

Seeds and Farmers' Rights

How international regulations affect farmer seeds





Peasant Seeds Network

Réseau Semences Paysannes (Peasant Seeds Network) is a French network made up of over 50 farmer and national organic agriculture organisations, as well as specialists, artisans, farmers, seed-producers and nurseries, and associations for the development and conservation of cultivated biodiversity.

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Introduction

The renaissance in farmer varieties has been accompanied and carried onwards by a groundswell of awareness on the part of professional farmers, as well as the general public, of the need to turn towards agro-ecological cultivation practices. The movement must meet the challenge of finding its place in a difficult, even hostile, economic and regulatory environment, the consequence of decades of productivist agricultural policies subsidising the creation of varieties meeting exclusively industrial needs.

Over time a web of enormous complexity has been woven around seeds and plant reproduction organs, trapping farmers in a tangle of decrees, laws, directives and conventions. Farmers are denied their say in the incomprehensible regulations affecting their right to produce, multiply, use, exchange and sell the seeds of plants cultivated in their own fields. While the market is becoming globalised and industrial concentration is consolidating the monopoly over the food industry into the hands of a small number of multinationals, industrialised countries' suffocating regulations are spreading across the developing world.

How do international regulations affect farmer seeds? What are the threats to farmers' rights over their seeds, the foundation of food sovereignty*? This dossier aims to shed some light on these questions.

The complex questions dealt with here can be understood at various levels, and some common threads are developed from one chapter to another. Each chapter can be read separately, but the subtleties of the legal straitjacketing are revealed in the relationships between the issues presented in different chapters. Analysis focuses principally on the situation in the European Union, but most of the examples used are taken from the French-speaking world, where constraints are often at their tightest, most notably in French-speaking Africa.

This dossier is intended as a tool. It is the result of discussions within the European Farmer Seeds Network which are still ongoing and still subject to change. Like farmer varieties, this dossier is neither homogeneous nor stable. It provides a diverse array of information whose structure might help the community of participants and users of farmer seeds to understand today's most important issues, whether they are farmers, gardeners, nursery workers, artisan seed producers, people who work with farmer varieties in their livelihoods (bakers, cooks), researchers, park employees or consumer groups. Although the technical and legal questions raised herein are sometimes difficult, they are not beyond our reach. We hope this dossier will clarify these matters for as many people as possible, increase participation in debates on seed regulation and help people to act to reclaim the fundamental usage rights over seeds which have been taken away from us.

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Chapter 1

What are farmer seeds and varieties?

A few decades ago almost every seed belonged to the category of “farmer seed”, and so the term did not exist. These were seeds of varieties gathered, picked out, maintained or enhanced through selection, conserved, multiplied and exchanged by the men and women who grew them in gardens or fields. The idea of restricting the grower’s liberty to use a part of his own harvest to resow a new crop was entirely alien.

This is no longer the case. Since the Second World War, the majority of European countries have seen their particular national varieties disappear little by little, and seeds* are essentially produced and governed according to commercial regulations restricting their free use.

***seed**

In its broadest sense, a seed is a plant organ chosen for use in propagating the plant, whether grain, cutting, tuber, root, rhizome or plant. The word “seed” denotes a wide botanical reality, yet the sense of the term’s sense has narrowed, used exclusively in regulations to govern commercial exchanges of “material for propagation” for plants. Legally, a seed only exists if it belongs to a variety.

** Asterisks refer to the glossary on page 82*

The concept of farmer varieties

Farmer varieties are distinct from commercial varieties in several ways.

• Origin

Farmer varieties are regularly multiplied, selectively bred and resown over a given area. This does not prevent them from travelling between different regions or countries.

• Methods of creation and renewal

Farmer varieties are created in the field or garden from a base of existing varieties and in conditions adapted for production methods within farmers' reach (thus excluding biotechnology*). Varieties are reproduced through selection and adaptation to local evolution, new environments and methods of cultivation, often through simple mass selection*. Plants are created sometimes through a series of manual cross-breedings, sometimes through selection of new characteristics which appear spontaneously in the population. This process of renewal is associated with "informal" seed exchanges, "local" or "traditional" social structures and systems of knowledge which can in fact be very modern (in agroecological terms, for instance).

• Genetic constitution

Farmer varieties are composed of genetically distinctive plant populations, products of farmers' selection methods. The interbreeding of plants within the population and their epigenetic* flexibility create a level of heterogeneity, endowing farmer varieties with a capacity for adaptation to naturally diverse soils and climates. Commercial varieties' genetic diversity and variability, on the other hand, is very poor. Their homogeneity (true-breeding plants*, F1 hybrids*, etc) often renders them fragile and vulnerable to disease, parasites and climatic changes.

Commercial varieties are difficult to reproduce

Whilst farmer varieties are always products of diverse breeds produced and maintained by farmers over several cultivational cycles, commercial seeds are largely products of a single genetic template, of clones* and hybrid lines selected by industry or research departments using methods beyond farmers' reach. Commercial varieties can no longer be reproduced using the farmers' harvest, and instead oblige the farmer to return to the original stock, retained by the breeder*. In other words, if a farmer resows seeds from a harvest sown using commercial seeds, the resultant plants will not have the same characteristics as those of the first harvest; this "drift" of the commercial variety in the farmer's fields is immediate with F1 hybrids of allogamous* species and without specific conservational selection becomes an important factor with true-breeding* species of autogamous* plants from the second or third generation.

• The weight of history

Farmer varieties possess a history, often a long one. Seeds and knowledge are exchanged and passed on in a tradition which keeps careful record of their qualities and uses. This history and tradition are not fixed, and are able to renew themselves through new practices and the creation or evolution of new farmer varieties.

• Nutritional value and taste

Selected and produced most often for the producer's own consumption, the quality of farmer varieties obeys superior standards. This is not the case for commercial varieties, selected principally for their returns and adaptation to industrial production methods; mechanisation, transport, longevity on supermarket shelves, etc.

– Terminology

[1. Common designations

“Farmer,” “local,” “traditional,” “heirloom” or even “soil” varieties ... There currently exists an abundance of different terms for talking about varieties produced by farmers and gardeners. Certain terms emphasise a variety’s geographic origins, others the community responsible for its selection or its history, others still its genetic composition. The common designations in everyday use can differ from those used in the regulations.

[2. Terms used in regulation

Farmer varieties have no legal existence in the majority of national regulations on trade or intellectual protection. Whilst the agricultural world functions mainly through informal exchange, the seed industry qualifies this process as a “black market” and the varieties thereby produced as infringements. If the term “farmer variety” does not appear, the regulatory texts use other names to refer to what are considered as exceptions with regard to the official catalogue’s breeder* varieties.

Synonyms for “farmer varieties”

Emphasising geographical origin

- + Local variety
- + Regional variety
- + Landraces
- + Common variety

Emphasising the community responsible for selection

- + Native, mixed-breed or “creole” variety
- + Folk varieties

Emphasising a variety’s history

- + Traditional variety (which also emphasises traditional selection methods)
- + Heirloom variety

Emphasising genetic composition

- + Population



- **‘Heirloom varieties for amateur gardeners’**

A French exception for species grown by amateurs. These varieties may only be sold to amateur gardeners, to protect the state from suits from professionals unhappy with the lack of varietal purity or homogeneity. To guarantee that these varieties are sold only to amateurs, seed sales are limited to very small quantities (2g maximum for tomatoes, 15g for leek, 5g for cauliflower, etc). They can be registered on a specific list annexed to the official catalogue (see chapter 3).

- **‘Conservation varieties’**

A European exception for ‘varieties threatened by genetic erosion and presenting an interest with regards to the conservation of phylogenetic resources (see the box in the chapter on the evolution of the European regulations). The term should also be applied to vegetable and to mixed species (Directives 2008/62/EC, 2009/145/EC, 2010/60/EC, see also chapter 7).

- **‘Creole varieties’**

A Brazilian exception. Local, traditional or regionally specific cultivars: a variety developed, adapted or produced by indigenous populations or by growers practising small-scale family agriculture, landless farmers reinstated thanks to land reforms and often supported by public research. Native varieties possess clearly determined phenotypic characteristics, recognised by their respective communities and not substantially similar to commercialised varieties, in accordance with Brazil’s ministry of agriculture and taking into consideration socio-cultural and environmental criteria.

- **‘Seed-saving’ or ‘farm-saved seeds’**

In the regulations on intellectual property rights this term refers to seeds produced from commercial varieties whose rights are owned by breeders, seeds produced for farmers’ own use. After several reproductive cycles on the farm the commercial variety, if it possesses a sufficient genetic base, may differentiate itself, diversify and adapt to regional conditions. Through traditional selection methods it may become a farmer variety within a few generations. In international treaties and conventions on genetic resources*, the term ‘seed-saving’ refers to the totality of seeds saved and reproduced by farmers, whether or not the original variety was commercial or protected. (See also chapter 4).

- **Phylogenetic resources, germplasm or genetic material**

Terms taken from the language of industry, referring to any plant which can through cross-breeding and/or genetic manipulation serve for the creation of new varieties. Due to their diversity and the heterogeneity of their genetic composition, farmer varieties are excellent genetic resources. They are considered primary material for industrial research and selection, and compose a significant part of the specimens preserved in gene banks next to breeders’ own varieties and genetic stock (see also chapter 5).

– A key principle: autonomy

The idea of autonomy is central to small-scale agriculture. The autonomy of the “informal” seed-producing system offers the community concerned the possibility of auto-regulation, through the progressive adjustment of cultivation practices and animals to different regions and to climatic variations. This system allows the adaptation of cultivated biodiversity to socio-economic and cultural changes, and to the needs of the human society which tends to it. Autonomy is the first principle of food sovereignty.

Farmer seeds, autonomy and the collective management of cultivated biodiversity

Plant populations are made up of a large diversity of plants; the population is a product of the heterogeneity and genetic variability of its individual members. The population’s intrinsic diversity assures the stability of harvests and the key characteristics of farmer varieties cultivated in natural environments and varied or variable climates. All over the world, small farmers without access to technology (fertilizer, pesticides, irrigation, mechanisation), or who choose more independent and more ecologically sound production methods, use and select their own seeds. In so doing, they demonstrate their ability to naturally adapt varieties to their regions, to conserve, renew and increase biodiversity, to reconstitute the carbonised organic matter stored in soil and to produce a sufficient quantity of healthy food at a lower cost and with lower intake requirements. These practices would be impossible without the independence of the groups responsible and “informal” seed exchanges between farmers, accompanied by a concerted collective management of cultivated biodiversity.



Formal and informal seed systems

Extracts from Farm Seed Opportunities' Policy recommendations document (Bocci et al. 2009; www.farmseed.net)

Scholars recognize two distinctive and interacting seed supply systems in agriculture: the formal and the informal sectors (Bishaw and van Gastel, 2009).

The former is characterised by the following stages:

- a. Variety development, evaluation, registration and release;
- b. Seed production, processing and storage;
- c. Seed marketing and distribution;
- d. Seed quality testing.

The latter depends on farmers' knowledge in seed selection, management and distribution and is based on local diffusion mechanisms. In general all the activities outside the marketing of improved and certified varieties are considered to belong to the informal sector (e.g. farm-saved seed, seed exchange, etc.). Lipper et al. (2010) have well demonstrated that formal and informal exchange channels exist simultaneously and interact in the same country.

The importance of informal seed systems in guaranteeing access to propagation resource in developing countries is well acknowledged by many researches and papers (see for example FAO, 2009; Bishaw and Gastel, 2010; Lipper *et al.*, 2010). For instance, in the Second State of World's Plant Genetic Resources for Food and Agriculture it is stated, "many country reports indicated that informal seed systems remain a key element in the maintenance of crop diversity on farm and can account for up to 90% of seed movement" (FAO, 2009). It is important to note that this share varies according to the crop and the model of agriculture considered within the same country (Lipper *et al.*, 2010).

The continuous presence of these seed supply systems after years of policies addressed to develop an efficient private seed sector it is the demonstration of the market failures. Informal seed systems are particularly important in the case (i) farmers prefer varieties with specific adaptation to local conditions or tasting/cooking quality that cannot be obtained from the formal sector;

(ii) formal seed systems are inefficient or expensive;

(iii) an acceptable seed quality could be easily produced (Louwaars, 2007);

(iv) it is difficult to having access to improved seed (Lipper *et al.*, 2010).

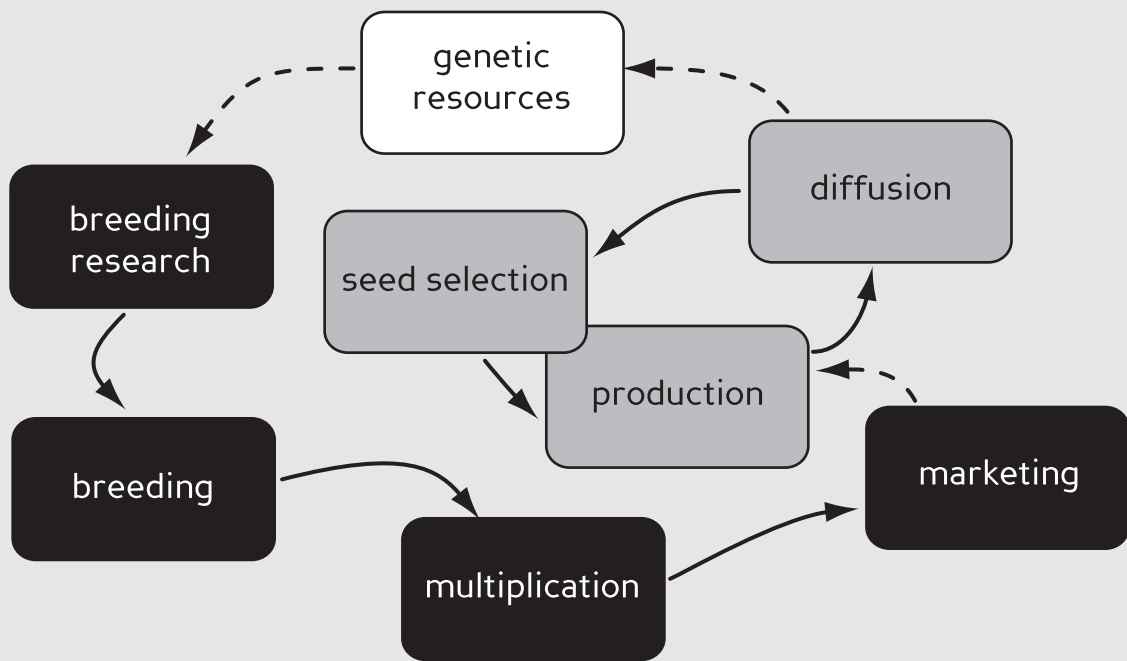
It is also difficult to clearly distinguish a system from another, for example improved seed could be reproduced on farm and then exchanged through an informal mechanism or sold in the market. The table 1 summarizes the different type of relationships that one can find according to the kind of market considered.

One good example of the positive interactions between formal and informal systems is the history of the rice variety named *Bordagol*. As reported by Salazar *et al.* (2007) in the Philippines a farmer selected a new variety as an off type of the modern and famous IR36, the archetype of the Green Revolution. Then this variety was officially registered to the Philippine Seed Board. So a modern variety came through an informal selection process, originating a new one, which in turn came official through the formal certification process. Therefore the formal/informal interaction generated new diversity in the field.

Nowadays promoting informal seed systems is considered important for food security and the sustainable use of PGR, and the challenge is to find the appropriate policies and legislations that can support them in an open and integrated approach with formal ones.

It has to be noted that also the Report of the special rapporteur on the right to food of United Nations published in 2009 stresses the importance of farmers' seed systems, claiming that reforming seed regulations is one of the measures that States could adopt in order to ensure that traditional knowledge is kept alive (United Nations, 2009).

Formal (black colour) and Informal (grey colour) seed systems and their relationships *BEDE January 2009*



Seed types and exchanges *Source: Lipper et al., 2010*

Transactions		Seeds	
		Formal	Informal
Markets	Formal	Certified, improved or purified seed sold in an input supply shop or licensed distributors.	Sale of recycled farm-saved seeds or landraces in a setting where sale of informal seed is explicitly permitted or where this is not permitted but prohibitions on non-certified seed sale or other deterring regulations are not enforced and the public widely recognises this.
	Informal	Sale of certified improved seed via non-regulated marketing outlets.	Sale of non-certified seed in transactions where seed is not explicitly recognised as the product. Formal distinctions of seed from grain may not be explicit.
Non-market exchanges		Theoretically, these exchanges would happen very infrequently because the majority of formal seed is produced without the specific purpose of marketing.	Acquisition of seed through sources not involving market exchanges. This includes saving one's own seed or receiving it as a gift from other farmers.



Chapter 2

The evolution of seed selection and regulations

Since the dawn of human existence the relationship between communities and the seeds they use has been built upon bodies of knowledge and expertise, common techniques and rules. Farmer seeds' twenty-first century renaissance can be understood in the context of a particular moment in the evolution of plant selection techniques, a new stage in this movement whose success depends on an awareness of preceding phases' rules and practices.

The evolution of plant selection is composed of several major phases, often overlapping and finding their methods in competition:

- plant gathering, over the last million years or more;
- the domestication and varietal diversification practised by peasant agriculture over the last ten thousand years;
- the improvement of elite varieties, developed by genetic sciences over the last century.

This third phase, historically very recent, can itself be divided into three distinct stages:

1. firstly, the purification of diverse plant populations to produce homogenous and stable varieties, scientific programmes' principal task for more than a century;
2. next, the transformation of plants' hereditary information through manipulation of DNA molecules, using biotechnologies such as transgenesis*, a focal point for research laboratories over the past forty years;
3. finally, the synthesis of new life-forms, an important part of the work done over the past decade by synthetic biology* programmes, working ever more closely with information technology and nanotechnology*.

Each phase of plant selection can be characterised by the combination of the group or community responsible, the phase's particular history (its origins and development), the biological level at which selection is carried out, the technical demands it makes (tools and methods) and its approach to conserving biodiversity. Each phase is shaped by broader ways of thinking which influence its every aspect; development and planning of experiments, interpretation of results and the common rules and/or regulations defining access, exchange and commercialisation rights for plant varieties.

If the oldest phases (plant gathering, peasant agriculture) offer a positive influence for modern farmer agriculture, as concrete resources or bodies of expertise in the renewal of a selection system adapted to modern agroecology, then the most recent ones (purification, transformation, synthesis), producing genetically modified and padlocked plants and associated with regulations leading to a progressive weakening of genetic diversity, are capable of seriously compromising its future. By analysing the joint evolution over recent years of selection techniques and regulation, we might better understand the nature of modern varieties and their potential impact on farmer varieties.

Mass selection: the root of farmer varieties' selection

This method, used by farmers throughout history, consists of choosing from a plant population those specimens which seem best adapted to the environment and the farmer's needs, and using their grains (and other reproductive material) as seeds for the next cycle. Repeated generation after generation, this process allows the progressive improvement of crops' performance. Between cultivation cycles, genetic recombinations are carried out naturally by the wind or insects, without human control, and sometimes through directed cross-breeds. Traditional bodies of knowledge, still practised by certain communities, also allow the exposure of plants to organised selection pressures greatly influencing their qualities and descendants. Western scientific research has not so far shown much interest in this expertise, often passed on exclusively through the oral tradition.



<u>Phase</u>	<u>Group responsible</u>	<u>Time frame</u>	<u>Level of biological organisation concerned</u>	<u>Techniques</u>
Plant gathering	Hunter-gatherer	Dawn of humanity, around 2 million years ago	Ecosystem	Reasoned sampling of certain plants Protoculture (cuttings, prunings)
Agriculture	Farmer, breeder	Neolithic age, 10,000 years ago	Plant populations	Domestication Renewal of cultivated varieties from within the population (mass selection) Selection in the field
Purification Plant improvement	Breeders in the public or private sector	Industrial age, over the last 200 years	The entire plant	Genealogical and conservational selection Elimination of variants and offtypes* - Replication of elite individuals Directed cross-breedings, search for ideotypes Homogenisation through true-breeding plants, clones, F1 hybrids, vitroplants* Static and laboratory selection
Transformation of living organisms	Biotechnologist Molecular biologist Chemical and pharmaceutical multinationals	The last 50 years	Embryo Cell Gametes Gene	In vitro multiplication and embryo saving Cellular multiplication* Polyploidies* Mutagenesis* Cellular fusion* Transgenesis Cisgenesis* Laboratory selection
Synthesis	Engineer Biotech start-up Information, energy, chemical and pharmaceutical multinationals	The last 10 years	Gene Atom Nanoparticles	Synthetic biotechnology, nanotechnology Convergence with techniques at an atomic scale BANG: Bit, Atom, Neuron, Gene Selection by numerical models
Farmer seed renewal	Farmers Independent seed-producers Gardeners Conservationists Genetic resource managers	The last 7 years	Plant population	Participative selection* for agroecological reasons, organic or biodynamic agriculture Directed cross-breedings, whether static or in the field, mass selection, techniques within farmers' reach

<u>Approach to biodiversity conservation</u>	<u>Methods of appropriation/regulation</u>	<u>Governing worldviews</u>
<i>In situ</i> co-evolution	Common good Rules of territorial access	Animism
Co-evolution of wild or cultivated plant species within a single system On site, farmer varieties existing in diversified agrarian systems	Common good, collective usage rights for local communities Pillage, invasion, war and commerce: factors in global diffusion	Cosmogonism, religions
<i>Ex situ</i> stocking of genetic resources, humanity's common good	Marketing authorisations excluding farmer varieties (national catalogues, seed certificates) Industrial property rights (US patents on varieties, UPOV 60 and 68 Plant Breeders' Rights) F1 hybrids Regulations (particularly relating to health)	Scientific universalism Darwinism Eugenicism
The sharing of advantages and national sovereignty Gene bank privatisation Restricted access: the Material Transfer agreement	Worldwide marketing authorisations on scientific evaluation UPOV 1991 (Essentially derived varieties) Molecular indexing Patents on all types of biotechnology, on genes and their functions Variety sterilisation, CMS, Terminator*	Reductionism
Synthetic conservation using digitized DNA sequences in international nucleotide sequence databases Artificial ecosystems	Patents on genetic techniques Genetic indexing	Transhumanism
Networks of <i>in situ</i> conservation* in farm and garden, dynamic management* of cultivated biodiversity Return of local varieties from gene banks to living plant collections and mutually held seed houses	Collective rights currently being elaborated Farmers' rights over genetic resources (TIRPAA)	Agroecology



The current situation

The nature of modern varieties and their impact on farmer varieties

Building upon agricultural expertise and techniques accumulated over several millennia, the modern school of “elite” seed selection and identical reproduction first emerged in Europe in the 19th century. Advocating scientific methods, the concept of plant “improvement” was an important aspect of the total reconfiguration of agriculture to respond to evolving industrial practices. This evolution can be divided into three distinct, successive phases with the following characteristics:

- **The first phase**, spanning the whole of the twentieth century, was characterised by ideas of refinement and purification. This period saw the spread of eugenicist schools of thought, preaching the natural superiority of “elite” individuals or races and arguing for improvement of hereditary characteristics, ideas which heavily influenced the course of animal and plant selection. Those responsible for selection set out to sift through the diversity of farmer varieties in order to retain and multiply only the highest-functioning specimens, which would serve as progenitors for plant-improvement programmes’ carefully directed series of cross-breedings. The selection of elite varieties served the needs of industrial societies based on exploitation of fossil fuels and growing populations. Mass production processes gave rise to mechanisms responsible on one hand for the specialisation of agricultural skills and on the other for the elimination of traditional bodies of wisdom. These same mechanisms helped erect systems of intellectual property allowing those responsible for selection to retain exclusive rights to homogenous and stable varieties: plant breeders’ rights in Europe, the patenting of varieties in the USA (see chapter 4).
- **The second phase** emerged in the 1950’s. The central idea now was that of transformation, driven by geneticists and biotechnologists seeking, through molecular manipulation of DNA and the hereditary characteristics it controls, to produce new genetic combinations in plants, non-existent in the natural world. Supported primarily by an industrial chemical oligopoly, those working on transformation organised the appropriation of living material through a system of patents placed on its constituent parts. This selection process is awash with a reductionist vision asserting that organisms can be fully apprehended through their individual components (cells, molecules, genes). This way of thinking ignores global approaches to living matter and the holistic knowledge accessed through the science and practice of agroecology.
- **The third phase** introduces the idea of synthesis. The synthetic recomposition of living material is being sketched out in modern laboratories engaged in bionanotechnology research, part of the growing convergence of technologies at the atomic level and the concentration of power into the hands of a few industrial giants. Accompanied by a transhumanist ideology aware of the environmental chaos produced by preceding phases, its central ambition is the reconstruction of a more efficient humanity in artificialised ecosystems.

[1. Phase one: the purification and selection of elite varieties

The first phase of plant improvement dates from nearly two centuries ago and is still being pursued today. Greatly influenced by ideas of scientific universality, Darwinism and eugenicism, it states that the plant variety, a population of varied individual specimens, must be purified until only “elite” individuals remain. Through directed programmes of cross-breeding, only the highest-functioning plant is selected and multiplied identically and its variant “offtypes*” eliminated. The variety thus becomes homogenous.

With the establishment of the principles of genetics, a new scientific discipline - the genetic improvement of plants - was born and tools were minted to measure genetic “progress”. In this approach evolution is considered a linear progression whose effects are cumulative. The measurement of progress is based on returns, and the selection process should produce an ever-improving series of varieties.

• Contesting the idea of superior elites

The process of purification does away with diversity generated naturally during multiplication. Pollen flow between plants, mutations (caused by cosmic or telluric radiation amongst other factors) and chromosomal rearrangements over the course of cell cycles are natural sources of micro-variations in varieties. Plant-improvement aims to put an end to these variations, often qualified as “degenerations”, which threaten to alter breeds’ characteristics. But identical multiplication of a sole individual is never entirely stable despite such purificatory efforts as the systematic eradication of offtypes appearing at each new multiplication. An elite individual’s “superiority” generally owes to the favourable environment in which it is cultivated, and the water, fertilizer and pesticide with which it is generously treated. Superiority vanishes when the individual is removed from this environment, and in more difficult environments the individual is often markedly inferior to specially adapted farmer varieties. Choosing improved varieties’ seeds obliges farmers to abandon the most difficult soils and regions, and to artificialize the cultivational environment, to “improve” it with fertilizer, pesticides and irrigation.

How varietal purity leads to dependence

Programmes of purification or improvement focus their efforts on creating varieties which can be multiplied exclusively by the breeder. Their goal is the sterility of all commercial varieties, allowing breeders to retain control of their creations.

+ F1 hybrids of allogamous plants are “economically sterile”; the products of unstabilised cross-breeding between two lines, they are engineered to produce perfectly homogenous varieties optimising heterozygotic** combinations of characteristics, a process known as “heterosis”** or “hybrid vigour”. The reproduction of F1 hybrid plants creates depressed plants substantially different from their parents.

