey
Veronique	Chable	INRA	France
Serder	Iskit	CRYI	Turkey
Gokmen	Ali	Middle East Tech Univ	Turkey
Regine	Andersen	Oikos-Organic Norway	Norway
Gokhan	Ijnal	Bugday	Turkey
Eser	Oncel	Bugday	Turkey
Kuyas	Ors		Turkey
Miyoshi	Satolow		Japan
Tracy	M. Lord	Emanetciler Der.	Turkey
Holli	Cederholm	Organic Seed Growers and Trade Association	USA
Lorena	Senanayake	Good Market	Sri Lanka
Malaya	Salas	Farmer	Philippines