+ For certain autogamous species unsuitable for conversion to F1 hybrids, the seed producer maintains control over his property through a “drift” of characteristics in the farmer’s field, a situation distant from its comfortable selection conditions, where offtypes are not eradicated. To preserve commercial seeds’ stability against “drift”, the varietal purity demanded by the regulations obliges the constant return to the genetic bases retained exclusively by the seed-producer, and which he cultivates in the most favourable possible conditions.

Elite varieties’ improvement of productivity and returns enables farmers to substitute physical labour for the fossil energy necessary to produce fertilizers and fuel mechanisation. The artificialisation of the agricultural environment is costly in terms of non-renewable energy and favours high-polluting forms of agriculture increasing both climate change and unemployment.

• The impact of elite varieties on farmer varieties

Over the past few decades we have seen the countryside change from the colourful checkerboards of different crops created by biodiversity to monoculture’s vast, monotonous spreads of mono-genetic mono-varieties. Diverse farmer varieties are at first obliged to share space with true-breeding varieties. Next, as the extension and concentration of commercial exchanges demand homogenous, stable and low-cost merchandise, industrial rules dictate that only true-breeding plants and F1 hybrids are developed. It is not farmers who pay the social and environmental costs of their cultivation, dependent upon non-renewable energies and particularly polluting chemical intakes, but rather future generations who are left to repair the damage.

In Europe, these elite varieties were the only ones authorised for commercialisation through catalogue inscription (see chapter 3). Diverse farmer varieties were consequently marginalised, and from the 1960's onwards their seeds were banned from both the official market and informal exchange between farmers. In countries with well-developed industrial agriculture and zones touched by the Green Revolution farmer varieties have almost completely disappeared.

Plant breeders (phytogeneticians) sought to curb the disappearance of diverse farmer varieties so as to retain some samples of this diversity. Through cross-breeding, these "genetic resources" are capable of providing elite varieties with desirable characteristics, most notably resistances to disease and climatic variation. Between 1970 and 1990 over a thousand gene banks were built around the world to house several million samples of farmer varieties of important cultivars. With primary material safely stocked in a few controlled locations, the replacement of farmer varieties by uniform and stable crop types would complete the purification process, clearing the stage for a new era of selection with the dawn of genetic modification techniques.

(2. Phase two: the orientation of selection to genetic transformation

The need to base organic agriculture on ethical foundations

Delmond and All, 2007

Since the end of the 1950's haploidization* techniques have allowed scientists to purify diverse genomes to the point where they contain nothing more than a batch of chromosomes. More recently, protoplast fusions* have permitted the combination of different species' genomes. New varieties produced by these techniques are marketed in the same way as varieties produced by natural cross-breeding processes. Recently, though, the introduction of these species into common organic agrosystems has started to come under scrutiny.

"How to decide what is and what is not compatible with organic agriculture, when plants' hereditary characteristics are treated like a mecano set? The existence of GMOs made people aware that a line had been crossed. But GMOs are only the most visible part of a whole iceberg of "manipulations" of living material, incompatible with organic agriculture's ethics. In Adelaide at the IFOAM's 2005 general meeting, during a debate on the definition of organic agriculture's principles a Sri Lankan representative declared that "organic is a way of life!". This phrase neatly sums up the choice made by farmers at the moment, or in the course, of their conversion to organic. At this point they have to stop simply following instructions, acting as a technician optimising circumstances for the material used. The farmer must interact with his or her animals, his or her plants and their environment; each belongs to the same living system, where too many elements are in interaction for the totality to be apprehended through one aspect alone. Whatever the definition of "organic", they all rely on this fundamental, sometimes unconscious principle; that Life invests its material supports and not the the other way round, that from the molecular organisation of organisms emerges a living state of matter. And if you modify the support using artificial means, Life will cease to recognise it."

It was biotechnology which initiated the genetic modification of plants from around 1960. The discovery of DNA's role as the sole bearer of hereditary information allowed scientists to target and modify specific material to obtain new organisms unlikely to occur naturally. The work of the breeder was focused on the laboratory and the field now served only as a testing ground to gauge the efficacy of manipulations. Processes of selection evolved in step with ever more intrusive innovations in genetic modification techniques.

• **Mutagenesis* and in vitro cultivation, selection at the cellular level**

› *The production of mutant plants*

Mutagenesis techniques were the first method applied to plants to modify their genetic heritage. Plant tissues are subjected to radiation at intensities far higher than with cosmic or telluric radiation, or to chemical solutions (ethidium bromide, colchicine...) generating an environmental stress more violent than anything occurring naturally, in order to provoke elevated mutation rates in the DNA molecule. These mutations are undirected and do not produce the same probability of mutation in each part of the genome. Another type of mutation induced by colchicine creates plants produced by multiplication of a single batch of chromosomes. In the first stage, these polyploidies* are the most developed of the mutated plants*. Thousands of modified mutant plants are evaluated in order to retain only sufficiently vital specimens with new, desirable characteristics.

Originally applied to the whole plant, the process of mutagenesis can now be applied at a cellular level. The techniques developed under the name of tilling or Marker Assisted Selection (MAS) allow the combination of genetic mutation with a precise molecular marker* system allowing scientists to keep track of random mutations and making the task of sifting systematically through thousands of mutated cells quick and economical. The most recent techniques allow researchers to target genes in which they wish to produce mutations, to manipulate them in such a way that they no longer influence the cell, or even excise them entirely. The methods used to manipulate species' internal processes are known as cisgenesis*.

› *In vitro* selection

A second technique, using *in vitro* cellular multiplication*, allows researchers to reconstitute the entire plant starting from a single cell. The arena of selection is no longer the field, nor even the plant, but the cell itself, where the genome can be manipulated directly. "In vitro" cultivation of plant embryos on a substrate of synthetic hormones makes it possible to cross-breed plants genetically too distant to produce a viable line of descent (Renan wheat, Nerica rice...). The fusion of protoplasts (cells from which the cell wall has been removed beforehand) allows researchers to cross plant genes which would not cross-breed naturally. Cytoplasmic male sterility* (CMS) is the result of this technique, the integration of sterility-causing genes in the cytoplasm of a cell whose nucleus has been removed before fusing it with the cell of the plant intended for modification.

• Transgenesis makes reproductive barriers between species porous

From the 1980's onwards, new and more intrusive transgenic techniques were used on plants with the aim of bypassing species' reproductive systems more efficiently than with cellular fusion* (using tools developed by physics such as particle cannons, or biological vectors such as modified *Agrobacterium* bacteria). Inserted genetic constructions are synthesised pieces of DNA, copies of several original strands of DNA, viral, bacterial, plant or animal, and capable of producing chimera plants.

Significant research efforts are being made to increase the spectrum of transformation of cultivated plants, with the goal of extending cultivation of such species to all quarters. Despite the thousands of laboratories working upon such projects, results obtained from transgenic varieties have so far been limited; in thirty years, only two traits have been successfully developed and retained in commercial varieties; herbicide tolerance and internal production of insecticidal toxin. Moreover, GMO varieties suffer molecular instability in their DNA. Randomly inserted genetic constructions do not always behave as desired and can cause unforeseen disruptions.

• Modern biotechnology's great project; the sterilisation of living material

Industrial seed-producers have always sought total control over the protected varieties they sell to farmers. With the agrochemical industry's financial support, powerful research teams focus their efforts on developing biological padlocks to prevent the multiplication of selected plants in the field. Harvested seeds from autogamous lines can be re-used, and seeds produced from F1 hybrids, although incapable of identically reproducing the variety, can serve as a foundation for new programmes of selective breeding and help produce plants with desirable characteristics. This is why modification programmes seek to sterilise commercial varieties' seeds.

Clandestine GMOs

Qualities such as polyploidies, directed mutations and cytoplasmic male sterility (CMS) are now found in numerous commercial varieties. These plants are "organisms whose genetic material has been modified in a way not occurring naturally through multiplication and/or natural recombination" (definition of a GMO in European directive 2001/18). Yet the legislature does not consider them as GMOs since their modifications were obtained through techniques other than transgenesis; artificial reproduction of a single chromosome, artificial mutation of a gene, or cellular fusion of protoplasts. Directive 2001/18 imposing processes of evaluation and labelling on GMOs in effect excludes them from its field of application.

In this way cytoplasmic male sterility replaces manual or chemical castration of female lines destined for manufacture of F1 hybrids when this process is technically impossible. CMS usually originates in a member of the same family with which the cultivated species does not naturally cross-breed. Numerous hybrid varieties with imported CMS are currently in existence; chicory endives with sunflower CMS, various types of cabbage and rapeseed with radish CMS or even leeks with onion CMS. Similarly, the majority of beetroots and rapeseed are polyploidies, and numerous types of wheat are mutants.

Sterilise living material to make it safe, and patent genes for climatic adaptation *www.etcgroup.org, June 2007*

F1 hybrids are in the process of becoming an antique curiosity in the panoply of attempts to sterilise living material. A decade ago (1998), civil groups' discovery of patents on Terminator technology (gene coding to sterilise seeds) led to the imposition of a de facto moratorium by the United Nations in 2000, reinforced in 2006. In 2008, however, the European Union under the pretext of environmental protection financed the Transcontainer research programme on new Terminator technologies, now baptised "bioconfinement techniques"; suicide transgenes (excised prior to pollinisation or grain germination) and "zombie" seeds (which die at harvest but can be revived if soaked in appropriate chemicals). Several governments are exploring the possibility of breeding genetically modified Terminator trees to avoid dispersal of transgenic material in the natural environment. During this period, the six largest chemical and biotechnological companies (together currently controlling 41% of world seed sales and 73% of world pesticide sales) have claimed patents on 93% of the identified genetic sequences for the control of climatic stresses for each agricultural species. These companies will possess exclusive rights to multiply these natural genes, which for farmers will henceforth be legally sterile.

The first sterilisation techniques developed were tested in the production of F1 hybrids. Natural sterilisation mechanisms, genetic or cytoplasmic in nature, depend on an absence of pollen or non-viable pollen. This sterility is passed down the line of descent, either partially in the case of genetic sterility (transmitted via pollen, the basis of male heredity in plants) or totally in the case of cytoplasmic sterility (caused by an interaction between nuclear and mitochondrial genes found in the cytoplasm, the basis of female heredity in plants).

Modification programmes strive to make plant reproduction impossible. Most recently, patents have been sought for several genetic constructions allowing grain sterilisation. Numerous civil movements and governments have denounced genetic use restriction technology (GURT), best known under the nickname "Terminator*". Yet several research programmes continue to pursue this goal, notably the Transcontainer programme, financed by the European commission with the aim of using biological confinement as an environmental guarantee of peaceful coexistence between GMO and other cultivations (see box).

(3. Phase three: the reconstruction of living material through synthesis

At the turn of the millenium the world moved from biotechnology to an extreme form of genetic engineering - synthetic biology. Whilst traditional transgenic technologies depended upon clumsy and tiresome processes of copying, synthetically reconstituting and pasting pieces of DNA into other species' genomes, synthetic biology is able to manipulate the genome in its entirety. Two genes placed brutally and randomly side by side do not necessarily stay in the new arrangement which the scientist wishes to impose; often the process leads to new genetic arrangements with unforeseen consequences, explaining transgenesis' multiple failures and numerous harmful effects upon health and the environment. The brutal stresses caused by other gene manipulation techniques - induced mutation, cellular fusion, etc - generate the same unintentional, unforeseeable and often hidden effects. Systems biology aims to correct these phenomena by studying the totality of the chemical, genetic and energy exchange networks (amongst others) which link genes. New discoveries allow more stable artificial reconstructions of these systems than ever before. The recent mastery of what has come to be known as "the matrix" enables the insertion of ever greater quantities of genes into plant genomes, the multiplication of artificial chromosomes in the plant's cytoplasm and the reconstruction of the entire genome of certain bacteria.

• **Artificial life has already been patented**

The stability and durability of these new chimera have not yet been proven. The majority of scientists, however, believe that the manufacture of new organisms from synthetically recomposed constituent elements is only a question of time. In 2008 the J. Craig Venter Institute deposed a worldwide patent on a unique, artificial and self-replicating life form built using atomic assembly techniques. Even if the patent request for this mycoplasma declares that such new species will allow scientists to increase efficiency in bioenergetic enzymes and decrease global warming, it is not so hard to imagine this extraordinary elementary microbe serving other objectives - as a matrix for the manufacture of new biological weapons, for example, or for the repair and reconstruction of living organisms unadapted to the catastrophic environmental changes currently in progress.

• A revolution in biodiversity conservation

The “dream” of synthetic living material leads those responsible to reconsider their approach to conservation, and by their logic such reconsideration is perhaps coherent. If biodiversity can be synthetically recreated in its entirety, why conserve it alive? Grain samples and dead animals are largely sufficient to sequence genomes and if necessary create synthetic copies. National collections of phylogenetic resources are being progressively abandoned and *ex situ* biodiversity concentrated in ultra-secure locations such as the Norwegian “apocalypse bank” from which seed samples will no longer be regularly resown to keep them alive. Prohibited and preserved in banks, freely accessible biodiversity seems condemned to mummification and replacement by artificial equivalents, the property of a few governments and transnational companies. Biosynthesisers believe that virtual, digitized, electronically stored “in silico” collections and the database of genetic sequences they provide will suffice to rebuild entirely artificial new life.

• Harnessing biomass*

Technological convergence gives rise to another threat to cultivated biodiversity: industrial transformation of wild biodiversity, essential for natural renewal and diversification. Reduced to the vague status of “biomass”, this biodiversity is an indispensable part of the ecological balance which permits durable human life on earth. The forecast exhaustion of fossil biomass reserves (oil, coal) has convinced multinationals and governments to invest staggering amounts in the conversion of biomass to fuel. The genetically modified or synthetic bacteria needed for this process have already been developed and the first industrial prototypes are now emerging from laboratories. Having not yet succeeded in their project of confiscating the quarter part of worldwide biomass currently under cultivation, the ETC group says that multinationals are now turning their attention to the other three quarters, wild biomass. The normal destination for harvest leftovers and waste materials is the soil, where they return to build fertility and store carbon in the form of humus. Without humus for nourishment, biodiversity would disappear. Fossil fuels such as oil are only the carbon offered by plants to the earth thousands of years earlier, the process which allowed the development of life. Humanity only recently began to extract this carbon from the earth and return it to the air through burning. Are we now getting ready to take as well the carbon plants extract from the air to nourish the earth, at the risk of being able neither to breathe nor feed ourselves?

Faults in the vault: not everyone is celebrating

Svalbard <http://www.grain.org/articles/?id=38>

After months of extraordinary publicity, and with the apparently unanimous support of the international scientific community, the “Global Seed Vault” was officially opened today on an island in Svalbard, Norway. Nestled inside a mountain, the Vault is basically a giant icebox able to hold 4.5 million seed samples in cold storage for humanity’s future needs. The idea is that if some major disaster hits world agriculture, such as fallout from a nuclear war, countries could turn to the Vault to pull out seeds to restart food production. However, this “*ultimate safety net*” for the biodiversity that world farming depends on is sadly just the latest move in a wider strategy to make *ex situ* (off site) storage in seed banks the dominant - indeed, only - approach to crop diversity conservation. It gives a false sense of security in a world where the crop diversity present in the farmers’ fields continues to be eroded and destroyed at an ever-increasing rate and contributes to the access problems that plague the international *ex situ* system.

Key issues

Modern industrial selection techniques have a negative influence on farmer varieties when they lead to the cultivation of varieties which:

- **can not be reproduced by the farmer** because of biological and legal padlocks leaving plants sterile. These selection techniques make both on-farm plant reproduction and the genetic intermingling necessary for evolution impossible. They do away with an essential part of the farmer's role, the choice of which plants to cultivate and adapt to his environment, and disrupt the dynamic management* of cultivated biodiversity.
- **possess an artificially modified genome** likely, through natural cross-breeds, to contaminate farmer varieties in open environments as well as wild biodiversity essential to their renewal. If contamination is weak and periodical, farmer selection techniques are capable of eliminating chromosomal irregularities within the course of a few reproductive cycles, but in cases of massive contamination the farmer variety is denatured and liable to become insecticidal, herbicide-resistant or sterile. Wild biodiversity too can be profoundly altered.
- **degrade the taste and nutritional value of food products**, qualities constantly harmed by successive phases of purification, modification and, soon, synthesis. The weakening of living matter is proportional to the increasing artificiality of selection techniques. A few rare studies have shed light on how nitrogen-based chemical fertilizers lead to the loss of micronutrients (vitamins, antioxidants, minerals) and the denaturing of protein qualities in modern selected varieties. Yet neither scientists nor legislators ever take this phenomenon into consideration. Farmers, gardeners and consumers rediscovering farmer varieties become aware of this fact, and are able to judge for themselves the difference between the two modes of production. Deteriorating food quality is in step with the growing artificialisation of food production processes, a profitable source of activity for the food and pharmaceutical industries: nutritional supplements, artificial aromants and colourings and nutraceuticals all serve to mask but not to compensate for what plants lose through modern selection techniques. New, artificially inserted nutritional genes only increase these instabilities. Degraded food is at the heart of numerous health concerns deliberately disregarded by authorities, and a source of profit for the pharmaceutical industry.
- **aid the tracing of intellectual property**. Modern production and synthesis techniques serve the purposes of genetic indexing and intellectual property control over new varieties. If a farmer uses saved seeds or a contaminated farmer variety, the patent-holders on the manipulated genes can claim legal ownership of the farmer seeds, legally considered an infringement of their rights. The sequencing and patenting of naturally existing genes linked to plants' resistance mechanisms to hydric stress, destructive predators, diseases, etc, might well allow firms owning these patents to appropriate locally selected plants with these genes. There is currently no clear legal mechanism to prevent such a situation (see chapter 4).

– >>> What can be done?

Although we cannot return to the agriculture of a few generations ago, the seeds used then are still the best foundation for modern farmer selection. Certain technical innovations acquired over the last century of plant improvement have their own value as well, as long as they are not dependent on fertilizers or chemical pesticides, fossil energies or biotechnologies which put the environment, health or society's normal functioning at risk.

There are several steps which can be taken:

1. Develop holistic approaches to the renewal of cultivated biodiversity, and systems of plant selection which take into account questions of diversity, the complex relationships between species, ecosystems and associated agrarian, social and cultural systems. These holistic approaches are generally present in traditional expertise and practices, re-adopted and developed by modern peasant agriculture and the sciences of agroecology, biodynamism or even permaculture.

2. End methods harmful to the development of farmer varieties and cultivated biodiversity. Oppose all forms of genetic sterilisation, whether total (GURTS/Terminator) or partial (CMS, triploids, F1 hybrids), intrusive gene manipulation methods (transgenesis, mutagenesis, protoplasmic fusion) and purificatory selection's systematic erosion of diversity (haploids, clonal selection, true-breeding plants).

3. Systematise participative selection programmes, including at each stage, from conception to realisation to evaluation, every community or group involved (researchers, farmers, gardeners, plant-growers, craftspeople, consumers, etc) and inviting the participation of scientists from various disciplines (entomologists, weed specialists, agronomists, nutritionists, ethnobotanists and ethnologists, legal experts, etc). Take into account the agrarian, economic and social systems which influence and are influenced by cultivation. Paths disregarded by modern research could be re-evaluated within the holistic framework.*

4. Take into account varieties' nutritional dimensions, modified relatively little by the mode of cultivation (an organic "long life" tomato remains a "long life" tomato). There remains a need for comparative evaluation of modern varieties' and farmer varieties' nutritional qualities by truly independent experts.





Chapter 3

A certification system that serves to eliminate farmer varieties

For centuries seeds have been produced by and exchanged between farmers according to local or regional rules and customs. Exchange between communities, regions or continents has been influenced by travel, war, trade or a combination of these factors. With the development of industrial processes, the seed-producing sector created a body of rules and regulations to organise the specialisation of seed- and food-production processes' every stage (breeders, seed-producing establishments, farmer-multipliers, distributors, farmer-users) and structure competition in the market. The progressive imposition of these legal frameworks, favouring specialist breeders' varieties, has little by little restricted farmer varieties' position in the market, to the point where it threatens to eliminate them entirely.

– The current situation

Seed regulations are difficult to understand; they are numerous, take many forms and vary from one species group to another. Fruits, cereals and vegetables crops each have their own specific regulations, for example. Moreover, regulations are subject to regional, national and international variations in application and different regulations can be combined, confused and sometimes even find themselves in competition. Their evolution is influenced by technical innovations, competition between major geopolitical industrial centres (the European Union, North America, Japan and China), the reigning legal culture and power relationships within societies.

Schematically, the industry's organisation of production and commercialisation has given rise to two separate regulatory systems:

- a catalogue and/or certification system guaranteeing seeds' identities and varietal purity;
- a system protecting the use of varieties through intellectual property rights (see chapter 4).

These two systems are separate in the American model which depends exclusively on the patent system, and where the catalogue and certification are not obligatory. In the European model, where catalogue inscription is part of the obligatory authorisation process for entry onto the market, the two systems are part of the same structure and work in synchronisation. In each case, the system serves to prevent farmers from producing seeds independently.

(1. The certification system and farmer seeds' exclusion from the market

Seed certification is an official proof that the maximum of precautions have been and will continue to be taken to assure seeds are in accordance with basic rules for commercialisation (germinative ability and purity of characteristics, humidity rates and, for certain species, sanitary conditions) as outlined in national regulations and the EU's common directives. In practice, this process consists of an inspection of production conditions prior to sale and the granting of a certificate for each bag of certified seeds. In Europe, certification is only obligatory for agricultural species. Other species' seeds can either be certified prior to sale or sold as standard seeds, obeying the same rules but only inspected through surveys taken after sale.

The nature of seed certification inspections in France

For most species, once the harvest is gathered it is impossible to ascertain if the correct variety has been collected, or whether there has been accidental or intentional contamination at threshing (an unclean harvester...), delivery to the factory (mixture of several farmers' harvests together), the sorting process (a mislabelled container), etc. In addition, the majority of inspections take place earlier in the process; the inspection of "mother seed" sachets to verify that they contain the advertised seed, and the farmer has sown his crop correctly; inspection of crops' isolation from possible contamination sources; of varietal purity in the field and elimination of offtypes; of the journey crops make, from the field to leaving the factory. For seeds due for sale the following year inspection takes place either on emergence from the factory or at the stocking centre. There is no guarantee, however, that seeds will still meet inspection standards at the time of sale (when conditions are too warm seeds may prematurely lose germinative capacity). Certification also guarantees that samples from various stages of the process will be cultivated, to make sure after the fact that the seed is of the correct variety and the variety is sufficiently pure.

The few species unregulated by the catalogue

A few major cultivars (spelt wheat, millet), some vegetables (parsnips, dandelions, salsifys), the majority of aromatic or medicinal plants, flowers, wild plants.

? Can varieties unregistered in the catalogue be cultivated? ?

Yes

The regulations prohibit trade or exchange, remunerated or free, of seeds from non-catalogue varieties with a view to commercial exploitation. A farmer producing his or her own seeds has the right to grow unregistered varieties but in practice it is rare for a farmer growing vegetables to entirely produce his own seeds, so this regulation greatly limits the possibility of growing unregistered varieties.

Organic or GMO varieties: two different measures for two different systems

The catalogue's required standards disqualify wheat varieties selected for organic agriculture because of insufficient uniformity or stability. Yet the many examples of instability in transgenic maize varieties have not led to their disqualification from the catalogue. The requirements of stability and homogeneity effectively ignore what happens at the level of the genome, focusing only on the consequent characteristics. Examiners consider that as soon as a required protein is present, no matter its quantity (and therefore efficiency), the seed meets catalogue standards. This example shows the extent to which standards are subjective and warped by the interests of plant-breeders, whose presence on evaluation commissions allows them to apply the rules however suits them best.

• Ruling standards for catalogue inscription

In Europe, only seeds from varieties registered in the **Official catalogue of cultivated species and varieties** can be put on sale. This obligation applies to the majority of regulated species, but a few minor species have no official catalogue (see adjoining box). In France, registration demands are examined by the Permanent technical committee on cultivated plant selection (CTPS in French) which submits varieties to examinations carried out by, or under the watch of, GEVES.

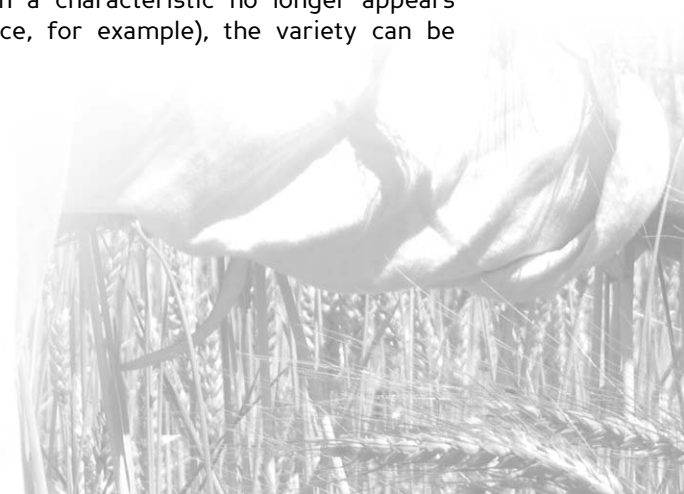
Rules for catalogue registration (DUS, VCU) and the costs involved (see below) systematically deny farmer varieties legal status, while ever greater numbers of non-reproducible varieties are placed on the market (F1 hybrids, polyploidies, cytoplasmic male sterility...).

› **Distinctiveness, Uniformity, Stability:** *magic words for recognizing a variety's existence*

Distinctiveness (D) is like a variety's identity card. Each variety must possess one or several important characteristics distinguishing it from varieties already registered in the catalogue. The definition of an "important" characteristic is highly subjective, and leaves no room for scientific differentiation. The point is not to distinguish between varieties, but to ensure sufficient distinctiveness to regulate competition between plant breeders. The number of varieties registered in the catalogue is no guarantee of diversity: closely related varieties and true-breeding plants with only a single gene's difference, all drawn from the same "genetic pools", can be registered.

Uniformity (U) means that the variety is made up of similar plants each identifiable by registered characteristics. Clones*, true-breeding plants and true-breeding F1 hybrids are the best guarantees of plant uniformity. Synthetic varieties made up of several homogeneous genetic lines are admitted only for certain species (notably fodder plants). This rule poses the greatest problems for farmer varieties which, though not always heterogeneous, are often insufficiently homogeneous.

Stability (S) is the assurance that the variety reproduces the same characteristics each time the grower uses the marketed seeds. Commercialised seeds must produce plants with characteristics identical in every way to those registered in the official catalogue. When a characteristic no longer appears (insect resistance, for example), the variety can be de-registered.



› **Values for Cultivation and Use tests: standards for genetic progress**

For species of major cultivars (cereals, oleaginous crops, fodder plants), catalogue registration also requires tests for agronomic and technical values. The evaluation process for Values for Cultivation and Use (VCU) tends to authorise for registration only varieties performing better during cultivation or at harvest, and/or their resulting products. The VCU standards demand that new varieties always produce yields equivalent or superior to those previously registered, preventing registration of varieties giving lesser yields but desirable for their taste, or agronomical or nutritional characteristics.

Cultivation conditions for VCU tests are regulated according to the conventional practices of industrial agriculture (synthetic fertilizer, herbicide and pesticide treatment, irrigation...), and the nature of the characteristics measured (yields or resistance to a particular type of virus, for example) disqualifies most varieties adapted to agroecological cultivation systems or conserved for taste or specific uses. Judged alongside an F1 hybrid variety specially selected for response to chemical fertilizers, a good variety adapted for organic agriculture, but unadapted to the fertilizer and pesticides used in VCU tests, cannot compete on these terms and will be disqualified. Similarly, a variety adapted for general disease resistance in a non-artificial cultivation system will not be able to survive direct inoculation with the agent of a particular disease, whereas a variety with a specific monogenic resistance to this agent will prosper even though several years later the resistance might be obsolete.

Technical criteria are influenced by the ways in which industry uses crops; because of this, many traditional varieties of wheat, which artisan bakers might use to make excellent bread, are declared unfit for bread-production because they are of no use in industrial baking.

› **Registration costs: an obstacle to diversity**

The catalogue requires registration fees for all candidate varieties. The cost of administrative examinations and the DUS and VCU tests can be as high as €15,000 for major cultivar species, and €10,000 for vegetable species (for whom there are no mandatory VCU tests). These expenses are no guarantee of a favourable outcome, and the success rate for VCU tests in France stands at 20%.

High registration costs are an economic obstacle to the diversity offered by numerous small plant-breeders. Such costs oblige breeders to produce large quantities of a single variety's seed in order to recoup their expenses, and so encourage the concentration of power within the seed industry. For wheat, an estimated minimum production of 200 tonnes of seeds is required to offset a new variety's registration costs, enough to sow 20,000 hectares.

? Can goods produced using varieties unregistered in the official catalogue (vegetables, flour, bread) be sold? ?

Yes

Only the seeds of these varieties are excluded from sale. A farmer has the right to produce such varieties for his own use, to acquire and use these seeds and to sell what he produces.

2008 catalogue registration costs, in euros
For a new variety of cereal
(whatever the variety's intended market or diffusion)

- Administrative fees:
 - › 485
- DUS examination:
 - › 690/year for 2 years
(a total of 1,380)
- Two years' VCU tests:
 - › 1st year 3,221/area
 - › 2nd year 1,610/area
(a total of 4,831)
- 20 years' maintenance annuity:
 - › 193/year for 5 years (a total of 965)
 - › 482/year for 15 years (a total of 7,320)
(a total of 8,195)

Total for the VCU area : › 14,891 euros

› *Diminishing alternatives to non-reproducible varieties*

More and more, varieties registered by breeders in the catalogue are impossible for farmers to reproduce in the field. F1 hybrids, sterile varieties (CMS without fertility restoration) or even triploidies act as biological padlocks preventing farmers from evolving varieties by resowing their harvests and progressively adapting them to more independent production methods.

Since 1960, for example, France's official catalogue has offered farmers no non-hybrid varieties of maize or sunflower. Over the last 25 years more than half of the non-hybrid varieties of vegetable species have disappeared from the catalogue, and over the last 45 years three quarters of traditional varieties have either disappeared or can no longer be sold. F1 hybrids currently make up over 80% of the official selection available to farmers.

[2. Other catalogues (ill-)adapted for farmer varieties

Far from protecting biodiversity and farmer varieties, the official catalogue of cultivated species and varieties operates as an instrument of genetic erosion, threatening farmers' knowledge and expertise with disintegration.

? Can the seeds of unregistered varieties be exchanged? ?

No

if they are destined for commercial exploitation.

In the words of decree 81-605, "by commercialisation, we mean the sale, the possession with intent to sell, the offer of sale and every kind of transfer or provision, with view to commercial exploitation, of seeds or plants, whether or not it is remunerated." The decree cites two explicit examples of exchange not linked with commercial exploitation of seeds: official experimental or inspection programmes, and service contracts between industrial organisations and farmers (industrial varieties, clubs). Exchanges with a view to research programmes, conservation or one's own consumption of the harvest (amateur gardening) are not qualified as commercial exploitation of the variety either, and so are not affected by the definition of commercialisation nor by the resulting requirement of catalogue registration.

The system's attempt to create a regulatory framework for heirloom or conservation varieties remains limited in application and unsatisfactory in results. Several specific catalogues have been proposed and changes in the common European regulation will produce even more (see chapter 7).

• **France: the register of traditional varieties for amateur gardeners**

In 1997, France created a register annexed to the official catalogue where producers are able, though not obliged, to register "traditional varieties for amateur gardeners" (ministerial order, 26/12/1997). This register is reserved for standard vegetable species. With greater flexibility in registration standards, the annex was created under pressure from a seed industry worried by the unregulated trade developing between small craftspeople starting to raise public awareness that farmers were no longer able to grow "the varieties our grandmothers used".

The regulation's field of application is restricted to "amateur gardeners", and its principal aim is to protect authorities from the complaints of professionals unhappy with varieties' insufficient homogeneity. To this end seeds can only be sold in small quantities (2g maximum for tomatoes, 15g for leeks, 5g for cauliflowers, etc), adapted to the demands of gardeners but ill-suited for professional use and inaccessibly priced. The annex does not call into question the definitions of seed commercialisation in European directives or France's decree 81-605, nor does it affect the possibility of selling unregistered varieties' seeds for uses other than commercial exploitation.



• Regulation initiatives for conservation varieties

› Italy

In March 2008, the Italian minister for agricultural affairs issued a decree recognising, for producers of conservation varieties unregistered in the current catalogue, the right to directly sell seeds or resulting plants, as well as the inalienable and unrestrictable rights of communities responsible for varieties' conservation. After Switzerland, which since 1991 has authorised the sale of limited quantities of unregistered varieties' seeds, Italy was the second member of the "European seed-producing area" to put into effect EU recommendations from 1998 encouraging states to take specific measures promoting biodiversity conservation in the field, by authorising the commercialisation of seeds and adapted plants.

To this end the Italian decree set up, alongside the catalogue excluding them from the market, a "conservation varieties section", where free registration costs and simple required standards would allow these varieties legal recognition. Moreover, Italian regional legislations are one of the few operational examples at European level for protecting agrobiodiversity. In many ways they can be considered a forerunner of regulations in line with the aims of the FAO Treaty. This experience highlights the importance of the local context in addressing the question of the sustainable use of PGRFA. In particular, combining rural development with agrobiodiversity appears to be an appropriate strategy for harmonizing local incentives and global objectives.

› France

In January 2009, the French minister for agriculture issued a decree opening an annex to the official catalogue for the registration of "conservation varieties" of major cultivars and potatoes, applying a new European directive of June 2008. The annex is limited to locally adapted varieties produced in low quantities in limited areas. Even while claiming to allow registration of "landraces", defined as the "ensemble of a diverse plant population," it imposes the standards of homogeneity and stability required for Plant Breeders' Rights (standards identical to those of the catalogue), adding only a tolerance level of 10% for "aberrant plants". This level of tolerance bears no relation to the reality of plant populations composed of freely-reproducing plants, and consequently distinctive in undefined proportions liable to vary from one year to the next. The criteria, a product of the European directive, also exclude naturally diverse plant varieties selected by farmers.

The technical regulation also requires candidates to indicate "a region in which the variety is traditionally cultivated," and leaves definitions of tradition to the relevant authorities; definitions might range from the few years indispensable for allowing local adaptation to the fifty years which, in Italy, excludes all recent farmer selections.

• The certification system's international development

There is no international convention imposing the catalogue. The system of identity certification using the catalogue and/or the certification process as its references has however become globalised (see chapter 8), with the notable exception of North American countries. In the United States and Canada, several thousand varieties in open-pollen environments are commercially available through seed-producing societies, with no official registration requirement.

Within the European Union each national system is different, and each system retains significant organisational specificities. The "Common catalogue of agricultural plant and vegetable varieties" is the sum total of the national catalogues compiled by each member state. The renewal of the European legal framework since 1998 (directives 98/95, 2002/53 and 2002/55) has introduced supplementary requirements concerning the admission of transgenic varieties into the catalogue.

Management of the catalogue is left to governments' own judgements. France's GEVES is an example of technical coordination, a body with a mixed status, bringing into association two public partners, the INRA (60%) and the ministry of agriculture (20%), and a private partner, the national inter-professional seed-producers' group (GNIS, 20%). France and Germany are the only European countries with large specialist organisations to carry out DUS tests and coordinate the network of VCU trials. Catalogue administration is trusted directly to the seed industry's inter-professional body, and official decisions on registration follow the recommendations of the CTPS, made up mostly of seed-producers, GEVES technicians and a few of the INRA's breeders.

Since 1970, a variety registered in one member state's catalogue can be sold in every other EU member state. The least prestigious or most expensive catalogues have found themselves marginalised. The free circulation of seeds or plants guaranteed by catalogue registration is problematic for smaller countries. The examination system supposes substantial fixed costs, and once these costs are no longer offset by a large number of candidate varieties the registration process can no longer be maintained. Because Romania, for example, has no such tests, Romanian varieties undergo VCU trials in Italy or France. Tested against control samples drawn from the testing country's highest-performing varieties, small countries' varieties run a greater risk of failing trials and being disqualified from the commercial market.

– Political issues around the catalogue

The catalogue's stated purpose is to give moral balance to the market by protecting users (which is to say farmers) against fraud. Its main function, paradoxically, is to deny these same farmers any right to exchange seeds between themselves.


Catalogue registration systems are the practical application of eugenicist principles to plant life, seeking to encourage "genetic progress" by retaining only elite varieties. Based on restrictive and politicised definitions of a variety, with DUS standards (distinctiveness, uniformity and stability) ruling authorisation and registration, the catalogue serves to organise competition between plant breeders in the global seed production market.

As soon as DUS standards become a requirement for a variety's catalogue registration, and so for the sale or free exchange of its seeds, the law becomes an instrument working to eliminate any competition which might threaten the industry's monopoly. Farmer varieties are denied legal economic existence by the impossible financial and technical conditions demanded by the catalogue or certification, conditions decided exclusively by the needs of plant breeders.

The biological reality of the "variety"

The catalogue's definition of a variety is not in line with biological reality. In botany a plant variety is neither homogeneous or stable, is identified by type but composed of a population of plants likely to vary at the genotypic level and freely cross-breeding in the field. The same goes for varieties of the same species not separated by physical or temporal barriers preventing them from coming into contact. Each generation sees a constant evolution of varieties' diversity and characteristics distinguishing one variety from the other. This process of evolution lies behind the natural appearance, renewal and increase of biodiversity.

The definition of a variety imposed by the catalogue is related to the particular and transient state of homogeneity and stability when a variety is put on sale by a seed-producer. This particular state can only be returned to via the specialised selection process in the particular conditions of the laboratory or selection station. Most of the time it requires a return to the variety's original genetic stock, retained by the breeder who selected this plant. This state is not accessible through cultivation in the field, where the homogeneous and stable characteristics defining the variety are liable to change. These two incompatible definitions of a variety are to the detriment of both farmers' seed independence and cultivated biodiversity.



Conservatoire
de semences
Réseaux parrainage

>>> What can be done?

1. *Official catalogue registration must only be a requirement for varieties resulting from unnatural selection methods unavailable to the farmer or gardener who will eventually use the variety. The evaluation of these varieties (plants with genetic manipulations, sterile plants, F1 hybrids...) should take into account the risks they pose for cultivated biodiversity, the environment, health and food sovereignty, and their diffusion should be strictly regulated.*
2. *Catalogue standards must change to allow registration of naturally diverse varieties and indicate the methods and resources used in selecting the plant (see chapter 4).*
3. *VCU tests are designed to evaluate a nebulous idea of genetic progress. These tests must change, no longer be obligatory and in no circumstances stand in the way of a variety being planted for cultivation.*
4. *The seeds of farmer varieties, selected and multiplied using methods available to small farmers, must be available for sale or exchange with no need for catalogue registration, and with the sole requirement of indicating their origin and the selection methods used to obtain them. In the case of seed exchanges between farmers, these indications will be communicated exclusively between the parties involved in the exchange, and this information will be guarded by the administration.*
5. *Farmer varieties require the development of registers other than the catalogue, taking note in particular of holistic approaches to selection using the methods of peasant agriculture. Registration in these registers must be free, and the costs born by society.*
6. *Every instance of seed commercialisation must respect the collective rights of the farming communities involved in the selection and conservation of either the varieties concerned or the original varieties used to select the new plants.*



Chapter 4

Intellectual property: a monopoly on reproduction

In parallel with certification and catalogue registration, there is a distinct regulatory system for plant varieties: intellectual property rights, and the protected monopoly they create over plant reproduction.

While the catalogue system dictates farmer varieties' exclusion from the market, intellectual property prevents farmers from freely gathering the seeds of plants cultivated in their fields, to reproduce them the following year.

The catalogue guarantees the holder of a plant's parental lines the commercial monopoly over the registered variety. Before the advent of the earliest biotechnologies ("in vitro" multiplication, haploidisation*, encouraged mutations) and the creation of a pan-European market beyond seed companies' usual national territories, this system sufficed to organise competition between seed-producers. The sums invested in plant-breeding are now so high that the industry demands a guaranteed monopoly not only for the holder of the original lines, but for the plant-breeder himself; this is the role of intellectual property.

The current situation

Since the start of the twentieth century, grain-producing companies have sought to protect from competition the homogeneous varieties they sell. France's first catalogue, guaranteeing plant-breeders commercial monopoly over their work, existed at a time when most marketed varieties were substantially similar to farmer varieties already under cultivation, and was thus of little use to seed-producers. After several attempts at implementing a sort of patent system on horticultural varieties, legislators finally decided to create a specific system to protect breeders' varieties through the granting of plant breeders' rights (PBR).

In 1961, a few European countries draughted the *Paris Convention on Plant Protection*, which gave rise to the UPOV (International Union for the Protection of New Varieties of Plants), created alongside the World Intellectual Property Organisation (WIPO). The two organisations are distinct but not distant, and share headquarters in Geneva. The UPOV began as a defender of the particularities of PBR over the patent system (see table), but these would rapidly change with the advent of biotechnology in the production of plant varieties.

Thirty years on from its creation, the UPOV was a supporter of the twin protections of PBR and the patents system, consolidating the industrial sector's monopolisation of seed production, and increasing the obstacles in the way of farmers wishing to reproduce plants they cultivate in their fields.

? *Is a catalogue variety necessarily protected by PBR?* ?

No

There are varieties unprotected by PBR registered in the catalogue. These varieties are in the public domain. Since 1991 for varieties protected under the terms of the UPOV's 1991 convention, 1994 for varieties protected by European PBR and 2006 for those protected by French PBR (following the law prohibiting seed-saving for these varieties), the protection granted by PBR lasts 25 years for annual plants, and 30 years for perennial plants and potatoes. At the end of this period, varieties fall into the public domain and are often removed from the catalogue, either because it is doubtful whether the breeder will continue their production, or because the breeder himself requests their removal, no longer interested in paying for a variety now available to anyone.

[1. How does PBR work?

• Differences with regards to the patent system

Plant breeders' rights (PBR), created to serve the seed industry's needs at the start of the 1960's, were originally very different from the patent system.

Unlike the patent system, the object of intellectual protection in PBR is not the innovation or invention but the material for multiplication which allows protected varieties to be reproduced. The seed, the product to be put on the market and sold, has a value, and it is this value which PBR protects. PBR never reveals the identities of a plant's progenitors, nor the type of cross-breeding, nor the selection tools used; none of the elements underlying the plant's selection are described. At a time when molecular markers were not yet in routine use, the lack of a requirement to describe the breeding process, and so identify the original varieties used to obtain a candidate for PBR, meant plant breeders had no way of proving their variety had been used in a cross-breeding for which a competitor now had intellectual protection. It was also difficult to prevent farmers from resowing harvests using breeder-produced varieties substantially similar to farmer varieties still under cultivation.

This first feature allows the protection not only of newly created varieties (as with the patent system) but of "discovered" varieties. Yet a variety can only be "discovered" in the field of a farmer, who has no interest in registering his variety. To benefit from the intellectual protection granted by PBR, a breeder need only develop a farmer variety to the point where it conforms to the required standards of homogeneity

and stability. The new characteristics demanded by PBR are evaluated not against all existing varieties, but only “legally recognised” ones. Since its very creation, PBR has served to legalise biopiracy*.

These two features give rise to what the seed industry vaunts as one of PBR’s fundamental “advantages”; while the patent system prohibits use of an innovation without the patent-holder’s authorisation, PBR leaves the way clear for competitors to use one protected variety to create another. The competitor might be a public sector researcher, a private company or even the farmer himself. In theory a farmer can freely direct a protected variety’s evolution to adapt it to his own land.

• The relationship between PBR and the catalogue

For PBR to be granted, a variety must possess at least one important characteristic distinct from every other “legally recognised” variety (that is, every other variety protected by PBR or registered in a professional catalogue). The variety must also be sufficiently homogeneous and stable; these last two qualities are the same as those demanded by the catalogue, to ensure varieties adapted for agrochemical production methods and irrigation.

The distinctiveness demanded by the catalogue, though, is only judged against other registered varieties, and not unregistered varieties protected by PBR.

?

If a variety is no longer protected, can its seed be sold? ?

Yes and no

An unprotected variety registered in the catalogue belongs in the public domain, and it is possible to use and sell its seed under condition of being registered as a seed-producing company. If the variety has been removed from the catalogue or was never registered, this is impossible.

Similarities and differences between the patent system and PBR

Similarities

- + Private property rights are applied to a living organism, considered an industrial product
- + Third parties are prohibited from using seeds produced from a plant.

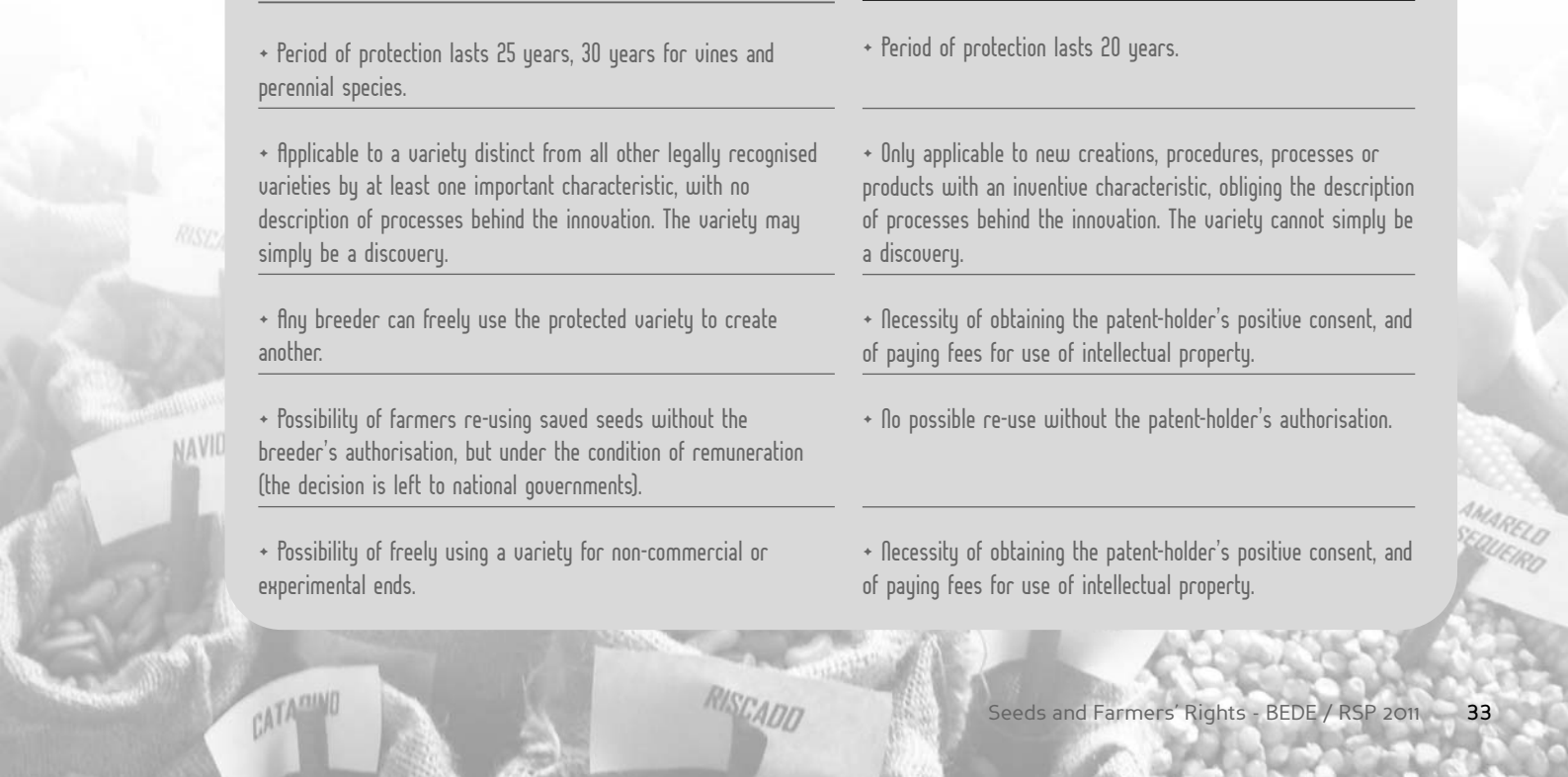
Differences

PBR

Patents

- + Period of protection lasts 25 years, 30 years for vines and perennial species.
- + Applicable to a variety distinct from all other legally recognised varieties by at least one important characteristic, with no description of processes behind the innovation. The variety may simply be a discovery.
- + Any breeder can freely use the protected variety to create another.
- + Possibility of farmers re-using saved seeds without the breeder’s authorisation, but under the condition of remuneration (the decision is left to national governments).
- + Possibility of freely using a variety for non-commercial or experimental ends.

- + Period of protection lasts 20 years.
- + Only applicable to new creations, procedures, processes or products with an inventive characteristic, obliging the description of processes behind the innovation. The variety cannot simply be a discovery.
- + Necessity of obtaining the patent-holder’s positive consent, and of paying fees for use of intellectual property.
- + No possible re-use without the patent-holder’s authorisation.
- + Necessity of obtaining the patent-holder’s positive consent, and of paying fees for use of intellectual property.



2. The evolution of selection techniques and their influence on PBR

• What was going on in the laboratories?

Since the 1970's, the introduction of an artificial genetic construction into another species' genome via transgenesis has enabled scientists to create genetically modified living organisms. Genetically modified organisms were rapidly recognised as a human creation, not occurring in nature, and so falling into the domain of intellectual protection. Genetic transformation was first used to justify the patenting of micro-organisms, and then of plant and animal life.

• A subtle and fundamental distinction between Europe and the United States

When in 1980 the US supreme court confirmed the existence of the right to patent genetically manipulated genes and organisms, European conventions followed its lead. But when in 1985 the US decided to allow the patenting of plant varieties and plants, Europe only partly followed its example. The European directive on the patenting of biotechnological inventions authorised the patenting of parts of plants (genes, cells, etc), but plant varieties created under PBR were excluded.

The isolation of a gene and its functions in another organism must however be part of an innovative activity likely to lead to a clearly described industrial application. The simple discovery of a gene or function cannot be protected if it is not shown to lead to any innovative activity or possible industrial application.

• Adapting the UPOV to patented genetic modification

In 1991, the UPOV altered its convention to allow the possibility of introducing a patented gene into a protected variety, and authorised the protection of seeds by two separate systems: PBR to protect the variety and a patent to apply to a gene or industrial process. National legislations were obliged to structure the relationship between patents granted to "inventors" of genes inserted in plant varieties and the protection accorded to the variety itself.

The UPOV's 1991 convention extended the protection granted by PBR to varieties essentially derived from the protected variety, so international biotechnology companies had free access to varieties, but breeders retained protection rights over commercialised varieties with patented partial modifications. Because of this extension, conventional seed-producing companies suddenly had an interest in the promotion of GMOs. Although they did not themselves use transgenic techniques in their selection programmes, they could reap the rewards of GMOs based on their varieties.

The 1991 convention also modified the legal status of farm-saved seeds reproducing protected varieties. With the extension of PBR's protection to essentially derived varieties, seed-saving became infringement and governments were able to prohibit it. If they wished to authorise seed-saving, authorisation was always on condition of "fair remuneration" for the breeder.

The extension of breeders' rights under UPOV Convention's 1991 Activities

a) Subject to Article 15 and Article 16, the following acts in respect of the propagating material of the protected variety shall require the authorization of the breeder:

- 1) production or reproduction (multiplication),
- 2) conditioning for the purpose of propagation,
- 3) offering for sale,
- 4) selling or other marketing,
- 5) exporting,
- 6) importing,
- 7) stocking for any of the purposes mentioned in 1) to 6), above.

b) The breeder may make his authorization subject to conditions and limitations.

(3. TRIPS and the WTO: a breakdown in international regulation

The World Trade Organisation enforces the recognition of intellectual property rights over plant varieties. An important section of their 1995 agreements, the trade-related aspects of intellectual property rights (TRIPS), created deep restrictions for farmers with regards to the seeds they use.

Article 27-3 (b) of the TRIPS agreement was particularly important, and remains controversial. This article enforces the recognition of patents on micro-organisms and micro-biological processes but allows governments to disavow the right to patent animal or plant life, on the condition that plant varieties are protected “by an effective *sui generis* system” (ie, one created specifically for this purpose). The TRIPS agreement recommends the review of this article, a source of much international legal conflict over the last fifteen years. In an attempt at resolving these problems, the 2001 Doha Declaration requested the TRIPS council to examine the relationship between the TRIPS agreement and the United Nations’ convention on biological diversity, the protection of traditional knowledge and folklore.

At these debates’ heart is the recognition of an “effective *sui generis* system”. European seed-producers contend that the UPOV’s 1991 convention is the only alternative *sui generis* system to effectively protect plant varieties, and several governments have been persuaded to alter national legislation to reflect this fact. One of their great successes was the 1999 revision of agreements regulating intellectual property in sixteen African countries, sinking an innovative continent-wide initiative, the Organisation of African Unity’s model law for “*the protection of local communities’, farmers’ and plant breeders’ rights, and the regulation of access to biological resources*”. This model law was a remarkable effort to propose a *sui generis* system applicable to Africa. It aimed to help OAU member states consider, articulate and apply policies and legal tools compatible with national objectives and political aspirations to support family peasant agriculture, whilst remaining faithful to countries’ international obligations. The African Intellectual Property Organisation’s adoption of principles from the UPOV’s 1991 convention rendered null and void the preeminence of farmers’ rights over those of plant breeders envisaged by the OAU’s model law.



BIENVENUE AUX PARTICIPANTS A
L'ATELIER D'ECHANGES PAYSANS SUR LA
PRIVATISATION DE LA SEMENCE
Non au brevet sur le vivant

Key issues

Intellectual property rights, whether enforced by patent systems, PBR or brands, are an obstacle to the development of independent seed-producing systems. Tools used to deny farmers', communities' and independent groups' collective rights over plants, these strategies can be described as biopiracy.

The monopolisation of seed production takes its most brutal form in the prohibition of seed-saving practices. The patent system enforces this prohibition in an obvious manner, but PBR works with greater subtlety, granting official exemptions on the condition that the breeder is fairly remunerated, and exemptions for private bodies with non-commercial or experimental goals, the latter being known as a "research exemption".

1. The end of seed-saving

Seed-saving, a term used to refer to traditional practices where farmers keep and re-use grain from their harvests as seed for new cultivations, has been under increasing attack from seed industry leaders seeking to limit the multiplication of varieties under their protection.

Recognition of a farmer's right to use a harvest, for reproduction or multiplication on his own land, has become optional. Such practices are allowed only under conditions: "within reasonable limits and subject to safeguarding the breeder's legitimate interests."

In France the production and use, even for purely personal ends, of seeds obtained through selection of a protected variety's harvest is similarly considered an act of infringement.

The UPOV's convention continues to evolve, and it is highly probable that the forthcoming version, currently under negotiation, will put a definitive end to seed-saving.

The UPOV puts an end to farm-saved seed *Taken from GRAIN 2007, The end of farm-saved seed?*

	UPOV 1961/1978	UPOV 1991	Forthcoming UPOV ?
Species covered	Optional Minimum of 24 species	Must cover all plant species	Must cover all plant species
Uses covered by protection	Reproductive material	All plant material. Optional for resulting products	All plant material. Optional for resulting products
Period of protection	15-18 years	20-25 years	25-30 years
Use for selection	Always authorised	Always authorised, but no new protection on essentially derived varieties	No use for ten years, and then only with registration and payment of the owner's royalties
Use of seed-saving	Signatory states can authorise, limit or prohibit it	Signatories can authorise it only subject to royalty payments, or prohibit it	Conditional on the breeder's authorisation
Request procedures	Different for each country	Different for each country	An international request system for every country
Double protection through the patent system	No	Yes, but only in Europe, with patents on genes but not on varieties	Yes

Since 1991 European plant breeders have complained about their competitive disadvantage next to American counterparts able to prevent seed-saving through contracts which the patent system allows them to impose on farmers. European breeders are seeking, by any means possible, to recoup the money lost to seed-saving. Instead of a patented gene immediately identifiable by molecular analysis, PBR demands the description of protected plants' morphological characteristics, and so does not allow breeders to prove simply and definitively that a farmer is growing a certain variety and no other.

Plant breeders from various European countries are trying to impose new legal devices to obtain royalties promised by PBR:

- the French voluntary obligatory contribution on common wheat mutualises the collection of royalties, which are then distributed in proportion to each breeder's declared sales figures;
- English plant-breeders impose a tax per hectare on all fields of oat, enforcing royalty payment whether seeds used are from protected or farmer varieties;
- in Germany, breeders have tried to force farmers to indicate the names of varieties they have sown. This attempt has failed because breeders are unable to force information from growers using crops in the public domain, and there is no sure way to distinguish these farmers from their colleagues growing protected varieties.

Confronted with these failures and half-measures, many breeders are now calling for the complete prohibition of seed-saving.



*Finally,
does the right
to resow a harvest
exist in France?*



Yes and no

Yes for varieties in the public domain, not protected by PBR. A very small number of these varieties are registered in the catalogue.

Otherwise, it is necessary to distinguish between varieties protected by European Community Plant Variety Protection (CPVP) and ones protected by French PBR, because two separate PBR systems exist and are applicable in France:

- *The European Community system (regulation 2100/94)*
- *The French system (1970 law, article L.632 of the Intellectual Property Code)*

European regulation (EC/2100/94 and EC/1768/95)

There exists the possibility of resowing 21 species (chickpeas, yellow lupin, lucerne, field peas, Egyptian clover, Persian clover, field bean, common vetch, oats, barley, rice, canary grass, rye, triticale, wheat, durum wheat, spelt wheat, swede rape, turnip rape, linseed) not including maize, soya and vegetable species:

- without conditions for small farmers cultivating an area less than that necessary to produce 92 tonnes, for cereals, and 185 tonnes, for potatoes, of the protected variety;
- under regulatory conditions (of quantity and breeder remuneration) for other farmers.

French regulation

Seed-saving practices are prohibited for all species. Numerous potato varieties are protected by French PBR, and producers saving their seeds are regularly pursued for infringement. For varieties protected by European Community Plant Variety Protection (ECPUP), seed-saving is authorised if the breeder is remunerated by the farmer. In the absence of specific regulations defining conditions for this remuneration, seed-saving is legally prohibited but in practice often tolerated.

Regulatory conditions for common wheat require the payment of the Voluntary Obligatory Contribution (UOC). The UOC is collected by a centralised body at the moment of either sale or harvest; farmers able to prove that they harvest fewer than 90 tonnes of wheat, or presenting a purchase receipt for certified seeds, have their contributions reimbursed. Royalty collection is carried out for any variety sown, whether protected by ECPUP or French PBR, whether in the public domain or unregistered. The collection's universality invites questions concerning the measure's legality. In the future, if France adopts European plant-breeding regulations, it is likely that the UOC will be applied to all species for which seed-saving is currently permitted (the French list might differ slightly from the European list, but the principle is the same).

2. Patents on genes: the central pillar of seed-sector monopolisation

The first commercialised varieties containing patented genes were genetically modified plants. Legislation on GMP dissemination, few of which are registered in the European catalogue, exerts significant influence over commercial varieties in Europe. The global seed sector, ever more heavily dominated by agrochemical firms, is moving towards the general implementation of patented plants in the near future. With cultivated plants increasingly required to adapt to climate change, there has been massive investment by the global seed and chemical market's main players in the patenting of genes controlling abiotic stress (see boxes below).

Seed Sector Concentration *Table produced using the work of the ETC Group*

In 1996, 10 companies controlled 37% of world seed sales. In 2006, 10 companies controlled 57% of world seed sales

Company (country)	Principal activities	2001 revenue (million \$)	2006 revenue (million \$)	Observations
Dupont (USA)	Chemicals	1 920	2 781	
Monsanto (USA)	Chemicals	1 707	4 476	Bought Seminis, and Delta and Pine
Syngenta (Switzerland)	Chemicals, pharmaceuticals	938	1 743	Bought Advanta
Limagrain (France)	Seeds	754	1 035	
Seminis (Mexico)	Seeds	449		Bought by Monsanto
Advanta (UK)	Chemicals	376		Bought by Syngenta
HWS (Germany)	Seeds	349	615	
Delta and Pine (USA)	Seeds	306		Bought by Monsanto
Sakata (Japan)	Seeds	231	401	
Dow Chemical	Chemicals	215		
Bayer Crop Science (Germany)	Chemicals		430	

The control of genes for climate change *Source ETC Group, May to June 2008*

Company (country)	Patent requests on genes controlling abiotic stress	Percentage of the global agrochemical market (ranking)	Observations
BASF (Germany)	21	11 (3)	\$1.5 billion dollar collaboration with Monsanto to produce high-yielding plants with greater environmental tolerance
Syngenta (Switzerland)	7	18 (2)	Controls 8% of the global seed market
Monsanto (USA)	6	9 (5)	Ranked first globally, controlling 19% of the world seed market
Bayer (Germany)	5	19 (1)	Controls 2% of the world seed market
Dow (USA)	2	10 (4)	
Dupont/Pioneer Hi-Bred (USA)	1	6 (6)	Controls 12% of the world seed market
CERES Inc (USA)	4		Partner of Monsanto
Evogene Led (Israel)	2		Partner of Monsanto and Dupont
Mendel Biotechnology Inc (USA)	3		Monsanto owns half their shares
Total	51	73	

3. Appropriation through contamination

In a few decades GM cultivation has covered more than 100 million hectares worldwide. For certain industrial cultivars such as soya, GM varieties have tended to completely replace conventional ones (at a rate of over 90% in the United States and Argentina). Contaminations may occur at any point in the production chain, whether at the gene bank, in pollen cross-breeding between neighbouring fields and related species, or the mixing of seeds during transportation, storage and food production. Contamination has occurred on a massive scale in certain areas; with soya in Brazil, rapeseed in Canada and maize in Spain. This is a lasting phenomenon when it affects the land, the breeder's seed stocks, gene banks or centres of origin and diversification. The denaturing of non-GM cultivars becomes widespread and begins to affect biological and agronomical factors as much as qualitative and economic questions. The case of Percy Schmeiser, a Canadian farmer who sought to defend his right to resow his crops against Monsanto's patent, and made it as far as his country's supreme court, is an excellent example of intellectual property's domination of usage rights, a phenomenon which extends far beyond Canada.

4. Genetic indexing and PBR: tools for developing clandestine GMOs

Molecular marking* techniques, able to identify every protected variety, have allowed the creation of genetic indexing which enabled Monsanto to pursue Percy Schmeiser, by identifying the patented transgenic construction in his traditional variety.

These techniques, alongside significant investment in bio-information technology, allow new approaches to "genetic association", linking molecular polymorphisms to phenotypic variations with great precision.

Since 1991, PBR has been defined by "the characteristics produced by a genotype or a combination of genotypes". This description authorises classical crop descriptions using stable and homogenous morphological or agronomical characteristics, but also the identification of crops via molecular marking. Already in use in Australia, this new tool is being prepared for use in Europe by publicly financed research programmes into varieties' genome sequences, part of the programme known as "marker-assisted selection".

GMOs excluded from directives *Guy Hastler*

The industry is currently offering a new technological solution, plants mutated by irradiation, to replace previous GM technologies whose environmental, sanitary, social and economic costs were becoming increasingly evident. The International Atomic Energy Agency is promoting these mutated plants with cool claims, reminiscent of Monsanto before them, that "the encouraged mutation consists of irradiating a plant to change its genetic code, ending up with a new, more resistant, variety. We produce nothing which would not occur in nature. This process simply accelerates mutations which would occur naturally, but at a much slower rate." Given the context, should we support the IAEA's propaganda at a time when European directive 2001/18 has declared that artificially mutated plants, or those produced by artificial cellular fusion, are GMOs, even if the directive excludes them from its field of application? It would be better, perhaps, to take this lucid piece of legislation as a starting point and demand these plants' commercial regulation, clear information for consumers, their evaluation and the right to refuse protective patents or even prevent their dissemination.



In France, public institutions defend their monopoly

Two research bodies, Entav (the Plant Institute's branch for the "improvement" of grapevines, holder of all such cloned stock in France) and Inra (breeder of the most recent grape varieties) have for the past few decades held a monopoly over the French grapevine market (860 authorised clones) resting on industrial sanitary norms. To purchase plants sold under the Entav-Inra brand, registered in 2009, royalties must be paid to these two bodies to the tune of 8 for every 1000 plants. The French Federation of Grapevine Nurseries (FFPU in French) and the General Association for Wine Production (AGPU in French) were each obliged to sign an agreement ratifying "shared effort" (half and half) between nurseries and wine-producers in royalty payment. According to the IFU, 80 million plants are sold each year in France. This new measure replaces the 2004 parafiscal tax on grapevines, and the brand-holders claim it will aid research, particularly the development of applications for the 2007 sequencing of the grapevine genome.

Thanks to genetic indexing, PBR now offers breeders several major advantages over the patent system.

- Molecular tracability strengthens a variety's marking, and can be used to show up infringement at any point from the field to the dinner plate. Here PBR proves itself just as effective as the patent system when it comes to the collection of royalties on seed-saving or other unapproved uses.

- - When genetic modification techniques lead to an important new characteristic, whilst the variety is protected by PBR the innovation is not required to be disclosed. A plant can thus be manipulated with no requirement to reveal the procedure or genetic resources used. To avoid the normal constraints of biosafety* regulations, breeders increasingly use directed or "encouraged" mutagenesis which, unlike transgenesis, is not covered by existing regulations on biotechnology.

Intellectual property rights can be claimed over farmer varieties contaminated by GMOs due to genetic markers, showing patents on manipulated genes and PBR-protected varieties.

(5. Brand rights and biopiracy

When used to appropriate genetic resources, intellectual property rights are a tool of biopiracy. We have seen the ease with which the private sector can use PBR to claim ownership of a farmer variety. A farmer variety which has never been officially described can be considered as new material and claimed for PBR after a few cycles of homogenisation and stabilisation, without any innovative selective work on the part of the breeder. Brand rights are another tool used in biopiracy.

Commercial appellations, brands protected by intellectual property rights, can be granted to plants for commercial reasons. Some registered brands take the name of an area's fruits or plants and such registration, with its potential to harm local or traditional communities, is also recognisable as biopiracy. For example, if a company obtained exclusive rights to the name "cupaçu", Brazil's Amazonian communities who have cultivated this fruit for centuries could be prevented from selling their product under its original name.

The Brazilian government fights back against abusive brand practices *OMPI, 2006*

The Brazilian government has produced "a non-exhaustive list of names normally associated with biological diversity in Brazil," containing more than 5000 generic Portuguese terms related to Brazilian plant biodiversity, as well as their scientific equivalents. Their aim is to prevent registration of insufficiently distinctive brands by providing an important reference base for brand offices and examiners. Terms such as "açai" and "cupaçu," native fruits of the Amazon, and "rapadura", an unrefined brown sugar traditionally consumed in north-east Brazil, have been wrongly registered despite not possessing the distinctive characteristic which, according to the TRIPS agreements and the Paris Convention, is an essential condition for a term's registration as a brand.

– >>> What can be done?

1. *Re-open the public debate on the legality of intellectual property rights over living organisms in general and plants in particular. It is important to show the illegitimacy of these rights.*
2. *Make people aware that branding rights, PBR and the patent system are instruments of biopiracy of genetic resources, and lead to a monopolisation of biodiversity.*
3. *Demand that PBR applicants be required to indicate the selection methods and the origin of the genetic resources used.*
4. *Demand that seed be sold with an indication of the rights protecting the variety or its elements.*
5. *Participate in an international watchdog on article 27-3 (b) of the WTO's TRIPS, to enable governments to disavow intellectual property on the whole or part of a living organism, including micro-organisms, and to demand recognition of the primacy of farmers' and communities' rights above all protection systems concerning plant varieties.*
6. *Demand the recognition of governments' right to refuse the commercialisation and/or cultivation of seeds of varieties likely to harm health, the environment or local agrarian systems which support the environment, renew biodiversity and/or assure food sovereignty.*
7. *Re-establish farmers' and gardeners' rights to exchange and resow, free from conditions or obligations, the plants which they cultivate.*





Chapter 5

Farmer varieties and international systems for genetic resource conservation

Farmer seeds produced by original bodies of knowledge

"We are not an alternative; we are the original. The varieties produced by the Green Revolution, GM organisms and hybrids were supposed to be alternatives to our agricultures, to our local farmer varieties, and they failed.

*Our knowledge is original. We need to be careful not to transform our language."
Indian peasant-women, DDS, February 2007*

Locally adapted farmer varieties are increasingly engulfed by globalisation's turbulent waters. Marginalised for decades by progressive doctrines, the failure of the green revolution's agricultural policies and economic models has led to farmer varieties renaissance, and their proclamation by peasant organisations as alternatives to industrial practices. This renaissance, and its accompanying renewed agro-ecological model has two foundations; thousands of years' experience of diverse agricultural systems, models of proven durability; and international conventions on environmental protection negotiated over the last twenty years, granting the peasant renaissance legitimacy as an essential component of biodiversity.

– The current situation

Several sets of international regulations protect farmer varieties and community seed rights, all under the umbrella of the Convention on Biological Diversity.

(1. The general framework for the Convention on Biological Diversity

Cultivated plants' genetic erosion is part of a wider phenomenon involving the damage and disappearance of the ecosystems and living species making up biodiversity. An unprecedented international movement led governments to sign the 1992 Convention on Biological Diversity in Rio de Janeiro. Conservation, sustainable use and equitable sharing of the benefits arising from genetic resources were the convention's three pillars.

Farmer varieties' legal status has long been precarious. Excluded from commercial agriculture by the catalogue and certification, they were relegated to subsistence agriculture's informal seed exchanges. Dubbed "humanity's common heritage", they were a reservoir for industry and research to freely draw on and appropriate for commercial seeds, using patents and plant breeders' rights. Through the common interests of first- and third-world governments, the latter rich in biodiversity, the former anxious to impose intellectual property rights over varieties, farmer varieties became genetic resources, industrial merchandise at a tariff decided between governments and private industry. "Humanity's common heritage" was forgotten; a farmer variety was a biological resource in care of a government, who granted access for a cut of industrial profits. The idea of "equitable sharing" only reinforced living resources' conversion into merchandise, and eased the way for patents and PBR to quantify the exact benefits to be shared around. As we saw in chapter 4, the legal structures used, always with PBR and almost always with patents, loosened holders' obligation to share their gains.

• Limited recognition of local communities' role

The Convention encourages the respect and preservation of traditional knowledge concerning biodiversity, identifies communities as sources of expertise in biodiversity's lasting conservation and makes clear that use of their expertise, innovations or practices must depend on prior informed consent. Recognition of communities' resource management rights remains, however, "subject to clauses in national legislations" and benefits are shared purely in a commercial sense, by their economic value.

National legislation on biodiversity conservation is a growing source of political dispute in several countries. In particular, opponents are dissatisfied with the way in which legislation serves to transfer control over resources from communities to government institutions, and to appropriate information on traditional management for databases, with no thought for communities' rights.

On the question of cultivated biodiversity, the CBD works in unison with two other international treaties:

- the Cartagena Protocol on biosafety, under the umbrella of the CBD;
- the International Treaty on Plant Genetic Resources for Food and Agriculture.

Article 8 (j) of the Convention stipulates that each contracting party shall, as far as possible and appropriate:

"Subject to its national legislation, respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity and promote their wider application with the approval and involvement of the holders of such knowledge, innovations and practices and encourage the equitable sharing of the benefits arising from the utilization of such knowledge, innovations and practices."

Laws protecting agrarian systems

Taken from "Let's Free Diversity", 2005

Among the numerous debates currently taking place in Europe over GM organisms, the question of coexistence is prominent. Coexistence threatens the freedom and rights of farmers producing their own seeds on-site. In its recommendation of 23 July 2003, the European Commission asked governments to organise the coexistence of GM and non-GM (whether organic or conventional) production lines through a system of voluntary management. We know however that coexistence is impossible. There have been an increasing number of claims of seed contamination by GM organisms in Europe and elsewhere, and we are seeing the denaturing of cultivated varieties spread rapidly, a denaturing whose effects are observed as much at the biological and agronomical levels as in qualitative and economic properties. In addition, the legal status of contaminated varieties is liable to change radically with the reclamations of intellectual property rights over cultivations produced by polluted farm-saved seeds. Farmers have the right to choose the seeds they want and that they have chosen, but the cultivation of GM crops scorns this right, necessarily entailing the contamination and denaturing of farmers' varieties. Most of the responsibility for contaminations and their consequences fall upon seed producers, the "owners" of the genetic constructions involved. The political system is charged with the responsibility of protecting farmers' rights through bans and moratoria. Farmers are charged with organising their resistance. The measures accompanying GM crops, the distance between cultivation sites, the new contracts managing contamination, are designed to adapt to coexistence. Moreover, Terminator seeds, supposed to help avoid pollution, present an even greater risk for farmers' rights. The debate on farmers' rights over their seeds needs to move beyond the issue of coexistence and address the reappropriation of fundamental rights. We must restore life to non-industrial agronomical systems, dependent on family, farmers and biological principles and based on the control of seeds and the principle of independence.

The Protocol's fundamental mechanisms

1. **Information:** there can be no cross-border movement of a GMO destined to be introduced into the environment without the importer's informed agreement.
2. **Transparency:** the exporter must provide documents with information on the product's identity and measures taken for risk management.
3. **Public participation:** public awareness and participation in decisions should be assured by mechanisms making information available and allowing public consultation prior to decisions.
4. **Responsibility :** the Protocol aims to set up a system of responsibility and reparation in the case of damages linked to cross-border movements of GMOs.

2. The Cartagena Protocol on biosafety

The CBD was the starting point for a specific treaty on the prevention of biotechnological risks to biodiversity. The Cartagena Protocol on biosafety was adopted in January 2000 to internationally regulate the safe handling, transport and use of genetically modified organisms (GMOs), particularly the cross-border movements and import of GMOs. The Protocol's signatories recognised genetically modified plants' fundamental difference from plants produced by conventional selection methods, the new risks they pose to health and the environment and the need for particular legal controls. Governments still have a sovereign right to regulate GMOs and resulting products nationally; the Protocol established an international regulatory framework and rules.

The principle of caution was affirmed and included in the Protocol's decision-making procedures. In the absence of scientific certitudes signatories must act carefully, and are authorised to prohibit or restrict GMO imports with regards to potential harmful effects. Signatories are required to regulate GMOs nationally, through the creation and implementation of biosafety laws and regulations capable of controlling GMOs crossing national borders, and to trace and evaluate the security of GMOs and resulting products.

National regulations can impose more rigorous measures than those in the Protocol. The EU, for example, has imposed tracability and labelling measures on GMOs destined for consumption.

Governments not signed up to the Protocol, notably large GMO exporters like the US, do not obey its obligations and support another international regulatory framework, the World Trade Organisation's free trade agreements. The Protocol's regulations and those of the WTO clash when the Protocol envisages environmental measures to restrict international trade of GMOs: the imposition of conditions or prohibition of import, and the enforcement of standards for identification or labelling.

What categories of GM organisms does the Cartagena Protocol apply to? *Source Inf' ogm 2005*

The protocol distinguishes between three categories of GMO (referred to in the text as "living modified organisms", LMO), for which parties' obligations are different:

- + GMO's destined to be used in a confined environment (for research);
- + GMO's destined to be voluntarily introduced into the environment (seeds, plants, animals);
- + GMO's destined for human or animal consumption or production.

The Protocol does not apply to:

- + GMO's used in pharmaceutical products for human use and which are treated in the frameworks of other international agreements;
- + food products derived from GMO's (oils, additives). These products are regulated by the Codex Alimentarius, an organ attached to the FAO and the WHO.

(3. The International Treaty on Plant Genetic Resources (ITPGR)

Farmer varieties, an essential component of cultivated biodiversity, have been designated as genetic resources by international conventions. The equitable sharing of benefits resulting from their use, a central clause of the CBD, was set out for the first time internationally by 2004's International Treaty on Plant Genetic Resources for Food and Agriculture.

• History

In the 1980's, whilst the Green Revolution was massively eliminating farmers and their varieties in the third world, an International Undertaking on Plant Genetic Resources between States was being draughted by the UN's Food and Agriculture Organisation (FAO). The disappearance of what was then considered as "humanity's common heritage" posed genetic breeders a boomerang-like problem: without genetic resources' diversity, it was difficult to produce new "improved" varieties. Farmer varieties became genetic resources whose collection, exchange and conservation were regulated. The Convention on Biological Diversity briefly called into question free access to these resources, designating them governments' sovereign property. Breeders argued that no country was self-sufficient in phytogenetic resources; all were interdependent on the genetic diversity of cultivated plants originating in other countries or regions. International cooperation and the free circulation of genetic resources appeared essential for food security. The idea behind the treaty was to produce, alongside the CBD's general framework, a particular framework for the facilitated access to food and agricultural plants' genetic resources.



Key issues around the Treaty

ITPGR Article 10.1

“In their relationships with other States, the Contracting Parties recognize the sovereign rights of States over their own plant genetic resources for food and agriculture, including that the authority to determine access to those resources rests with national governments and is subject to national legislation.”

A. Put into place a multilateral system allowing plant breeders and scientists simplified access to major cultivated species’ genetic resources, and an agreement on material transfer assuring that the beneficiaries share the advantages resulting from use of these resources with their countries of origin.

B. Recognise intellectual property rights over plant life regulated by other international conventions (WTO, UPOV), as well as farmers’ rights, justified by their enormous contribution to the cultivated diversity which feeds the world.

Extracts from a material transfer agreement (MTA) between an INRA gene bank and a regional association for the development of rural and agricultural jobs, signed in July 2008 for 12 regional farmer varieties of wheat not subject to any industrial property deeds.

Article 2: the INRA is recognised as sole proprietor of the material, as well as of any line, stock, reproduced element, sub-element, related derivative, hereafter referred to as MATERIAL, of information given to beneficiaries and of eventual pertaining industrial and intellectual property rights..

Article 3: the beneficiary is not authorised to proceed to any modification or transformation which could affect the INRA’s rights, without the INRA’s prior written consent.

The beneficiary is not authorised to combine, mix or blend the material with another material (organic or otherwise), apart from for the research requirements defines above.

Article 5: the beneficiary acknowledges the confidential character of this material and information and agrees:

- + to only give this material and information to members of his or her permanent staff and who agree to abide by the conditions of the present agreement;
- + to take all reasonable measures to avoid his staff sharing with third parties, even for free, without the INRA’s prior written authorisation, all or part of the material and/or information.

The beneficiary takes responsibility for applying this agreements obligations with regard to any person with access to the material and/or information.

Article 7: The results of the present agreement obtained by the beneficiary will not be shared with third parties without the INRA’s prior written consent.

1. The multilateral system and material transfer agreement

The multilateral system concerns a limited number of species listed in an annex. Most commercial crops are present, but not all; soya, tomato and rice are absent, for example. For species not on the list, conditions for exchange are generally governed by the Convention on Biological Diversity, and so are subject to rules of access regulated by sovereign governments.

The multilateral system covers all phylogenetic resources managed and administered by signatories and in the public domain. A material transfer agreement (MTA) guarantees easier access to these resources, and contains a clause indicating that the beneficiary must request that the MTA’s conditions apply to every subsequent resource transfer.

Typically, a MTA strictly regulates every transaction, restricting the beneficiary’s use of material.

Public gene banks, holding major collections of genetic resources, are no longer free to access. Some have become safehouses for which the MTA is the magic key, imposing ever stricter conditions and bureaucratic requirements, preventing farmers from accessing their parents’ varieties. (Taking as an example the MTAs currently available through the INRA in France).

(2. Farmers' rights

The indispensable contribution which farmers make, have made and continue to make to biodiversity conservation is explicitly recognised by the CBD and the ITPGR. The resulting recognition of their collective rights over biodiversity concerns not only a few traditional varieties, but also these varieties' current and future renewal, as well as current and future crop selections. The right to protect varieties against biopiracy, through the requirement of enlightened consent for every selection, development or commercialisation programme, is laid down in the CBD. This convention also declares their right to share in benefits resulting from the exploitation of genetic resources which they have conserved, and the Cartagena Protocol declares governments' right to protect health, the environment and biodiversity against genetic contamination.

The ITPGR declares farmers' right to protect their expertise, to conserve, use, exchange and sell seeds reproduced on-farm, to access genetic resources locked up in collections (free of charge only for third-world farmers) and to take part in national decisions on biodiversity. It confirms their right to share in benefits without putting this measure into practice.

The implementation of these rights is trusted to governments, and subject to national legislations. This reservation allows governments to control farmers' rights, but in no way to entirely remove them, which some governments nonetheless do with intellectual property rights and the obligatory catalogue. The Treaty's governing body is currently deciding what "support" it should lend to governments to make sure of their recognition of the treaty.

Extracts from the ITPGR favourable to farmers' rights

" Preamble

The Contracting Parties [...]

Affirming also that the rights recognized in this Treaty to save, use, exchange and sell farm-saved seed and other propagating material, and to participate in decision-making regarding, and in the fair and equitable sharing of the benefits arising from, the use of plant genetic resources for food and agriculture, are fundamental to the realization of Farmers' Rights, as well as the promotion of Farmers' Rights at national and international levels [...] have agreed as follows:

- Article 5

Each Contracting Party shall, subject to national legislation, shall in particular, as appropriate:

- c) Promote or support, as appropriate, farmers and local communities' efforts to manage and conserve on-farm their plant genetic resources for food and agriculture;
- d) Promote *in situ* conservation of wild crop relatives and wild plants for food production, including in protected areas, by supporting, inter alia, the efforts of indigenous and local communities.

- Article 6 [...]

6.2 The sustainable use of plant genetic resources for food and agriculture may include such measures as:

- a) pursuing fair agricultural policies that promote, as appropriate, the development and maintenance of diverse farming systems that enhance the sustainable use of agricultural biological diversity and other natural resources;
- (b) strengthening research which enhances and conserves biological diversity by maximizing intra- and inter-specific variation for the benefit of farmers, especially those who generate and use their own varieties and apply ecological principles in maintaining soil fertility and in combating diseases, weeds and pests;
- (c) promoting, as appropriate, plant breeding efforts which, with the participation of farmers, particularly in developing countries, strengthen the capacity to develop varieties particularly adapted to social, economic and ecological conditions, including in marginal areas.

- Article 9

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

- a) protection of traditional knowledge relevant to plant genetic resources for food and agriculture;
- (b) the right to equitably participate in sharing benefits arising from the utilization of plant genetic resources for food and agriculture;
- (c) the right to participate in making decisions, at the national level, on matters related to the conservation and sustainable use of plant genetic resources for food and agriculture.

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

>>> What can be done?

1. Keep watch over the application of international conventions capable of supporting farmers' and communities' rights over the management of farms and cultivated biodiversity.
2. Defend free access for farmers and gardeners to genetic resource banks and work to make in situ and ex situ exchanges easier.
3. Given governments' abandonment of gene banks, support local seed banks managed by the community.





Chapter 6

Collective rights over farmer seeds

Until the seed-production industry's recent emergence, cultivated varieties, originally local products, were all reproducible. Each was selected and conserved within a certain region, using local and/or exogenous resources, by a specific community. This community respected certain collective rights of use, often unwritten and negotiated within the communities themselves; the right to conserve, resow and exchange seeds following certain agronomic and social rules.

In rich countries traditional rural communities have mostly disappeared and been replaced by industrial agriculture. Yet new communities and networks are now appearing, not necessarily anchored in a single territory but connected by an autonomous agricultural, economic and social model adapted to each area, and based around farmer varieties selected and renewed using available local resources and/or accessible public collection resources.

These communities of people of different abilities and professions producing, using and exchanging farmer seeds, must be free to decide their own rules of use. As long as such rules are not decided collectively each member must act according to their own sense of responsibility. He or she can obey market laws and give seeds to parties ignorant or incapable of cultivating them correctly, who work to destroy the community behind the variety's creation through unfair competition, or who work towards biopiracy, appropriation or GMO creation. The user can decide that the variety is stable and well-known enough to be spread widely without risk, or that it is still too young and fragile to be given to anyone other than those worthy of caring for it, and in a quantity which they will be able to care for correctly. These are all essential considerations, and concern the issue of collective rights.

Collective rights over seed use are the cornerstone of the legal framework allowing the farmer agriculture renaissance. Unlike the heavily developed area of intellectual property rights, and despite their older foundations, collective rights have been little explored, whether for ideological reasons (the West's deep attachment to individual rights) or because of a lack of means. The situation is changing, however, and an internationally recognised status is moving closer within the framework of the International Treaty on Plant Genetic Resources (ITPGR, see chapter 5).

The current situation

1. Some key ideas called into question

• The decline of “humanity’s common heritage”

In an ideal world, everyone would have free access to all living material; any potential resource (plant, animal, insect) belongs to humanity’s common heritage. For several decades this apparently generous idea offered the expanding seed industry free and easy access to worldwide genetic diversity cultivated by peasant agriculture. If we ask who is concretely able to access all the planet’s resources, “humanity” is quickly reduced to firms and universities working to their own ends, and small, poor farmers attached to their land are left outside.

Two statuses for seeds

Farmer seeds are a community’s common good, and any transaction should be governed by the sending and receiving communities’ collective usage rights. Only these communities may decide whether or not seeds are free. We can only speculate whether a community would ever freely give seeds to a company wishing to use them to develop unfair, socially and ecologically destructive competition, or to manipulate and use them in destructive cultivation practices (exports and biofuel replacing subsistence agriculture). The market makes refusal to sell a crime but, in economies of reciprocal exchange, reciprocity is negotiable.

Industrial seeds are a merchandise protected by private intellectual property rights, and their circulation must depend on local communities’ evaluation and acceptance, taking into account risks to health, the environment and local agrarian or cultural systems.

From the 1980’s onwards, the reality of changes in intellectual property rights (patents on living material, challenges to seed-saving from the UPOV’s changing legislation on plant breeders’ rights) nullified the status of common human heritage. Governments capitalised on these changes through massive privatisation of biological resources in exchange for recognition of national sovereignty over unprivatised genetic resources and the sharing of (financial) advantages accruing from their use. These changes were enshrined in 1992’s Convention on Biological Diversity.

Farmer seeds are not part of a common heritage because dynamic management of biodiversity does not take place at a global level, but at that of territories and communities. Seeds can pass from one territory or model to another, renewing their diversity and giving rise to new varieties adapted through successive multiplications or selections to new sites and cultivation practices. Except in exceptional circumstances exogenous farmer seeds are transferred in small quantities, unlike in global trade which, for example, uses industrial maize seeds multiplied in Chile to supply the whole planet.

• The “shared benefits” fraud

Farmers’ collective rights concern not property but biodiversity. Because of this, international law currently concludes that farmer varieties’ seed is ownerless, and allows industrial property deeds on varieties and governments’ appropriation of genetic resources. To legitimize this plunder and the legal tools which enable it (patents and PBR), the industry committed itself in the Convention on Biological Diversity to sharing benefits gained from farmer varieties’ genetic resources with the farmers and communities responsible for their selection, conservation and renewal. “Shared benefits” are an illusion though, because inalienable collective usage rights, often unwritten, cannot be shared using individual and transferable property deeds.

Communities controlling usage rights are generally deprived of legal status granting them particular rights. Nor do they have means to keep global track of every application for a patent on a variety. In addition, gene patents and PBR are submitted without information on the origin of resources used in their development, preventing any demands for sharing. The multiple cross-breedings involved generally make it difficult to identify plants used in the selected variety’s breeding.

Seed-producing firms mostly use resources collected before the signing of the CBD, resources still possessing the status “humanity’s common heritage” and thus incurring no payments. Since the CBD’s signing only a few patents have been contested or subjected to any kind of benefit-sharing; nevertheless numerous NGOs or representatives of native communities cling to the illusory hope of their natural heritage one day making them rich.

• The end of the line for genetic progress

Collective rights have been sacrificed on the altar of industrial property, the driving force behind protection of innovation and the spread of the idea of “genetic progress”. Originating in eugenicist schools of thought characteristic of the 19th and 20th centuries, this idea claims that sound genetic selection is the path to universal progress. Only now are the limits of genetic progress being shown. New commercial varieties are clones of fixed lines with ever shorter life expectancies, more fragile, less resistant to disease and rarely offering real novelty. The accelerating need for innovation means that breeders produce ever more similar varieties, often separated by only a single gene. In addition, dependent patents and the monopolisation of the seed-producing sector impede true innovation.

Peasant innovation in plant selection belongs to another system entirely, the renewal of plant populations inherited from past generations and bequeathed to future ones. Its tools are the local adaptation of diverse varieties through numerous cultivation cycles and the adept use of exogenous resources to avoid inbreeding and introduce new characteristics. Innovation is part of biodiversity’s slow and continuous evolution; any measure of progress depends on several criteria and must take into account the large genetic base guaranteeing adaptation to various changes.

Rights attached to this kind of innovation are usage rights; they concern a collective good primarily characterised by an evolving relationship with the farmer communities responsible for its selection, conservation and, ultimately, existence.

The current acceleration of socio-economic and climatic changes requires a similar acceleration in the adaptation process of plant varieties resulting from farmers’ “informal” exchanges. Numerous participative selection programmes in the field have proved the effectiveness of these processes.

Extracts from Farm Seed Opportunities’ Policy recommendations document, (www.farmseed.net)

6.3.3. Peru

90% of seeds are produced in the informal seed system and the agrobiodiversity is a way of managing risks in search of food security. There is a PPB project on potato, corn and bean and Community seed banks have been set up. Two inventories have been realised: one for native potatoes, with 28 minimum descriptors identified with farmers’ participation (a specific law passed in 2008 on this issue); one for national corn, based on 11 descriptors for classification, containing also recommendations for the participatory characterization and the identification of farmer’s name or community using a particular landraces.

6.3.6. Brazil

The Brazilian agricultural sector presents a strong duality between agribusiness for export on one side, and family farming on the other. Informal seed systems are important and they account for 60% in the case of rice, 87% in beans, 17% in corn, 46% in soybean and 34% in wheat. These are growing due to: (i) lack of trust in “formal” varieties”; (ii) low quality and high prices of commercial seeds. Seed law (law no. 10.711/2003, regulated by Decree no. 5.153/2004) regulates formal seed system, but creates some legal space for farmers’ and local seed systems: (i) there is a legal definition of local, traditional or creole varieties: varieties developed, adapted or produced by family farmers, agrarian reform settlers or Indigenous peoples, with well established phenotypical traits, recognized by the respective communities as such and taking into consideration also socio-cultural and environmental descriptors, (not only agronomic). They cannot be characterized as substantially similar to commercial varieties; (ii) waiver of official registration for local varieties: Registration in the National Cultivar Registry of local, traditional or creole varieties used by family farmers, agrarian reform settlers or Indigenous peoples is not mandatory” (due to inadequacy to DUS criteria); (iii) waiver for family farmers: “Family farmers, agrarian reform settlers and Indigenous peoples who multiply seeds or seedlings for distribution, exchange or trade with each other are not required to register in the National Seed and Seedling Registry. The Decree created the following restriction: “farmer organizations can only distribute (not sell) seeds, and only among members of these organizations”. This interpretation is questioned by farmers’ organizations.

6.3.7. Nepal

The traditional seed systems contribute to 90% of seeds of food crops and are characterized by production, exchange, and sale of farm saved seeds of both local and improved crop varieties. The formal seed system is characterized mainly by public sector seed production and distribution of new varieties, with limited engagement of private sector. Seed production and marketing is regulated by Seed Laws, but in practice remain largely unregulated. The Seed act of June 2005 changed application formats in favour of PPB varieties to include: (i) farmers’ perception data; (ii) organoleptic taste data; (iii) accept data from participatory assessment; (iv) national listing (registration) of landraces and local crop varieties, including farmers’ varieties; (v) provisions for production and marketing of farmers’ varieties - both notified and non-notified.

[2. Characteristics of collective rights

Rebuilding farmer seeds communities

In most regions affected by industrial agriculture, communities and varieties traditionally attached to a defined territory have disappeared. The farmer seed renaissance is built around the alliance of numerous groups using farmer seeds, often geographically distant but organised in informal networks. Although the main nucleus is naturally made up of gardeners and farmers, other participants wish to conserve, renew and promote products of farmer varieties. Such participants may include;

- seed-producing craftsmen reproducing old varieties no longer available on the market;
- organic or biodynamic plant selectors;
- genetic resource conservatories;
- natural parks;
- consumer groups such as AMAP or social gardening programmes;
- associations promoting biodiversity conservation and its financing, solidarity and the sharing of experience and expertise;
- scientists working to reinforce farmer selection by reviving historical practices;
- artisan companies promoting goods produced using farmer varieties;
- territorial collectives.

These networks of participants can define common objectives, decide on the ethics of exchanges and put into place at various levels (local, regional, national and international) systems to safeguard farmers' collective rights over their seeds.

The development of farmer seed houses

Seed houses exist in several countries; they are particularly widespread in Brazil, for example. A collective site for both conservation and exchange of seeds, they are directly managed by the farmer communities who provide their contents. Sometimes supported by local authorities, they are funded as a link between food aid programmes and society's poorest members, providing "seed kits" for numerous varieties enabling families to set up subsistence gardens.

Several models of seed house are being developed in France offering evaluation, selection or research programmes, sometimes supported by public funding or collaborating in public research, with seed exchanges benefiting from the catalogue's registration dispensation for research, conservation or selection. In other cases, conserved and shared seeds "belong" to the collective, and not the initial provider. Only members of the collective have access to this common good; there can be no commercial exchange of seeds but when necessary there is remuneration for conservers', breeders' and multipliers' work. In Germany organic vegetable distributors offer a percentage of their profits to those responsible for the conservation, selection and multiplication of seeds and biodynamism. Unfortunately public financing remains the exception rather than the rule. Civil society can help these initiatives through charity, contributing to their indispensable work for food sovereignty and feeding future generations.

• Collective rights concern the intangible part of resources

There is generally a distinction made between material good and information, which is intangible. Collective rights cover this intangible part. Although a plant belongs to its owner, its genetic information, inherited over generations and responsible for the plant's characteristics, belongs to the collective. This information's material support (the grain or fertile cutting) is controlled by collective rights, and its owner can only use, sell or pass it on with respect to these rights.

• Collective rights are permanent

Collective rights are inalienable, and exist for "the good of present and future generations". Once a sovereign government has recognised them, it cannot withdraw this recognition, because it cannot invalidate the rights of persons not yet in existence.

• Collective rights are managed by a community

Because farmer seeds are a common heritage, their rules of access must be negotiated by society. This is not free access. This heritage belongs not to humanity, but to a collective. If other farmers, or any other party, wants access to this material, they must negotiate with the collective. Responsibility for the management of collective rights belongs to organised local communities where these exist, as for certain collective uses of irrigation water. In cases without such organisations a territorial collective can be partly invested with a responsibility. Italian legislation, for example, trusts town halls with certain collective rights dating from the Middle Ages; French legislation on common land does the same.

• Collective rights operate in a negotiated framework

Collective rights neither prohibit nor exclude, but instead offer rules of access. They do not offer the free and automatic access of "humanity's common heritage" where anyone can simply come and take what they please, nor that of the free market where refusal to sell is an offense. Neither is there any automatic right to demand specific licences for access, in the manner of monopolistic systems. Collective rights depend on negotiation. Whether there is monetary exchange, exchange with return, gift or counter-gift, collective rights obey not a market economy but one based on sharing.

– Key issues –

(1. The right to move beyond a market-driven vision of resources and knowledge

Farmer varieties' identifiable traits cannot be reduced to morphological characteristics nor to numbered genomes, but concern qualities of taste, agronomic and nutritional characteristics, culinary values and the capacity for adaptation to production techniques, as well as questions of culture, religion and environment, all influenced by geographic, social and economic origins. No variety exists without the human community responsible for its selection and renewal. Reducing a variety to a catalogue description of morphological or numerisable characteristics, or a piece of heritage for an illusory ideal humanity, separates it from these geographic, social and economic conditions and eases its appropriation by anonymous businesses and intellectual property rights. This negation of communities' collective rights leads to their destruction, as well as that of their economic, social and cultural environment.

Society must consider not the commercial value of resources and popular wisdom, but the legitimacy of collecting them and making them available to industry and research. Knowledge is a common good as well; can we put a price on it? Does "scientific" research driven exclusively by a quest for private intellectual property rights produce positive results for society? Should research be financed by private individuals or a social governing body, and should those benefitting from research be asked to contribute to its costs? The right to conduct research on living material and participatory plant breeding free from matters of intellectual property is now an issue of central importance.

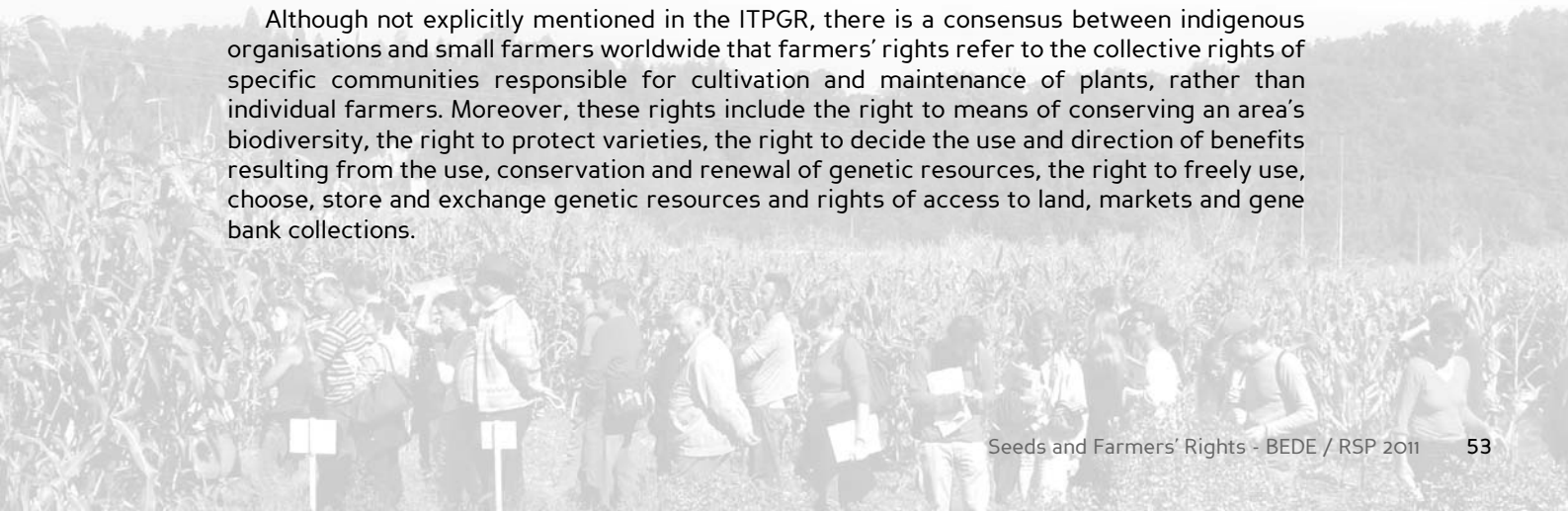
(2. Sowing the seeds for international recognition

The farmers' rights listed in the ITPGR are often thought of as individual rights; conservation, use, exchange, sale, the sharing of commercial benefits and participation in decision-making through representative delegation. Only the protection of traditional knowledge is not easily reduced to an individual right, knowledge being a collective entity, although in the absence of sufficiently strong collective organisations, the monetarisation of knowledge and the deeds to resulting benefits can very well be shared out between individuals.

In Europe these rights are denied to individuals as much as to collectives. For this reason demands for their implementation are often formulated without regard for their specific nature, as individual usage rights and collective protection rights over a collective common good.

The recognition of these as individual rights is not enough to prevent their disappearance. Such recognition would make no sense without a parallel recognition of collective usage and protection rights over the common good in all its material and intangible aspects, and the recognition of its collective origin in a historically and geographically specific human, rather than universal, community.

Although not explicitly mentioned in the ITPGR, there is a consensus between indigenous organisations and small farmers worldwide that farmers' rights refer to the collective rights of specific communities responsible for cultivation and maintenance of plants, rather than individual farmers. Moreover, these rights include the right to means of conserving an area's biodiversity, the right to protect varieties, the right to decide the use and direction of benefits resulting from the use, conservation and renewal of genetic resources, the right to freely use, choose, store and exchange genetic resources and rights of access to land, markets and gene bank collections.



Indigenous peoples' holistic approach places particular emphasis on the protection of areas in their entirety, including biological and cultural resources. Pertaining collective rights are recognised in theory but not in practice in the fora of international conventions on environment and development; the CBD, ITPGR, the Convention to Combat Desertification, ILO-Convention 169, the Declaration on the Rights of Indigenous Peoples and the UNESCO Convention on Safeguarding Intangible Cultural Heritage.

3. Collective rights can restrict freedom of exchange

If we accept the legitimacy of the right to conserve, resow and exchange seeds and varieties, the restrictions to the circulation of seeds which sometimes results causes certain problems.

Communities can exert their rights over varieties by prohibiting the free exchange and sale of other varieties' seeds, to protect their varieties from:

- a/ genetic contamination
 - by patented transgenes (the Cartagena protocol on biosafety takes into account transgenes' impact on health and the environment, including agrarian systems);
 - by "indexed" and patented genes;
 - by the introduction of cultivations disseminating dominant or disruptive genes (not necessarily patented) in the same geographic areas as farmer-selected varieties.

- b/ biopiracy, whether legal (PBR, patents, genetic indexing), technical (catalogue rules, the replacement of reproducible populations by F1 hybrids and other "economically sterile" plants), or economic (the relocation of a local economy depending on a local variety).



– >>> What can be done?

1. *Re-establish farmers' and gardeners' rights to exchange or sell seeds reproduced on-site, on condition that they are the product of farmer selections and multiplications, that they indicate the origin of the genetic resources used and that existing collective rights are respected.*
2. *Defend farmers' and communities' collective rights to protect the common good against biopiracy, genetic contamination, invasive subsidised monoculture, relocation towards less socially or ecologically attractive sites and attacks on food sovereignty.*
3. *Give further consideration to collective rights affecting the management of seed houses.*
4. *Allow the free sale and exchange of reproducible farmer seeds, dispensed from obligatory catalogue registration (when the seeds have been produced by selection and multiplication techniques within reach of the final user).*
5. *Impose documentation on varieties' origins, selection and multiplication methods and respect for sanitary rules concerning contagious diseases as the sole constraint on these exchanges or sales, managed by the community.*

The role of seed networks in implementing Farmers' rights in Europe

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Agrobiodiversity, collective action, rural innovation

• Introduction

Agriculture modernisation and modern plant breeding have resulted in a separation of farming from breeding activities. Seed laws have also contributed to this outcome, e.g. by imposing strict rules for the entry of varieties in the official catalogues. Currently, some pioneers, among them farmers rejecting industrialised agriculture and more often practising organic agriculture, are proposing a different option. In Europe, since the beginning of this century, seed networks have been developing: the Réseau Semences Paysannes in France, the Red de Semillas in Spain and the Rete Semi Rurali in Italy. Their members are farmers, consumers and scientists working together in order to reconsider the scientific, technical and legal aspects of seed production, multiplication and marketing. This paper draws an history of these seed networks, underlining their specific characteristics and showing the importance of collective action in sustainable use of agrobiodiversity.

• Seed Networks in Europe

The movement started in February 2003 after the meeting "Cultivons la biodiversité dans les fermes [Let us cultivate biodiversity on the farm]", which took place in France at Auzeville organised by Confédération paysanne, Nature&Progrès, Fédération Nationale d'Agriculture Biologique des Régions de France, Mouvement de Culture Bio-Dynamique, Bio d'Aquitaine, GDAB Midi-Pyrénées, Syndicat des Semences et Plantes bios du Languedoc-Roussillon. This meeting was intended to respond to an emergency in Europe about the adoption of strict regulations allowing organic farmers to use only organic certified seeds. The Auzeville's organisers conducted a survey the months before the meeting to check the situation in farm fields and verify farmers' practices regarding seeds in France. The outcomes of this survey demonstrated the value of agrobiodiversity in organic and low input farming and the importance of selection and seed multiplication managed by farmers. These results were discussed in Auzeville with the participation of many foreign delegations (Anonymous, 2003). Since the very beginning organic associations and farmers played a key role in this movement.

Soon after the Auzeville meeting, in France the Réseau Semences Paysannes (RSP - Farmer Seeds Network - www.semencespaysannes.org) was founded mainly to cope with the lack of seeds adapted to organic or low input farming and also to refuse of the use of biotechnology in the plant breeding. Nowadays, it gathers forty six different organisations: associations for the development of organic farming or "paysanne"

[peasant] agriculture, small seed companies, associations which maintain and collect food plants (cereals, fruit, vegetable), Regional Natural Parks. Many of them are also involved in project of participatory plant breeding. The work of RSP is organised through thematic working groups by major species of crops: wheat, corn, vegetable, fruit and fodder. There is a specific group working on wide and political issues, e.g. seed regulations and intellectual property rights. The network's objective is to realise technical exchanges among the different members, work on the scientific and legal recognition of farmers' varieties and inform the general public about seed issues. It plays an important role in encouraging a change of the legislative framework and the exchange of experiences and resources at international level. It also stimulates and ensures partnerships with public research. Through meetings, newsletters, website, training and publications, the RSP creates different space for exchange among farmers but as well with consumers.

At the same time in Italy an informal group of social scientists, farmers and agronomists (the Rete Semi Rurali [Rural Seeds Network] - www.semirurali.net) was working since 2001. Some of them participated to the Auzeville meeting and contributed to the discussion at European level on seed laws and farmers' rights. This network has worked particularly at the level of the regional governments, which for 10 years now have been enacting regional laws to safeguard local agrobiodiversity (Bocci and Onorati, 2006, Bertacchini, 2009). The legislative work has produced the text of law on conservation varieties which was approved by the government in 2007 and its implementing decree approved in 2008 (Bocci, 2009). In 2007 the informal group took on legal status in the form of a network of associations, which now has 10 members many of them regrouping organic farmers (e.g. AIAB, CTPB and AVEPROBI). In 2008 the RSR has signed a three years programme with the Ministry of Agriculture on the implementation of the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) in Italy. In that way the Italian Ministry of Agriculture has intended to formally include civil society organisations in this process, enlarging a project till now dedicated to finance ex situ conservation and research activities. In Spain the Red de Semillas "Resembrando e Intercambiando [Re-sowing and Exchange]" (www.redsemillas.info/) has been operational since 1999, and a Spanish technician worked for the French survey in 2003 and participated to the Auzeville meeting. This network - a technical, social and political organisation - adopted its legal status as an association only in 2005. The wealth of the RDS network lies in the diversity of the people and organisations making it up. Among those participating in the network are farmers' organisations, technicians, consumers, local action groups and people linked with universities and research.

In Austria, Germany and Switzerland, there is a cooperation of seed initiatives varying according to aims and key activities. In 2007, the “BUKO Campaign against Biopiracy”, the European Civic Forum and IG Saatgut organized the third European seed seminar in Halle, Germany. In 2010, Arche Noah (who is a member of IG Saatgut), ÖBV - Via Campesina Austria and Longo Mai Austria together organized the 5th seed seminar in Graz, Austria. Pro Specie Rara from Switzerland, also an IG Saatgut member, contributed to the 6th forum in Hungary. The main characteristics of these networking partners and seed initiatives are the following.

- **Buko Campaign against Biopiracy:** Since 2002 working against private appropriation of genetic resources, supporting traditional or local communities, smallholder farmer groups.

- **European Civic Forum:** Working among others on agricultural issues; based on friendship of eastern and western European groups and organisations.

- **IG Saatgut:** Network of commercial and non-profit seed conservation organisations, cultivators and breeders from Austria, Germany and Switzerland; aiming at GE-free seeds.

- **Arche Noah:** Founded in 1990. Network of 9.000 gardeners, farmers and supporters. Ex situ and on farm activities, capacity building, awareness-raising, lobbying.

- **ÖBV-Via Campesina Austria:** Since 1974 campaigning for more equitable conditions for mountain and smallholder farmers.

- **Longo Mai Austria:** Part of network of agricultural cooperatives, with a basic grass-roots, alternative, rural, laic and sustainable ideology.

- **ProSpecieRara:** Since 1982 saving and developing the diversity of crop varieties, animal races and their cultural values.

These seed networks share a common critique to modern varieties mainly designed by the seed firms for an industrial model of agriculture, focussing on the following aspects:

1. Technical, affirming that the requirements for the registration to the official catalogues (DUS, distinctness, uniformity, stability, and VCU, Value of Cultivation and Use) are incompatible with the ecological qualities required for organic farming;

2. Political and legal, raising questions of how to design the regulatory space so that the farmer can regain his activity of producing his own seeds, and especially some sort of recognition over farmers' varieties;

3. Scientific, searching for a model of plant breeding in line with the principles of organic agriculture (see the Plant Breeding Draft Standards developed by the International Federation of Organic Agricultural Movements) and affirming the role of farmers' knowledge in rural innovation.

Moreover their characteristics and their organisations display some common features:

1. They bring together different civil-society actors concerned about cultivated biodiversity (associations, farming unions, institutions etc.);

2. They arose in the early years of the Millennium and are displaying rapid expansion, measured by the number of member associations and the number of campaigns carried out (partnership research projects, biodiversity fair, publications, training etc.);

3. They have a capacity to communicate with the wide public and to share their concerns;

4. Their work at national level has been accompanied by a growing awareness of the need to extend the common task to European and international levels (anon. 2005). They accordingly also belong to other civil-society networks.

They differ from a professional farmers' organisation in recruiting also people other than farmers themselves and bringing together all citizens who feel concerned about seeds and food choices.

• The “Let's liberate diversity” meetings

In 2005, the French network decided with the Coordination Nationale de Défense des Semences de Ferme (CNDSF) to hold another meeting on agrobiodiversity this time more focussed on the European level, so as to start an in depth discussion on this issue and its legal, scientific and political implications. For this purpose a European steering committee was put in place with the responsibility of inviting experts and selecting the different themes. This meeting took place in Poitiers in November 2005 and was the starting point of a series of conferences of these seed networks that were organised in the following years under the title “Let's liberate diversity”, which is now a sort of common logo of the movement. In Poitiers four themes - conservation of agrobiodiversity, seed laws, agricultural research and GMOs' contamination- were discussed in four different workshops. It was the first occasion to share each others experiences and better know the activities carried out by a variety of associations in Europe. One of the results of Poitiers was the idea of strengthening the work at European level to better cope with the negative impact of European legislation and co-ordinate the different activities undertaken at national level. It should be noted that improving the advocacy and lobbying capacity was one the major task of these networking since the beginning. Moreover, in his opening speech Guy Kastler, the president of the French network at that moment, said that “in a society in which the expert's opinion is replacing political decision more and more, working along with scientists is paramount for legitimising the practices and the collective rights of farmers” (Anon., 2005). This statement clearly characterises agricultural research as one of the main field of activities of these new networks.

The third European seed seminar took place in May 2007 in Halle (Germany) and focused on the preservation of the diversity of cultivated plants in farmers' fields (on farm) and on the presentation of different non-profit seed initiatives. 135 farmers, gardeners, plant breeders and representatives of gene banks from 25 countries took part in the seminar. It was organised by the BUKO - Campaign against Biopiracy, the European Civic Forum and the Association for seed production GM free in close cooperation with the Réseau Semences Paysannes (RSP). Organising the meeting in Halle presented the additional advantage of making it relatively easy to access for members of eastern European initiatives so as to strengthen the exchange with them. Therefore the European Seed Network broadened its social basis to other countries due to the presence of participants from Russia, Poland, Latvia, Hungary, Romania, Bulgaria, Slovenia and Georgia. Speakers from Chili, Iraq, Iran, Israel, Mali, Tunisia and the USA provided a perspective from outside Europe.

The other three meetings were held in Spain (Bullas) in 2007, in Italy (Ascoli) in 2008 and in Austria (Graz) in 2010.

• Farmers' exchange

The construction of knowledge through peer to peer exchanges is another of the key points of this seed movement. With the support of the European Union's Leonardo Da Vinci Training Programme, in 2006 and 2007 French farmers of RSP visited similar experiences in Portugal, Spain, Italy, Hungary, Romania and Bulgaria. These exchange meetings have shown that approaching seed problems, there are many other issues that are raised. In fact, through actions of agrobiodiversity conservation, farmers maintain and share their traditional knowledge and the cultural heritage associated with local varieties. Some farmers still speak of local varieties as part of a collective memory. These exchanges consolidated the initiatives of the groups on the conservation of agrobiodiversity in Europe and helped them to have a common ground. Convergences have emerged around the European legislation as well as on farmer-based participatory breeding programmes, which allow the potential development of common strategies.

In fact all the initiatives involved pointed out the following concerns around agrobiodiversity:

1. The paramount importance of building new relationships between farmers and researchers aimed at better integrating on farm and ex situ (seed banks) management of genetic resources;

2. The emergence in different countries of new form of rural communities, based on collective forms of organising, sometimes inspired by tradition, in other cases rebuilt around a new vision of society. They intend to launch actions for the protection of local plant varieties as well as organic and GMO-free agriculture;

3. The valorisation and sustainable use of genetic resources remain the central issues of their work. The problem is how to finance and promote these bottom up initiatives that strongly contributed to the conservation of agrobiodiversity. Indeed, the efforts of conservation carried out by public institutions and international organisations are supported by funding schemes worldwide, and it is not the same for the conservation work carried out by farmers in their fields that has yet to be fully recognised. Even if the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) explicitly acknowledges the role played by farmers and their rights. Actually, European public policies generally fail to translate this engagement into concrete measures that support actors on the field, who are thus often left alone in finding the means to highlight the value of their work and products originating from cultivated biodiversity on a competitive globalised market;

4. The obstacles put in place by norms and legislation, which could ban access to seed collections, hinder on-farm processing or encourage crop contamination by GMOs. Despite the legislative debate's complexity, actors on the ground have no choice but to delve into it in order to defend themselves. The exchanges allow the comparison of different national contexts, occasionally offering alternative perspectives to deadlocks presented by national legislation.

• From seeds to rural innovation

These peasant movements in Europe also raise a political question. Affirming their ability to select and maintain varieties, to produce and multiply seeds, is a direct challenge to the prerogatives of the scientific community that has arrogated to itself innovation in agriculture. "Farmer knowledge" is bringing out a more holistic and local scientific approach based on rigorous observation of natural processes, refusing the contributions of biotechnologies, seen as a factor for destabilising the adaptive and evolutionary modes of ecological systems (Chable and Berthelot, 2006). Farmers' rights and knowledge are thus bringing true scientific innovation in which living things are apprehended in their totality. Integrating farmers' need, knowledge and practices, into agricultural research needs to relocalise it, passing from a centralised model to a de-centralised, participatory one (Ceccarelli, 1994; Cleveland and Soleri, 2002). It is only fairly recently that scientists have been rediscovering an interest in a holistic vision of the environment where questions of agricultural production have to come together with those of the environment (Altieri, 2004). In this sense agroecology, the conceptual basis for organic and peasant agriculture, can renew scientific discourse by moving away from the majority reductionist and analytical approach of agronomic science in general (Altieri, 1995). The regulatory system has accompanied the scientific paradigm of the stable, homogeneous variety, constructed by genetic science, and favouring the concentration of few seed multinationals, with increasingly huge financial stakes, reducing the farmer's freedom and autonomy in relation to seeds, and reducing available biodiversity (Bonneuil et al., 2006). Farmers and other actors investing in the future of the seeds in the networks have become aware that they are at long last touching upon fundamental values of today's society. This thinking has also extended to the place of the life sciences that are formatting man's relationships with plants. The debate is all the more crucial in countries that still have a large farming population, so as to preserve the cultural and plant heritage that still exists. Elsewhere, as in Europe, farmers have the responsibility for recreating varietal diversity in order to revitalise farming based on terroir.

Starting from seeds, we very soon come to understand that in reality what we are dealing with is innovation in rural areas: who produces it, and how? Farmer innovation and even participatory research lead towards a collective system and take on a community dimension. Exchange through the circulation of knowledge and of seeds is the basis for creating innovation (Brush, 2004). The present arrangements to protect intellectual property do not take account of this process, since they are based on the concept of individual ownership. Within a community (formal or informal) whose bonds are territorial (chiefly in the countries of the South) or ethical (the organic movement in countries of the North), varieties are shared, conserved, cultivated and improved. At this regard, the value system has to be inverted in order to protect and promote these new forms of rural innovation: we have to start speaking of collective rights (Onorati, 2005; Salazar et al., 2006) and move from the concept of ownership to that of the recognition of the community and its protection in relation to the outside world. In fact, farmers' rights in the FAO treaty are in course of being established on the basis of these ideas (Andersen, 2008).

• Conclusions

Reading about these seed networks it is clear that the debate in Europe now offers a range of seed system models related to different farming systems. It is time to enlarge this debate to developing countries through the sharing of knowledge between farmers of the North and South, aiming at dynamically conserving agrobiodiversity and promoting rural innovation.

In the countries of the South, it is now evident that the Global Plant Breeding system being carried on by several international agricultural research centres in the Consultative Group on International Agricultural Research (CGIAR) is not enough, and above all does not get outside of industrial agriculture; it has generally favoured yield characteristics and the promotion of introduced varieties for as large-scale use as possible, ignoring the diversity of conditions in local agricultural systems (Bellon and Morris, 2002). The system of registering varieties also largely guides selections towards varieties that respond to the industrial agriculture of the countries of the North.

Extending this debate between farmers and scientists from North and South is fundamental to emphasising the legitimacy of a plurality of approaches in seed issues and thus promoting the sustainable use of agrobiodiversity in farmers' fields.

Bibliography

- Anonymous, 2003. Actes des premières rencontres Semences Paysannes "Cultivons la biodiversité dans les fermes", www.semencespaysannes.org
- Anonymous, 2005. Libérons la diversité. Droits des paysans et semences : les enjeux pour l'Europe, Compte rendu du Séminaire européen sur les semences, Poitiers, www.semencespaysannes.org
- Anonymous, 2008. Let's liberate diversity!, Proceedings of the 3rd European Seed Seminar in Halle, BUKO Campaign against Biopiracy, European Civic Forum, Interessengemeinschaft gentechnikfreie Saatgutarbeit
- Altieri MA. Linking ecologists and traditional farmers in the search for sustainable agriculture. *Front Ecol Environ* 2004 ; 2(1) : 35-42.
- Altieri MA. Agroecology: The Science of Sustainable Agriculture. Westview Press, 1995
- Andersen R. 2008. Governing agrobiodiversity: Plant Genetics and Developing Countries, Ashgate.
- Bellon M, Morris M. Linking global and local approaches to agricultural technology development: the role of participatory plant breeding research in the CGIAR. CIMMYT Economic working paper 2002; 02-03
- Berson A, Bocci R, Bouhélier P, Brac de la Perrière RA, Kiss C, Mathieu JJ et Ramos N, 2008. Promoting Peasant Farming and an Ecological, Solidarity-Based Agriculture in Europe, BEDE
- Bertacchini E, 2009. Regional legislation in Italy for the protection of local varieties, *Journal of Agriculture and Environment for International Development*, Vol. 103 - N. 1-2 - January/June 2009.
- Bocci R, 2009. Seed Legislation and agricultural biodiversity: conservation varieties, *Journal of Agriculture and Environment for International Development*, Vol. 103 - N. 1-2 - January/June 2009
- Bocci R, Chable V, 2008. Semences paysannes en Europe: enjeux et perspectives, *Cahiers Agricultures* vol. 17, n° 2, mars-avril
- Bocci R, Onorati A. Législation européenne pour les variétés résultant des programmes de sélection participative : état des lieux dans les régions italiennes. In : Proceedings of the ECO-PB Workshop "Participatory Plant Breeding : relevance for organic agriculture?" 2006 : 82-84
- Bonneuil C, Demeulenaere E, Thomas F, Joly PB, Allaire G, Goldringer I. "Innover autrement ? La recherche face à l'avènement d'un nouveau régime de production et de régulation des savoirs en génétique végétale". *Dossier de l'Environnement de l'INRA* 2006 ; (30) : 29-51
- Brush S. Farmers' Bounty, locating crop diversity in the contemporary world. *New Haven and London : Yale University Press*, 2004
- Ceccarelli S. Specific adaptation and breeding for marginal environments. *Euphytica* 1994 ; 77 : 205-219
- Cleveland DA, Soleri D. Farmers, scientists and plant breeding: integrating knowledge and practice. *New York: CABI Publishing*, 2002
- Chable V, Berthelot JF. La sélection participative en France : Présentation des expériences en cours pour les agricultures biologiques et paysannes. "Quelles variétés et semences pour des agricultures paysannes durables ?". *Les dossiers de l'Environnement de l'INRA* 2005 ; 30 : 129-138
- Onorati A. Collective rights over farmers' seeds in Italy. *Seedling* 2005 ; July
- Salazar R, Louwaars NP, Visser B. On protecting farmers' new varieties: new approaches to rights on collective innovations in plant genetic resources, CAPRI Working Paper 45 2006 ; January



Chapter 7

Modification of the European legal framework

The working environment for European community legislation on seeds has completely altered over the last thirty years. The seed sector is developing in an ever-expanding and constantly evolving international context, where globalisation, the development of plant biotechnology and the new demands made by consumers (in the area of organic food, for example) all play an important role. A competitive seed sector with many participants, principally small and medium-sized companies, has found itself threatened by the monopolization of the food industry by a few multinational firms. A process of revision and simplification of the European Union's regulations governing seed commercialisation ("Better regulation") allows us to foresee changes upon which the future of agricultural biodiversity and small-scale agriculture on the continent will depend.

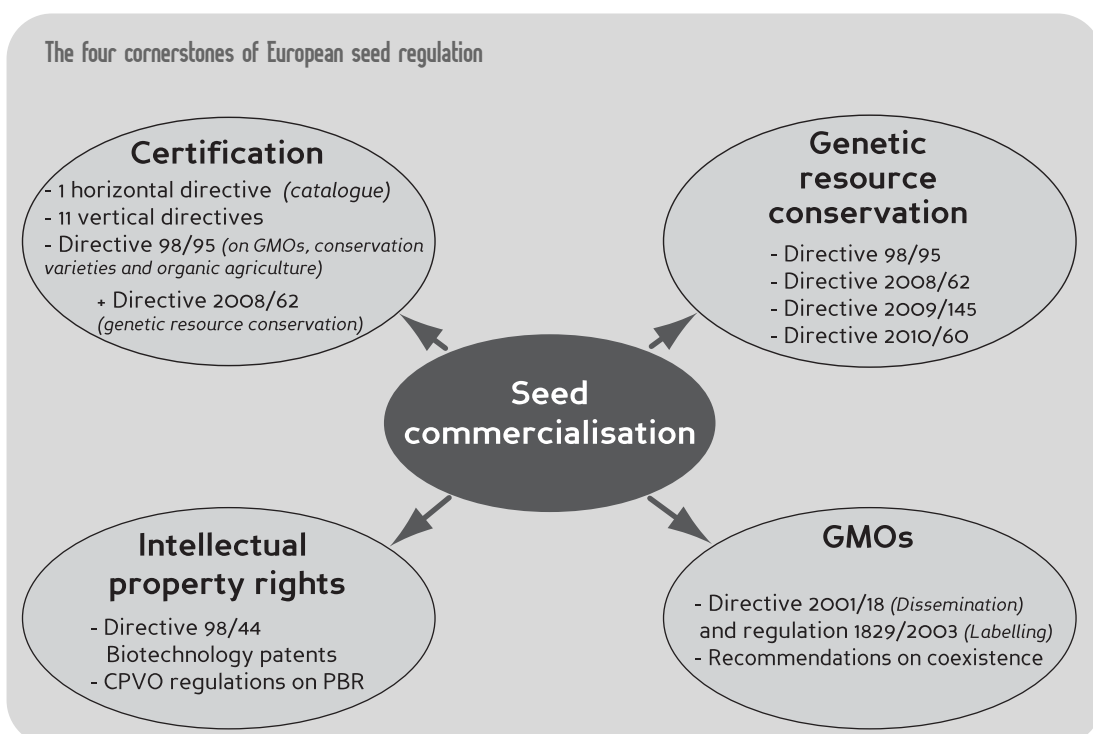
– The current situation

In Europe, the seed-production sector has traditionally been dominated by French, Dutch and German companies, who have exerted a significant influence on the EU's common legal framework, and have generally upheld a "purificatory" understanding of seed selection. These companies direct the rules and regulations in such a way as to restrict on the one hand internal competition from small-scale farmers and on the other external competition, in particular from the US. With the development of biotechnology, the sector has attracted the investment of multinational firms specialising in agro-chemistry, who control an increasingly significant part of the market, and are moving more and more towards using the patent system for the protection of their intellectual rights over new varieties. New alliances and oppositions are being formed in the industry between those with expertise in selecting innovative genetic arrangements (conventional seed-producers) and those at the forefront of research into genetic modification (the agro-chemical companies), and the extension of this research into the development of varieties modified using biotechnology (genetically modified organisms, mutant plants, etc).

The common legislation on the commercialisation of seeds and materials for plant propagation, dating back to the 1960's, has over time gained in complexity, and even for experts poses problems of understanding. Initially based upon two major pillars, the registration of a variety and its certification, the legislation operates today in tandem with the legislation on intellectual property, and those concerning health, consumer safety and most recently the environment, in particular the laws regulating the dissemination of GMOs.

When dealing with the commercialisation of farmer seeds, particular attention must be paid to the evolution of the following four regulatory cornerstones:

- 1/ the process of registration and certification which serves to exclude seeds from the market, and limits or obstructs farmer varieties' right to existence;
- 2/ the intellectual property system, which affects the right to propagate, reproduce, exchange or sell plants from one's own fields;
- 3/ the conservation of genetic resources, which are the industry's primary material and the object of international agreements designed to guarantee industrial access to the developing world's independent varieties;
- 4/ the dissemination of GMOs, responsible for the contamination, denaturing and, by means of the patent system, the appropriation of farmer varieties' genetic resources.



Key issues

1. The stranglehold of the catalogue on the mechanisms of registration and certification

European community legislation comprises 12 directives organised around a horizontal directive on the common catalogue of agricultural species and varieties, and 11 vertical directives on commercialisation, of which 6 relate to seeds (seeds for fodder crops, cereals, and beet, potato plants, seeds for oleaginous plants and vegetable seeds), 4 to plant propagation (materials for the propagation of vines, and fruits and vegetables other than seeds and ornamental plants) and one concerns the propagation of forest species.

Two supplementary directives introduce certain dispensations:

- Directive 98/95 on the commercialisation of genetically modified plant varieties and on genetic resources;
- Directive 2008/62 on the admission of landraces and agricultural varieties naturally adapted to local and regional conditions and threatened with genetic erosion.

To regulate competitiveness, the industry imposed a restrictive definition of plant variety, which is required to comply with standards of distinctiveness, uniformity and stability (DUS) and, for certain species, values of cultivation and use (VCU). This method of defining plant variety is essentially political, serving as it has as the basis for the exclusion of farmer varieties from the commercial market. The DUS standards have also served to define the intellectual property rights of seed producers by regulating competitiveness between plant breeders and eliminating competition from seeds produced by small-scale farmers. "Free trade" is thus restricted to industrial seeds alone. Farmer seeds are deprived of legal recognition and condemned to illegality.

The European regulations for seed commercialisation demand prior registration of the varieties to which seeds belong in a catalogue compiled according to industrial standards (of stability and homogeneity). Traditional and farmer varieties, unable to meet these standards, are thus excluded from the market. On top of this, the term "commercialisation", as defined by the regulations, also includes non-monetary exchange of seeds, meaning that unregistered varieties can no longer even be freely exchanged.

2. Intellectual property: mutual reinforcement between the patent system and plant breeders' rights (PBR)

There are two systems regulating intellectual property which concern plants:

- the regulations of the Community Plant Variety Office (CPVO) which deals with the protection of discoveries made through plant breeding in line with the UPOV (International Union for the Protection of Varieties of Plants) Act of 1991;
- and Directive 98/44 relating to the legal protection of biotechnological inventions, which authorises the patenting of genes, and by extension of plants containing the patented genes, but not of varieties.

Whilst European plant breeders protected themselves by means of PBR, North American seed producers used the patent system, which allows for the prohibition of every kind of seed-saving and every usage of a protected variety towards the selection of another.

With the globalisation of seed exchange, these two systems found themselves competing in the same markets. Thus, in the 1980's, new genetic manipulation methods gave rise to a new threat for plant breeders, who overnight might find their varieties appropriated by a competitor taking advantage of the "plant breeder's privilege" by inserting a patented manipulated gene.

In order to compensate for these "competitive anomalies" between the patent system and PBR, the UPOV Act of 1991 decreed to allow:

- the extension of the protection granted by PBR to varieties essentially derived from the protected variety. This created a legal basis for the sharing of rights between the patent-holder on the manipulated gene or inserted genetic construction and the owner of the PBR over the variety. This also allowed for the designation of any type of seed-saving making use of the protected variety as "infringement";
- the extension of this same protection, in cases of infringement, to the harvest and the products thereof;
- the definition of the bred plant as a function of the characteristics of a genotype or a combination of genotypes. This allows the use of molecular indexing of new varieties to "trace" intellectual property through the fields and the food production chain in order to pursue the sources of infringement (crops sown via seed-saving and the materials produced from them) just as effectively as with the patent system.

PBR is thus able to take advantage of the patent system to block or take its share of royalties gained through seed-saving, while at the same time guarding the benefits of its own system; the protection of discoveries without any indication of varieties' origins nor of the selection methods used.

In addition, an aggressive campaign has been led by the European Seed Agency (ESA), demanding that royalty collection commence on the products of seed-saving for 21 different species. The ESA proposes that governments take total responsibility for the collection and distribution of royalties, and that they legislate to make non-payment a crime. Governments have already granted plant breeders the right to send official inspection agencies to collect periodic samples from fields; they would also now allow them to require farmers to indicate the identity of the varieties they use. In parallel with this, the International Seed Federation (ISF) has asked that the UPOV re-examine completely national legislations on the rights granted to plant breeders, and that they "propose suitable legal solutions for the effective assertion of plant breeders' rights", threatening to move towards other systems to protect their intellectual property.

The export of the French concept of 'Voluntary Obligatory Contribution'

Whilst they await the arrival on the market of new varieties characterised by molecular markers, French seed producers have, through an inter-professional agreement, reached an accord on the obligatory reclamation of royalties on all seed varieties of common wheat. Their aim is to extend this *Voluntary Obligatory Contribution* to every species in every European country. This inter-professional agreement goes well beyond the 1991 UPOV convention which it aims to enforce. On one hand, the agreement enforces the collection of royalties from every farmer on grain delivered to the central stocking body; on the other, it reverses the traditional burden of proof of infringement, which now falls upon the farmer. While former piracy laws required the injured plant breeder to provide proof of infringement, to have his royalties reimbursed the farmer must now prove either that he has not employed seed-saving methods, by presenting a certificate of purchase of certified seeds, or that he belongs to the class of small producers exempt from this levy because they produce fewer than 92 tonnes of cereals annually. This agreement extends the reclamation of royalties owed on protected varieties to every variety, whether or not they are protected.

3. The conservation of genetic resources: from the appropriation of varieties collected *ex situ* to the appropriation of a conserved biodiversity *in situ*

European regulation first addressed the question of the seed catalogue not long after the EU's adoption in 1994 of the UPOV's 1991 convention; this same year, along with directive 98/95/EC, saw the adoption of directive 98/44 authorising the patenting of genes and their functions. Having obstructed this process for ten years, the first practical directive published addressed cereals and potatoes, two species rarely conserved *in situ* by amateur growers. The directive concerned varieties whose non-protection was obligatory, and which were thus freely available for the gene-patenting industry as resources.

Under pressure from civil society, and spurred by a general desire for change, in 1998 a window was opened by directive 98/95, which allows member states to create regulation "establishing particular conditions for the market status of seeds and material for the propagation of cultivated species, in relation to their conservation *in situ* and the long-term use of plants' genetic resources, through cultivation and commercialisation". Taking into consideration traditional varieties, organic agriculture and the combination of different varieties, this directive was set out as a concrete measure by which the "The global plan of action for the conservation and sustainable utilization of plant genetic resources for food and agriculture", established in Leipzig in 1996, might be put into action. This plan sought to counterbalance the authorisation of the registration of genetically modified varieties, the conditions of which were specified in the same directive.

After long years of legal battles, in 2008 a directive (2008/62) was created introducing certain dispensations for "landraces" and crop varieties naturally adapted to local and regional conditions and threatened with genetic erosion. This last directive limits itself to permitting the catalogue registration (that is, the right to exist economically) of older varieties, produced in very small amounts within limited geographic zones and with respect to rules on distinctiveness, homogeneity and stability. The directive indicates an outmoded vision of biodiversity conservation and cultivation, which has little to do with the heterogeneous reality of independent varieties. This step back, however, has already been called into question by the first suggestions of the "Better regulation" report.

The conservation of cultivated biodiversity and the freedom to produce and develop farmer varieties are regulated to serve the genetic resource needs of the industry. The regulatory framework will change with the evolution of both industrial techniques and systems of intellectual appropriation.

For example, certain species, such as fruits and flowers, are unaffected by the requirement of catalogue registration. For fruits, a catalogue exists but registration is non-obligatory. The liberty granted to the commercialisation of seeds or of unregistered plant varieties facilitates the conservation of biodiversity *in situ* by amateur growers or unincorporated professionals. The exclusion from the market of farmer seeds (or plants) is thus achieved primarily through the PBR, associated with brand strategies and the incorporation of producers into clubs. For fruits this exclusion is reinforced by the obligation to use registered catalogue varieties in order to receive the aid of the CAP. For other species in the majority of European countries this freedom is accorded only to seeds destined for amateur gardeners, since catalogue registration is obligatory only when seeds are sold for commercial use. France is the only country to make a distinction for species grown by amateurs, having created an annex to the catalogue for amateur gardeners. Despite the intimidatory attitude of the administration, this annex remains optional for every sale explicitly made to amateurs. As for cereals, their simple absence from the crops grown by amateur gardeners explains the complete disappearance of *in situ* conservation*.

The total exclusion of non-industrial seeds from the commercial sector runs in parallel with the strategy of appropriation of cultivated biodiversity, the "purificatory" school of thought based on the model of 'UPOV 1960 + catalogue'. The useful genetic resources which make up the "primary material" of selection programmes are guarded in gene banks, and the cost of *in situ* conservation is left entirely to subsistence agriculture, too poor to afford the purchase of industrial seeds.

With the emergence of biotechnology, the current of change in the industry will force an evolution in strategies of appropriation. Value will no longer reside in the recombination of existing varieties, but in genes, or the “networks” which bind genes together. The model of the patent system (like that of the UPOV when it is finalised) has no need for the catalogue to eliminate competition from farmer seeds. These are a minor problem, on one hand because commercial demand tends ever more towards artificial methods of cultivation, which serve as the industry’s primary material; and on the other, because they are easily denatured by contamination from patented genes.

In addition, confronted with the limited capacity for innovation offered by the dead resources of the *ex situ* collection, the industry in fact needs to grant a greater liberty to the conservation and renewal of living biodiversity in the fields. It is innovations made by small-scale farmers that lead to new elements of biodiversity, and these new elements provide new resources for the creation and patenting of artificial genetic constructions. The sharing of the benefits created by utilising genetic resources, guaranteed by the CBD, now makes biodiversity and traditional wisdoms economically desirable. Farmers’ *in situ* conservation will be allowed to turn a profit only as long as it serves the needs of the industry.

Recommendations for the revision of EU legislation on the marketing of seeds and plant propagation materials

Common position of the Rete Semi Rurali (Italy), Réseau Semences Paysannes (France), IG Saatgut (Germany, Austria and Switzerland) gathering organisations working for the promotion, dissemination and recognition of farmers’ seeds - 2010 -

1. The overall objectives of the revision of legislation on seeds

The revision of the legislation on seeds must enable all those who wish to cultivate plant genetic resources, especially small farmers, to access these resources and ensure they can save, use, exchange and sell their varieties. The revision of the legislation on seeds must improve coherence of biodiversity issues with seed legislation.

Marketing should be possible for:

- Conservation varieties and locally adapted varieties,
- Reproducible¹ traditional and new varieties, especially those selected and cultivated on-farm, farmers’ varieties / population varieties,
- Mixtures of varieties

Obstacles to the marketing and exchange of these seeds must be removed.

The revision should recognize the rights of farmers in Europe as determined in FAO’s International Treaty on Plant Genetic Resources for Food and Agriculture. The EU must recognise that farmers have made, make and will continue to make an essential contribution to the conservation and development of agricultural biodiversity. This cannot be reduced by claims such as “Farmers’ seeds and plant propagating material are not in favour of plant breeding” (Evaluation Report of Arcadia International for the EU, p. 154)

¹ **Reproducible:** Meant as technically reproducible (not terminator or F1 hybrid) as well as legally (no legal ban or restriction on farm-saved seed. Originating from breeding techniques within the reach of the end user.

The revision must ban transgenic plants and create transparency in the methods of seed breeding for users and consumers. It must extend and strengthen current rules applied to the testing/evaluation and labelling of transgenic plants for all plants created by different molecular biotechnologies.

The review should ensure that seeds are completely free of genetically modified organisms.

For this purpose it is necessary to implement zero tolerance for the presence of GMOs in seeds and implement the polluter-pays principle. Tolerant of contamination thresholds inevitably increases both the contamination of seeds and the food chain with unacceptable economic, environmental and health consequences. The potential polluters should also have to come up for the costs of prophylactic analysis.

Coexistence of GMOs and traditional varieties is not possible. Therefore we demand an EU-wide ban on GMOs.

2. Farmers’ Rights

The review must prevent private appropriation of farmers’ varieties, population varieties, public plant genetic resources and farmers’ knowledge. Farmers’ knowledge and farmers’ rights should be recognised as collective.

Farmers who maintain and renew crop biodiversity do so by producing for the market. Therefore, it is appropriate to exempt seed exchange between farmers in the legislation on the marketing of seeds and to respect farmers’ rights to:

1. *Conserve and resow farm-saved seed of all species cultivated. No form of intellectual property right should jeopardize these inalienable rights.*

2. *Exchange and sell farm-saved seeds.* A waiver must be included in the revision that authorises the transfer or sale of seeds of varieties that are not included in the catalogue, “under the framework of a non-commercial operation” aiming at enabling conservation work, research or breeding.

Under the revision this derogation must be explicitly extended to the exchange of seeds between farmers who conserve, select or do research on their biodiverse seeds. For this reason, and as long as the seeds are not created by transgenic biotechnologies, direct marketing to the end user of farmers’ seed varieties, which are not included in the catalogue and that farmers’ have themselves produced on their own farm, should be allowed without any obligation of certification, regardless whether the seeds are intended for commercial exploitation of the harvest in the market or not.

In addition, farmers must also have facilitated access to plant genetic resources of public collections in all European countries, including the collections that were public, but now are in the hands of privatised institutions.

3. *Protect traditional seeds and knowledge against bio-piracy.* In order to fight against biopiracy, indications of the origin of genetic resources used should be mandatory for any exchange of seeds and especially for registering a variety in the common catalogue or for obtaining a plant variety certificate. Concerning seed exchange, the competence of farmers’ organisations, gardeners’ groups or local communities must be recognised in terms of registering seed exchanges without additional bureaucracy. The validity of informal records of varieties, whether they be professional, NGO or community-based, should also be recognised as proof of the prior existence of a variety.

3. Requirements for the registration of varieties

The DUS criteria for varieties and mixtures of varieties must be changed as follows: the uniformity criterion should also include the internal diversity of a variety. This will allow intravarietal diversity and adaptation on farm. The stability criterion must be changed to permit the marketing of varieties, which, based on their internal variability, may evolve by adapting to the diversity and variability of terroirs and climates. Characteristics defined by the Community Plant Variety Office or by research institutions (e.g. Bioversity International...) should be used in a flexible way, without being mandatory [as a whole], and be accompanied or replaced by other descriptors, e.g. agronomic data, drawn from field experience.

Transparency regarding the breeding and reproduction methods should be a condition for registering a variety. The seed users must know whether the seeds they acquire or buy are reproducible or not (F1 hybrids, male sterility ...), and whether they originate from traditional breeding methods or biotechnologies involving genetic modification. This applies also to mutated plants, cell fusion, cisgenesis, nanotechnology and other

methods, which should be explicitly described in seed labelling. Only if this is provided to the grower can the information be also passed on to consumers. The marketing of all varieties originating from permanent or reversible biological sterilization of plants or some of their characters (GURT-technologies) must be banned. These constitute an obstacle to the farmers’ rights as guaranteed by the ITPGRFA, and to the conservation and development of crop diversity.

We reject the molecular characterization of varieties when used as the method for the registration. They only serve to facilitate the widespread patenting of varieties, the strengthening of intellectual property rights and the privatization of varieties far beyond the current limits of varietal distinction. Molecular characterisation can identify varietal differences based on a limited number of markers, which cannot take into account the plasticity of varieties characterised by a wide internal variability. For example, this variability will be necessary for the adaptation of varieties to changing or extreme weather conditions. Molecular characterization as a definition of varieties thus is an obstacle to crop diversity.

The registration fee of a variety should be varied depending on the degree of public or private interest in the respective variety’s marketing: Conservation varieties, for instance, deserve public funding because of the strong public interest in their conservation. Reproducible varieties or varieties in the public domain should attract reduced costs compared with “industrial varieties”, which are not intended for reuse, or should be entirely free if they are intended for niche markets.

There should be no examinations of the “value of cultivation and use” (VCU) for registering organically produced and farmers, varieties. For example, these examinations obstruct the registration of organic or locally adapted varieties. However, we must encourage voluntary comparisons of varieties that address the needs of end users (organic or biodynamic agriculture, low input agriculture, processing purposes).

The geographic and quantitative restrictions to the marketing of conservation varieties must be optional and be based on the demands of groups, communities or collectives that have selected or conserved them or that are attributed associated collective rights. Geographical restrictions should be reserved for names of local varieties. These restrictions shall not apply to traditional and conservation varieties that:

- Were listed in old catalogues, and in this case, have lost their status of local or regional variety, even if they have never been on the EU list of varieties,
- Were listed in the EU list of varieties but have been removed or deleted from that list.

For such varieties, these restrictions contradict diametrically the objectives of on-farm conservation. They also act against the dynamic and diversified development of varieties that is essential for the sustainable use of crop diversity. These limitations clearly prevent the implementation of the ITPGRFA.

If a breeder wants to delete his/her variety from the official list, he/she must at the same time give a sample to a public institution, which is responsible for the conservation of varieties in a given country. If possible, the institution must be located in the country of origin of the particular plant genetic resource used for breeding and if it is not possible, the breeder must submit a sample to an international organization in order to find a solution. The place of conservation must be indicated in a public database (e.g. EURISCO).

The number of species regulated by the seed legislation should be reduced, and in no case increased.

4. Requirements for seed certification

Seed production should be transparent, and hence the labelling of seeds must include an indication of the region / location of development and multiplication.

Seed certification should remain mandatory for non-reproducible "industrial varieties"².

However, certification should not be privatized. It is necessary to maintain public control and transparency of certification. Enforcing plant health and safety regulations must remain a responsibility of governments. Plant health obligations must take into account farmers' breeding methods and the control of health risks. Enforcing GMO laws and ensuring that there is no contamination of non-GMO seeds and products should be financed by those who would wish to introduce GMOs into the seed market and grow them in the open. This obligation must apply to all plants originating from molecular biotechnologies regardless of the particular method used.

For reproducible seed varieties, and for conservation varieties, seed testing could be carried out in a way similar to standard seed testing.

5. Requirements for the marketing of varieties

Each EU Member State must have the right to refuse the marketing and / or use of seed varieties in its territory authorized at Community level, which may adversely affect health, the environment and farming systems that maintain the local environment, renew locally grown biodiversity and ensure its food sovereignty.

6. Relationship between legislation on marketing and rules for plant variety protection

The review of legislation on the marketing of seeds should not lead to a strengthening of intellectual property rights.

The European Union must not recognize patents on seeds, varieties, elements composing varieties (genes, gene stacking, networks...) or mixtures of varieties. It should prohibit patents on life (varieties), portions of life (genes, gene functions) or manipulated living (synthetic genes, nanoparticles).

The breeder's exemption should also apply to farmers who breed their own varieties as part of their agricultural production. It must be a condition of respecting farmers' rights. Revealing the genetic resources or varieties that have been used for the production of a new variety should be mandatory in any application for variety protection.

We reject the protection of new plant varieties that have been "discovered" and were not renewed, but were simply adapted to the DUS criteria. After the expiry of the variety registration, the variety protection should end immediately. The variety must be readily available.

Plant variety certificates should not apply to farm saved-seeds.

It remains necessary to finalise a legal protection system for the collective rights of farmers to use their seeds and varieties. Protection against genetic contamination, bio-piracy and unfair competition must be guaranteed, while fostering varietal innovation by farmers.

² **Non-Reproducible Industrial Varieties:** Originating from breeding methods that are not within the reach of the end user, which are not intended to be reused. A breeding method is within the reach of the end user when it can be implemented by a farmer or a gardener. Example: Mass selection, evolutionary breeding, breeding pressure by the crop's environment, directed cross-pollination. Biotechnology applied in the laboratory (mutagenesis, CMS, haploidisation, transgenesis etc.) and methods protected by intellectual property rights are not within the reach of the end user. A freely reproducible variety may be reproduced by a reseeded of the crop. F1 hybrids, male sterile plants, the varieties protected by an IPR restricting the use of farm-saved seed (Plant variety certificate or patent) are not freely reproducible.

4. The dissemination of GMOs and biosafety

The regulatory framework currently in operation includes, among others:

- Directive 2001/18 on the voluntary dissemination of GMOs into the environment;
- the regulation 1830/2003 concerning the traceability and labelling of genetically modified organisms and the traceability of products destined for human or animal consumption produced using genetically modified organisms;
- the recommendation on coexistence 2003/556/EC;
- Regulation 889/2008 defining the methods of production, transformation and distribution of materials produced by organic agriculture.

Although MON810 Bt maize is at this moment (early 2009) the only GMO present on the EU market authorised for commercial cultivation, an ever greater number of varieties of this maize are registered in the EU's common seed catalogue, and requests for authorisation are pending for several new GMOs. There is increasing pressure to raise permitted thresholds for seed contamination, and observations of seed lots contaminated by GMOs unauthorised by the EU are on the rise. The rules on coexistence, which allow simultaneous cultivation of GMO and non-GMO varieties in an open environment, have become one of the key issues in the new legislation on seeds.

Methods of evaluation: directives and regulations in competition

Directive 2001/18, at the centre of the European system, regulates the deliberate dissemination of GMOs into the environment (i.e., cultivation in the fields, transport, handling), whether or not they are destined for human or animal consumption. When GMOs are destined to be marketed as materials for human and/or animal consumption, or as the seeds allowing the production of these materials, it is regulation 1830/2003 which is applied. This regulation created a centralised authorisation procedure for GMOs at the level of the European Commission; with regards to directive 2001/18, this procedure limits the role of member states to participation in the evaluation of the GMO. At the moment in the EU the application of this regulation tends to override directive 2001/18 once the GMO is destined for human or animal consumption. This regulation has similarly been applied in the case of the authorisation renewal procedure for MON810 maize. This rule's chief consequence has been to put into place the labelling of a product as GMO when the unintentional or technically inevitable level of GMO therein is superior to 0.9%. There is, however, no provision for the labelling of materials (eggs, meat, milk, etc) produced by animals fed with GMOs.

Despite several attempts, there is currently no European regulation fixing an authorised threshold for the unintentional presence of GMOs in seeds. In the absence of such a regulation, each European state sets its own thresholds for labelling, from the level required for detection (0.01%) up to the threshold of 0.9%. In France, the authorities accept the sale of seeds unlabelled as containing GMO if they are contaminated at a level inferior to 0.5%, for a GMO authorised for consumption and cultivation; 0.1% if the GMO is authorised only for consumption and not for cultivation; and 0% if the GMO is not authorised at all.

As for organic farmers, the new European regulations, in force since January 2009, set out the rules concerning the presence of GMPs in the products of organic agriculture. The product is not obliged to be labelled as GMO as long as the proportion of GMOs which it contains (or with which it is produced) remains inferior to 0.9% for each ingredient, and if this presence is unintentional or technically inevitable. On this point states cannot decide to apply stricter rules specifically for organic agriculture.

EU member states enjoy, thanks to Directive 2001/18/EC, a strong and broad legal mandate to set out their own regulation on coexistence. They have available an explicit authorisation to avoid the unintentional presence of transgenic material and to preserve the possibility of GMO-free production and consumption within their national legislation. There is no legal foundation justifying the position of the European Commission, which declares that member states are obliged to tolerate a consistent contamination of non-GMO products by transgenic material up to a maximum level of 0.9%.

The current process, with its reinforcement of the environmental evaluations of candidate GMPs for cultivation, has at the European level tended towards replacing the eventual refusals of authorisation which would otherwise have resulted. The industry coped poorly with the shutting down of the pan-European market in which it had invested, by safeguard clauses or restrictive national laws on coexistence. The industry had in effect accepted the growing cost of market authorisations in exchange for complete access to this European market, guaranteeing the monopoly of the biggest companies and cushioning the cost of investment. The strengthening of the European environmental evaluation process only serves to eliminate the first pesticidal GMPs currently reaching the end of their patents, and opens the whole of the European market to new, environmentally secure GMPs (those carrying zombie or suicide genes, female heredities leaving pollen free of all transgenic material, etc), by depriving states who wish to activate a safeguard clause of any “scientifically acceptable” environmental pretext.

5. The choices offered by the “Better Regulation” initiative

An evaluation of the European common legislative framework on the commercialisation of seeds and materials for plant propagation was carried out in 2008 by a consortium for the evaluation of the food production chain. Led by the private consultancy Arcadia International, known for its favourable attitudes towards biotechnology, their aim was to propose realistic options for simplifying European regulation. The “Better Regulation” initiative will make its final proposals in 2012. Despite its limitations, the study allows for several observations of interest to farmer varieties, and shines a light upon what is at stake in the forthcoming regulations.

Windows of opportunity for farmer varieties

Amidst widespread contentment with the usefulness of the current system, which has largely achieved the objectives set for it, there appear several observations and propositions of interest to farmer varieties.

Observation

- + The catalogue is not always necessary to regulate the market. In sectors of cultivation without a common catalogue (fruits, flowers, etc), there have been no problems observed with the internal market.
- + The UCU tests are not indispensable. The relevance of these tests, designed to indicate efficacy, have been called into question in several sectors of cultivation where the UCU is non-obligatory and in several developing countries where the lack of regulatory tests has not prevented a level of competitiveness as high as in regulated sectors.

Propositions

- + Take note of the existence of several different markets; adapt the rules for “niche markets” such as the organic market or those based around biodiversity. Make the official rules on variety uniformity more flexible, in order to allow the registration of non-uniform varieties at costs proportional to the specialised markets at which they are aimed.
- + Develop a system of traceability, with indications to keep the user informed of the origin of the commercialised variety, on the varieties used in its breeding as well as the specific methods of breeding used.

These opportunities are supported by the general direction of change within the industry, which does not feel threatened by competition from farmer varieties, and looks favourably on the emergence of new elements of biodiversity which might be appropriated by artificial reconstructions and their patenting.



- **Key questions in the forthcoming regulations**

- › *The strengthening of industrial property*

The study's propositions

- *Organise a centralised verification process for variety denomination, using the database of the Community Plant Variety Office for registration, and make sure that both the catalogue and rules for intellectual protection of plant breeding discoveries use the same DUS trials; 'One key for many doors'.*
- *Generalise the VCU rules to all sectors of cultivation, and test developed varieties using new technologies such as DNA markers.*

» Comments

This proves that the catalogue does not exist to protect buyers, but rather serves the cause of intellectual property in the form of PBR, and the DUS and VCU tests belong to a system of monopolistic control which extends over every sector of cultivation.

The recommendation of morphological analysis of varieties using molecular tools poses several problems.

1/ Firstly, the use of the molecular marker as the foundation of indexing (the presence or absence of a molecule connected to one or several genes, whatever quantity is present) presents a loophole to the requirement of homogeneity and stability of morphological characteristics, or of the stability of inserted transgenic constructions.

2/ Secondly, this arrangement could prove even more dangerous for farmer varieties than the restrictive demands of DUS-VCU, for several reasons.

- On one hand the arrangement facilitates the traceability of seed producers' intellectual property through the fields of small producers and the food-production industry, and consequently the banning of seed-saving practices.
- On the other, it allows the appropriation of every farmer variety contaminated by protected genes.
- Ultimately, it reduces a variety's identity to characteristics which offer no clue as to the phenotypic, agronomical or cultivational reality recognised by small farmers. No longer themselves able to define what they are growing, these farmers will find themselves definitively and totally dependent upon those who hold the rights to biotechnology.

- › *Sanitary and environmental norms in the industry*

The study's propositions

- *Put into place systems which reduce the risk of contaminants in food products (considering the process of plant breeding as a strategic public health tool). To this end, standards for variety registration will include the potential to reduce contaminants such as mycotoxins.*
- *Establish a genuine internal market for chemically treated seeds.*
- *Establish a minimum threshold for the unintentional presence of genetically modified organisms in commercialised seeds, to resolve the problem of zero tolerance fixed by current legislation. Make seed legislation compatible with rural development and environmental policies, including policy on biodiversity and climate change.*

» Comments

Beyond the environmentalist window-dressing, the linking of phytosanitary rules and the marketing of seeds puts beyond doubt the agrochemical sector's stranglehold on agriculture. The largest chemical multinationals, who currently control over three quarters of the global seed market (see tables in chapter 4), aim to match the characteristics of the new varieties which they produce to the development of a market for their agrototoxic products.

The integration of phytosanitary, sanitary and environmental regulations into seed legislation will make it possible to restrict competition from agro-ecological farmer varieties and varieties adapted for organic agriculture through the imposition of industry-specific rules, such as a maximum level of mycotoxins in harvests. Transgenic Bt varieties, where internal production of insecticide works to decrease mycotoxin levels, could well become the norm. Seed types adapted to secure agro-ecological systems through sound agricultural methods (crop rotation, the composting of buried organic materials, etc) will become an exception.

The health and environmental concerns caused by genetic manipulation have made it necessary to evaluate a GMO's impact prior to any kind of commercialisation or dissemination. This evaluation is the responsibility of a specific national agency in each country, and of the European Food Safety Authority (EFSA) across Europe. Because of the widespread use of other gene-manipulation technologies (mutated plants, cisgenesis, cellular fusion, etc), and the need to combat health and environmental concerns caused by pesticide use, the scope of such evaluations needs to be expanded to every kind of modern variety. This is the reasoning behind the proposed extension of obligatory VCU tests to every plant species, and the addition of "durable development" standards to encourage varietal disease resistance.

The cost of disease resistance evaluations, imposed under the pretext of encouraging the commercialisation of varieties with lower pesticide requirements, may well signal the end for both traditional and modern farmer varieties. These hundreds of thousands of varieties, scattered at low densities across their terrains because of their pesticide-free selection, and with no need for such evaluations, will disappear, leaving the way clear for the few varieties fitted with molecular markers for resistance. The large scale at which these varieties are cultivated means that their evaluation costs remain a marginal expense. Similarly, the use of treated seeds will become a necessity to secure industrial agriculture's high-risk practices, while untreated seeds, adapted through sound agro-ecological methods to resist disease, will be accused of spreading pathogens and thus banned. Yet it is the same industrial varieties and seed-treatment products responsible for the insecurity which makes necessary the evaluation process.

Under the pretext of finding a realistic (industrial) solution, a contamination threshold for non-GMO seeds has been suggested. The proposed method of calculation would permit harvests contaminated at levels below 0.9%, after the addition of contamination linked with cultivation. This method ignores the fact that a contaminated harvest can be propagated through seed-saving or the non-commercial exchange of farmer seed which, due to further contaminations in successive cultivations, will be condemned to a swift disappearance.

Similarly, the Lisbon strategy's "rural development policy" provides only for activities remunerated by the market. Biodiversity is only given consideration for its economic utility, and not for its value as a source of conservation or renewal. The market, and its principle of economies of scale, has always contributed to the erosion of biodiversity. The same goes for research financially dependent on intellectual property, which can only support its own expense through the heavy dissemination of a small number of varieties.

An inadequate response to durable cultivation systems

*Taken from "A new legal framework for seeds"
(Guy Hastler, 26 June 2008)*

Whilst farmers fight diseases by balancing and diversifying their cultivation systems (by rotating their cultivations, pairing or mixing crops, moderating fertilisation) to encourage auxiliary insects, fungi or microbes, commercial varieties are required to be "resistant" or immune to the latest pathogens produced by the most production-driven cultivation conditions. In order to achieve this, the breeder is obliged to suppress all diversity by identically multiplying the sole individual specimen presenting the desired characteristic in a pathogen-free environment. In a real cultivation environment, however, this resistance is quickly overcome by the appearance of new pathogens. Seed producers place on the market new varieties resistant or immune to the latest pathogen to appear until the emergence of the following generation of pathogens. So every year salad varieties resistant to last year's fungus are the only ones available for commercialisation. This vicious circle leads to ever shorter life spans for new varieties. Whilst there are vines or orchards planted over a century ago still surviving, new plants must be pulled from the ground after ten or twenty years because they are affected by degenerative diseases produced by successive clonal multiplications excluding any form of mass selection. New wheat varieties last on average five years, and certain new vegetable and flower varieties last no longer than a year. Ever faster "varietal innovation" comes at a high price. This strategy only remains competitive on the market because it prohibits farmers' traditional strategies for disease resistance. These responses might depend on the cultivation of diversified and variable plant populations allowing for the selection of general natural disease resistance and requiring co-evolution, with pathogens placed under controlled pressure rather than eradicated entirely.

There is no patented gene for climatic adaptation which can bypass the massive chemical support necessary to adapt varieties to diverse and ever-changing climates and territories.

The informal seed-production systems of small-scale farmers exist in an economy of exchange or gift, free from market rules. These systems alone are apt to increase biodiversity and plants' capacity to adapt to climatic, economic and social conditions. A patented gene or network of genes can encourage adaptation to a specific new environmental circumstance, but not to conditions of continuous change. Only the plasticity of plant populations and social agrosystems, rooted in their own territories, is capable of local adaptation and change over a length of time. The propositions made in Arcadia's report, ignorant of the very existence of informal seed-production systems and participative selection, offer no response to the key issues of climate and biodiversity.

› *A certification system to make the industry safer*

The study's propositions

- *Encourage the inclusion of phytosanitary regulations, rules on health and environmental safety, and on labelling and GMO authorisation into the programmes of seed certification.*
- *Encourage a process of self-certification under official inspection.*

» Comments

Certification is paid for by the commercial organisation rather than by the state. The inclusion of new criteria increases the cost of certification, placing it beyond the means of small companies and low-dissemination varieties. These propositions thus serve to accelerate the concentration of power in the seed industry and to undermine the diversity of choice on the market.

The inclusion of public policy inspections in the certification process is an act of surreptitious privatisation, the appropriation by private enterprise of one of a state's sovereign missions. The clue lies in the idea of self-certification. "Money talks", and as soon as it is the tested party paying for the test, it is he who takes charge of the process of inspection. This system is in operation in France, where the official inspection service for French seeds is trusted to the GNIS, seed producers' inter-professional organisation. The certification process becomes a validation of the industry's internal inspection procedures, principally designed to reinforce its own high-risk practices, supply methods and sub-contracting according to its own criteria, which exclude any global agro-ecological approach. We might expect official inspections of private certification to put a check on the privatisation process, but ultimately they play the role of accomplice. Official organisms charged with carrying out inspections, such as France's COFRAC, are in effect directly controlled by private certification organisations, following the HACCP industrial norms imposed on the industry in the Codex Alimentarius.

It seems clear that under such a system there will be no hope of certification for farmer seeds. With no access to the market and informal exchanges banned, farmer seeds are condemned to disappear.

The current "Better Regulation" process reflects the industry's negotiation of the passage from appropriation and varietal PBR to inspections and gene and network patents. The changing industry is divided between supporters of the older "purificatory" school of seed-selection and those who see the importance of evolving, and are eager to replace old practices with new ones. Without the intervention of civil society and small-farmer organisations, there would be no dissenting voice to change the industry's course. Whilst there exist two types of seed, two seed-producing systems, two modes of agronomic, economic and social existence requiring two different regulatory frameworks, the industry may well impose a single system, and put a definitive end to those used by small farmers.

– >>> What can be done?

1. *Establish a civil body focused on the legal situation of seed legislation. This group will be able to:*

a/ follow the law changes affecting the four regulatory cornerstones (registration/certification, intellectual property rights, biodiversity and GMO dissemination), the evolution of biotechnology and alternatives offered by small farmers;

b/ highlight the issues at stake in the current changes;

c/ work to increase the practical information available to participants in the farmer-seed renaissance as well as civil society.

2. *Consolidate pan-European exchange between national networks and organisations concerned with farmer seeds and cultivating biodiversity, to encourage comparison between different national practices. Build a force of consensus capable of presenting propositions at the level of the European Community.*





Chapter 8

The imposition of regulation on Africa's farmers

As trade became globalised, the seed industry sought to globalise its regulatory system to protect its interests and assure development. Its goal was to replace farmer varieties with “improved” varieties, protected by intellectual property rights allowing the systematic recuperation of royalties for farm-saved seed.

In Africa, particularly sub-Saharan Africa where between 80 and 90% of reproductive material is produced on-site, the effects of this restructuring are beginning to be felt as the exported European model starts to fully impose itself.

– The current situation

The top-down restructuring of the seed sector

In the wake of independence, Africa's Francophone countries largely imitated French models for their legislative and regulatory frameworks. Since then the former colonial power has regularly worked to oppose regulatory autonomy as well as American influence in its old provinces, and has intervened on several occasions to maintain regulatory frameworks favourable to its industrial interests. Over the past ten years France has changed its policy towards the seed industry through the transfer to the private sector of traditional public services and overtures to the Anglophone world. France supported the 1998 creation of the African Seed Trade Organisation (AFSTA) and influenced the 1999 adoption of an annex on plant varieties (faithfully reproducing the UPOV's 1991 convention) by the African Intellectual Property Organisation (AIPO), which regulates intellectual property rights for sixteen countries including all Africa's Francophone nations.

[1. The FAO prepares the ground for change

The overhaul of the continent's regulatory framework owed much to the intervention of the United Nations' Food and Agriculture Organisation. To revitalise research and expand the market, the FAO helped the private sector organise itself into cooperatives, economic interest groups, networks of agro-businesses and other activities. French funding allowed the 2003 alignment of eight countries in the Economic and Monetary Community of West Africa, which in 2005 expanded to the Permanent Interstate Committee for drought control in the Sahel (CILSS, in French) and the Economic Community of West African States (ECOWAS) bringing together fifteen West African governments.

[2. The African Union and regional organisations impose change

To get around democratic reluctancies and objections to controversial national issues, regional economic unions were relied upon to impose change. In October 2007 AFSTA signed a protocol agreement with the African Union (AU) engaging the AU to consult AFSTA on all general agricultural matters, and those relating to seed and biotechnology in particular. For Mark Sachs, president of AFSTA, this protocol "will allow coherent policy in step with the seed industry's current thinking" (source: "Cultivar Seed", n°44, February 2008).

To put this process into operation at ground level, he emphasises that "regional economic unions have made efforts to align seed regulations, offering private companies large areas for action and prospecting" (source: *ibid*). The countries of the Southern African Development Community (SADC) have already realigned their regulatory framework in accordance with the industry's wishes.

In West Africa ECOWAS is currently putting the finishing touches to its own regulatory framework. The West African Seed Alliance (WASA), representing AFSTA, is taking an active role in the realignment process to facilitate the unrestricted movement of seeds for seed companies.

ECOWAS's alignment of privatisation and biosafety

Given sovereign states' limited capacities and the porous nature of national borders, regional approaches to biosafety, offering effective public participation, particularly from farmer organisations and the rural population (80% of the population) offer definite advantages. Yet these options have not been considered. The ECOWAS action plan for biotechnology and biosafety development was devised by experts, away from democratic debate. The plan foresees the alignment of seed regulations and the creation of a support network for national systems enabling them to meet their responsibilities, a west African seed committee and a west African catalogue. The plan's execution is trusted to agencies favourable to biotechnology: WECAARD (West and Central African Council for Agricultural Research and Development), and INSAH (the Institute for the Sahel) specifically for biosafety development. The Coalition for the Protection of Africa's Genetic Heritage (COPAGEN) and numerous farmer organisations have flatly denounced biosafety law projects influenced by ECOWAS, including the one submitted by the Malian government to a parliamentary vote in November 2008.

3. Government withdrawal

Harmonisation here concerns quality control, certification, commercialisation, phytosanitary products, fertilizers and biosafety regulations allowing GM cultivation. The CILSS document for the creation of a regional regulatory framework on conventional and transgenic seeds and biosafety in the Sahelian zone (2005), the central document behind ECOWAS's plan, emphasises that "the alignment of quality control regulations and phytosanitary rules on seeds must involve the withdrawal of government from seed production, collection and commercialisation, leaving the way open to the private sector" (Source : "Cultivar Seed" n°44, feb. 2008). The CILSS's framework convention stipulates that all distributed and commercialised seeds must be certified, that a national catalogue must be created and that alignment will create a regional framework for cooperation.

In parallel with this is the creation of the Alliance for a Green Revolution in Africa (AGRA), financed notably by the ultra-liberal Rockefeller and Bill and Melinda Gates foundations. North American in origin, AGRA supports the Programme for Africa Seed Systems (PASS) which consolidates AFSTA's plans through training programmes and the creation of networks of agro-businesses.

4. The transfer of public services to the private sector

AFSTA uses national seed associations as intermediaries in various countries; in Mali, ASSEM (Association of Malian Seed-Producers); in Senegal, the National Interprofessional Seed Union (UNIS, in French), modelled directly on France's GNIS. These organisations are intended to play a central role in the privatisation of national seed systems, encouraging governments to reduce the cost of certified seeds through direct subsidies, by making free sites available to seed societies or by granting exonerations from customs duties and import taxes.

The evolution of seed regulations in Mali

Since 1995, a National Seed Council, bringing together the main institutions concerned, sets Mali's seed policies and a National Species and Varieties Council is charged, amongst other things, with keeping the catalogue up to date. The system is broadly organised to leave basic seed production to the Research Institute (IER) and to transfer to the private sector the majority of the National Seed Service's (SSN) responsibilities and infrastructures. To encourage privatisation, tax reliefs have been granted to businesses. The SSN retains a coordinating role however.

Created in 1996, the General Directorate of Regulation and Control is responsible for the regulation and control of agricultural and pesticidal products and seed certification. The Directorate operates a central laboratory for seed analysis, the LABOSEM.

In July 2007 Mali's National Committee of Farmer Organisations (CNOF) produced a document on the seed industry's production chain. The report analyses the research institution's equipment weaknesses (unequipped in treatment material and quality laboratory supplies) as well as lack of human resources. In addition, it highlights that the IER cannot meet with demand for local varieties.



— Key issues —

[1. The replacement of farmer varieties with improved varieties: the impact of the catalogue and the doctrine of uniformity

The new seed policies of countries influenced by AFSTA are based on the well established doctrine stating certified seeds' importance in increasing production and productivity. Even though African agriculture's experience of green revolutions' repeated failures has long revealed this doctrine's falsity, one of the new policies' central objectives is to encourage "benefiting farmers to commit to renewing their seeds whenever necessary, particularly in the area of large-scale cereal production for consumption".

The replacement of better adapted, easily reproducible local varieties with certified varieties has become an article of faith for governments, research programmes and NGOs able to influence farmer organisations. For farmer organisations, "improved seeds" (see insert on the famous "local improved" seeds), taken from farmers and homogenized by research programmes, often seem small-scale agriculture's only accessible route to intensification. The active participation of the AOPP (the Association of Professional Farmers' Organisations, bringing together 210 Malian farmer organisations) in national "certified seeds" production and commercialisation programmes allows thousands of farmers to become involved in the multiplication of base seeds for cereals.

Yet varieties selected in station and meeting certification and catalogue approval standards (distinctiveness, homogeneity and stability) are rarely adapted for peasant agriculture's cultivation conditions. Their production potential depends on fertilizers and supplementary irrigation, and farmers living on less than two dollars a day cannot be expected to intensify production using chemical inputs or sophisticated equipment.

[2. The privatisation of seeds

To smooth the laws' acceptance by farmers' and African societies, they were not initially applied to subsistence agriculture, where farmers' insolvency ensured the seed industry's lack of interest. These farmers have continued to resow, exchange and freely sell their seeds, reproduced on-farm. In the "strategic" sectors of commercial cultivation and export, it is still usually the national seed sector which provides farmers with improved seeds, and sometimes fertilizers, cheaply or for free (in exchange for a share of the harvest's profits). National seed sectors tend to complain less about intellectual property frameworks, and to tolerate informal seed exchanges and seed-saving. Each country, however, belongs to the African Intellectual Property Organisation (AIPO) and are signatories to the Bangui agreements committing them to applying plant breeders' private rights according to the UPOV's 1991 convention, where farmers' right to resow seeds in their fields carries little weight. In time the private sector will remind governments of their obligations.

The greatest current threat to farmers' rights is the progressive privatisation of national seed systems, the spread of hybrid vegetable varieties and the introduction of GM crops. These measures threaten to eventually lead to the violent and total imposition on peasant agriculture of the existing legal framework.

Morocco's experience shows the limitations of certified seeds

In the Maghreb the Moroccan seed sector has benefited from voluntarist policies to become the continent's second largest seed producer after South Africa. Alignment began in 1969, and Morocco's UPOU membership dates from 2002. More than 2000 varieties are registered in the country's national catalogue, 90% of which are bred by foreign firms.

Commercialisation is carried out through certified bodies. Although 100% of seeds for vegetable species are certified, the same is true for only 10% of seeds for major crops (cereals, legumes, fodder and oleaginous plants). These seeds are used in the country's irrigated areas. According to the president of the Moroccan Seed and Plant Association (AMPS), farmers in major "unirrigated" cultivation areas, where production is subject to climatic hazards, often consider selected seeds an investment in pure chance and so prefer common seeds.

In February 2007, an international workshop preparing for the Nyeleni Forum for Food Sovereignty emphasised the questions raised by seed privatisation in the region, carefully noted by farmer organisations:

- the loss of autonomy permitted by farmer varieties not requiring supplementary inputs;
- the relationship between selection conditions for improved seeds, carried out in laboratories and tested in favourable conditions in research stations, and the conditions for true participative farmer selection;
- the true nature of the intellectual property rights involved in improved seeds, and their capacity to alter social relationships: gifts and seed exchanges are replaced by trade, regulation and monopoly rights, contrary to farmers' regional community usage rights.

Counterweights to Mali's Agricultural Reform Law

In Mali seed policy is governed by 2006's Agricultural Reform Law, introducing the concept of food sovereignty and drawn up in participation with farmers' organisations. The law includes numerous articles acting as safeguards against the private sector's liberalising drift and protecting farmer varieties. Article 141 proclaims: "The state, along with territorial collectives and the farming profession, defines biosafety policy with a view to assuring total coverage of national needs in selected seeds, the conservation and promotion of existing varieties and those threatened with disappearance as well as the reintroduction of those which have disappeared. The state, along with the farming profession, draws up the national seed catalogue and keeps genealogical records."

On the question of intellectual property, though, the law remains ambiguous. Although article 110 stipulates that "available genetic resources and newly-bred varieties of plant species and animal races are part of the country's heritage?", article 111 clarifies that "genetic resources are the object of intellectual protection in accordance with national regulation and international agreements, on the basis of a national catalogue of plant varieties and animal races."

The AIPO's new agreements encourage biopiracy of farmer varieties

In April 2009, the National Directorate of Niger's Platform for Peasant Agriculture (*Plate Forme Paysanne du Niger*, in French) and Nigerien member organisations of COPAGEN launched a campaign denouncing the request to the AIPO for exclusive rights over the onion variety "Galmi purple" by the private firm Tropicasem (a branch of the French seed society Technisem).

Extracts from the declaration:

Consider that the variety "Galmi purple" takes its name from the region where it was domesticated. Galmi is a village in the republic of Niger. It is only because of its qualities that this variety's cultivation spread to various countries in the region.

Consider that local Nigerien communities (farmers), like other farmers around the world, have collective rights over traditional cultivated plants, which they have domesticated and/or improved, and which become their genetic heritage.

[...]

Consider the sovereignty which the Convention on Biological Diversity grants governments over the protection and safeguarding of biological diversity. Concerned for the respect of social, economic and cultural rights, we, the communities of Niger;

[...]

- + consider the actions of Tropicasem and its accomplices as theft, a seizure of over a century's effort on the part of Galmi's farming community, as well as a violation of this community's rights. This act shows enormous contempt for African farmers, and those of Niger in particular. We plan to oppose it in the following ways;
- + we will press the Nigerien government to use every available means to appeal against Tropicasem's request at the AIPO before the end of the regulatory period ending in August 2009; with no detriment to judicial actions against this society;
- + we call on all farmer organisations, all organisations in civil society and anyone able and willing to help, concerned for human rights, human dignity, justice and the future of peasant agriculture, to join forces to support and assist the Nigerien community and put an end to Tropicasem and the AIPOs' cheating.

– >>> What can be done?

1. *Develop in all areas independent farmer seed systems based on the promotion of local varieties.*

2. *Increase the exchange of experience between farmers in different regions, to consolidate the collective rights of communities still based around customary laws.*

3. *Put into place at the regional and continental levels a system allowing farmer organisations to keep watch over national and international regulations affecting seeds.*



Bibliography

ANVAR (Shabnam), *Semences et droit : l'emprise d'un modèle économique dominant sur une réglementation sectorielle*, (*Seeds and the law: an economic model's stranglehold over sector regulation*), thesis in law, Paris I Sorbonne, 2008.

ARGUMEDO (Alejandro) and PIMBERT (Michel), *Protecting farmers' rights with indigenous biocultural heritage territories : the experience of the Potato Park*, ANDES - IIED, 2008.

BEDE and RSP, *Renaissance des semences paysannes*, (*The farmer seeds renaissance*), educational dossier, Montpellier, 2004.

BERLAN (Jean-Pierre), *La Guerre au Vivant*, (*The war on living matter*), Agone, 2001, 168 p.

BIOCONTACT, Seed dossier, February 2009.

BOCCI (Riccardo), CHABLES (Véronique), KASTLER (Guy) and LOUWAARS (Niels), *Set of recommendations on farm conservation strategy, the role of innovative market mechanisms, legislative framework for landraces, conservation varieties and amateur varieties in Europe*, *Farm Seed Opportunities*, 2009, www.farmseed.net

BONNEUIL (Christophe), GILLES (Denis) et MAYAUD (Jean Luc), *Sciences, chercheurs et agriculture ; pour une histoire de la recherche agronomique*, (*Science, researchers and agriculture; towards a history of agronomic research*), éd. Quae et L'Harmattan, 2008, 297 p.

CNOP, BEDE, IIED, *Peasant Seeds, The Foundation of Food Sovereignty in Africa*, 2008.

Cultivar Seed, n°44, February 2008.

DELMOND (François), CHABLES (Véronique) and COEURJOLY (Delphine), *Des bios au pays des "biotechnologies végétales"*, (*From organic to the country of "plant biotechnology"*), Alter-Agri-85, 2007.

ETC Group, « A qui appartient la nature ? Pouvoir des grandes sociétés et ultime frontière de la marchandisation du vivant », (*Who does nature belong to? The power of large societies and the final frontier in the commercialisation of living material*), in *communiqué N°100*, November 2008.

ETTY T.F.M (2008), *Legal Brief - On Coexistence: Best National Practices for Regulating the Cultivation of GMOs in Europe*, Consultancy report (Ettly Legal Consultancy) commissioned by Greenpeace International.

FIBL, « Techniques de sélection végétale », in *Dossier FIBL N°2*, September 2001.

GNIS, *Tout sur les semences*, (*Everything you need to know about seeds*), Paris, 2004.

GRAIN, *The end of farm-saved seed?*, report in *Seedling*, February 2007.

GRAIN, *Protecting and promoting farmers' seeds in Europe: Italy's experience with regional laws. An interview with Antonio Onorati*, in *Seedling*, July 2005.

HARLAN (J.R.), *Crops and Man*, American Society of Agronomy, Madison, Wisconsin, 295 p.

HEMITTE (Marie-Angèle) (edited by), *La protection de la création végétale. Le critère de nouveauté*, (*The protection of plant discoveries. Criteria for novelty*), Librairies Techniques, Paris, 1985.

Inf'OGM, *Prévention et réparation des dommages liés aux OGM*, (*Preventing and repairing damages linked to GM organisms*), Legal guide, Montreuil, 2005.

SECRETARIAT OF THE CONVENTION ON BIOLOGICAL DIVERSITY, *Cartagena Protocol on Biosafety to the Convention on Biological Diversity*, Texts and annexes, Montreal, 2000.

SULMONT (Guillaume), *Etude comparée des systèmes d'inscription au Catalogue des variétés d'espèces agricoles dans les principaux pays européens*, (*Comparative study of registration systems for the catalogue of agricultural species in major European countries*), GEVES, 2003, 163 p.

Acronyms and initialisms

AFSTA	<i>African Seed Trade Association</i>	GEVES	<i>Testing and examination group for varieties and seeds</i>
AGPV	<i>General Association for Wine Production</i>	GMO	<i>Genetically modified organism</i>
AGRA	<i>Alliance for a Green Revolution in Africa</i>	GMP	<i>Genetically modified plant</i>
AIPO	<i>African Intellectual Property Organisation</i>	GNIS	<i>National Interprofessional Seed Producers' Group (France)</i>
ASSEM	<i>Association of Malian Seed Producers</i>	GURT	<i>Genetic use restriction technology</i>
AU	<i>African Union</i>	IER	<i>Institute of Rural Economy (Mali)</i>
BH	<i>Biocultural heritage</i>	INRA	<i>National Institute for Agronomic Research</i>
CBD	<i>Convention on Biological Diversity</i>	IPC	<i>International Potato Centre</i>
CILSS	<i>Permanent Interstate Committee for drought control in the Sahel</i>	ISF	<i>International Seed Federation</i>
COPAGEN	<i>Coalition for the Protection of Africa's Genetic Heritage</i>	ITPGR	<i>International Treaty on Plant Genetic Resources</i>
CPVO	<i>Community Plant Variety Office</i>	MTA	<i>Material Transfer Agreement</i>
CTPS	<i>Permanent Technical Committee on Selection of cultivated plants (France)</i>	PBR	<i>Plant Breeders' Rights</i>
DDS	<i>Deccan Development Society</i>	RSP	<i>Farmer Seeds Network</i>
DGRC	<i>General Directorate of Regulation and Control (Mali)</i>	TRIPS	<i>Agreement on Trade-Related Aspects of Intellectual Property Rights</i>
DUS	<i>Distinctiveness, Uniformity, Stability</i>	UNDRIP	<i>United Nations Declaration on the Rights of Indigenous Peoples</i>
ECOWAS	<i>Economic Community of West African States</i>	UNESCO	<i>United Nations Educational, Scientific and Cultural Organisation</i>
ECPVP	<i>European Community Plant Variety Protections</i>	UPOV	<i>International Union for the Protection of New Varieties of Plants</i>
ENTAV	<i>National Technical Establishment for the Improvement of Grapevines (France)</i>	VAT	<i>Agronomic and technical values</i>
EFSA	<i>European Food Safety Authority</i>	VCU	<i>Value for cultivation and use</i>
ESA	<i>European Seed Association</i>	VOC	<i>Voluntary Obligatory Contribution</i>
FAO	<i>United Nations' Food and Agriculture Organisation</i>	WASA	<i>West African Seed Association</i>
FFPV	<i>French Federation of Grapevine Nurseries</i>	WECARD	<i>West African Centre for Agricultural Research and Development</i>
		WTO	<i>World Trade Organisation</i>

Allogamy: a characteristic of plants which preferentially depend for fertilization upon other individual plants (so-called cross-fertilization).

Autogamy: a characteristic of plants where fertilization preferentially takes place within the individual plant, the flower's ovule being fertilized by pollen from the same flower, or from a different flower of the same plant.

Biomass: the total quantity of matter (mass) of all the living species in a given environment. We can also talk of the energy output of the primary producers (the plants) in joules. This output is influenced by several factors; the quantity of light, of water, access to nutrients and ambient temperature.

Biopiracy: the unjust appropriation of biological resources through intellectual property rights.

Biosafety: national and international measures assuring the greatest possible security in the transfer, handling and use of living material produced by modern biotechnology.

Biotechnology: the body of techniques and processes which allow us to take advantage of living organisms, in particular of micro-organisms.

Breeder: in the area of seeds the breeder is the person who produces, whether by chance or deliberate selection, a new breed of plant, a species different enough from other variants for it to be considered a new variety.

Cellular fusion: cellular fusion or cellular hybridisation is the *in vitro* creation of a single hybrid cell through the joining of two cells originating in different species. In the hybrid cell, the vital nuclei can remain separate or can fuse, but during subsequent cellular divisions a single spindle apparatus forms so that each resulting cell has a single nucleus containing partial or complete pairs of chromosomes from each parental line.

Cellular multiplication or mitosis: the process by which a cell's chromosomes separate into two equal groups so that each new cell receives exactly the same hereditary material and can carry out the same functions as its mother cell.

Cisgenesis: consists of transferring and/or modifying only genes specific to the species in a plant.

Clone: a population produced from the same individual through plant multiplication. Each individual possesses the same range of genes, the same genotype.

Cultivar: a contraction of the term "cultivated variety". A cultivated plant population or variety produced by a selection process. The terms cultivar and variety are often used interchangeably, although the characteristics of a cultivar are often linked to its history (the methods of selection used) and to its geographic territory.

Cytoplasmic male sterility (CMS): a system naturally occurring in certain plants involving malformed, and thus sterile, pollen grains. These are referred to as cytoplasmic because the genes controlling sterility are found not in the nucleus but in the organelles of the cytoplasm (mitochondria or chloroplast). Cytoplasmic sterilities are a "biological tool" of hybridisation for allogamous species (preferentially cross-fertilizing), used in the production of "F1 hybrid" varieties' seeds.

Dynamic management: a method of *in situ* conservation of plants' genetic resources assuring the renewal of cultivated biodiversity in the fields by farmers using various methods of cultivation, selection, conservation and exchange.

Epigenetic: a modification which is not coded in a DNA sequence.

F1 hybrid: a hybrid is the result of cross-breeding between genetically different parents belonging either to the same species or to different species or genera. F1 hybridisation is a method of industrial cross-breeding allowing for the creation of highly homogeneous varieties.

The F1 hybrid is the result of the cross-breeding of two homozygotic parental lines also known as true-breeding or inbred genetic lines. Hybrid varieties are unstable when it comes to reproduction, and the descendants of F1 hybrid seeds are highly heterogeneous.

Food sovereignty: the international right making it possible for countries or groups of countries to put into place the best possible agricultural policies for their populations without having a negative impact on other countries' populations. Food sovereignty represents a break with the current order of food markets put into place by the WTO.

Genetic resource: according to the Convention on Biological Diversity, a genetic resource is a genetic material having a real or potential value.

Haploidisation: the process of obtaining haploid cells and haploid plants, with a single set of chromosomes, using diploid cells.

Heterosis: designates a stage prior to natural or artificial selection processes, characterised by the selection of the highest-functioning/most vigorous hybrid, as much in comparison with other hybrids as with the true-breeding parent lines. Heterosis consists, after the hybridisation of two true-breeding but interfertilizing varieties, of selecting among the offspring those who best combine the qualities of the two parent varieties to prosper in a given environment.

Heterozygote: produced by two different parents.

In situ conservation: maintains the renewal of plant populations' genetic diversity in the same environment where they developed their distinctive characteristics (ecosystems or agrarian systems). Complements *ex situ* conservation, where genetic resources are stored in a protective conservatory (in the form of living collections of the specimen), in cold chambers or in a gene bank.

Mass selection: consists of choosing from a plant population the specimens of greatest interest and using their grains as seeds for the next cultivation. This operation is repeated over successive generations, allowing the progressive improvement of cultivation performances. Between two selection stages, genetic recombinations occur naturally, with no human interference.

Molecular marking: molecular markers are fragments of DNA serving as points of reference to follow the transmission of a segment of chromosome from one generation to the next. If an allele X carried by an individual is born by the father but not by the mother, the individual must have received this from its father. The molecular markers for this allele allow us to establish the allele's parental origins.

Mutagenesis: a word made up of "mutant" and "genesis", signifying the creation of mutants. Covers every method allowing the modification of a living organism's genome. The term "mutagenesis" refers to every voluntary production of genetic variability in a living organism, through the use of energetic (gamma rays, X rays, etc) or chemical agents or the cultivation of cells exposed to selective agents such as a herbicide.

Mutated plant: a plant genetically modified by chemical or physical treatments creating transmittable mutations in its hereditary information (DNA, RNA).

Nanotechnology: nanometric technologies level include a series of techniques used to manipulate matter at the level of atoms and molecules. The term "nano" refers to the size of a "nanometre" (nm) which is equivalent to a billionth of a metre. In this context, nanoscience is the study of phenomena and the manipulation of matter at the atomic, molecular and macromolecular levels, where physical and chemical properties are notably different from those known to us at larger scales. Nanotechnology concerns the conception, characterisation, production and application of structures, devices and systems by controlling shape and size on a nanometric scale.

Offtype: differing individuals in the descendance of a homogeneous line.

Participative selection: a collaboration between farmers and scientists to renew plant varieties. Participation depends on dialogue at every step of the process of regaining farmers' seed independence, based on a shared conception of the fundamental principles and nature of living material. The term participative selection is sometimes wrongly employed for operations which simply consist of asking farmers to test the latest varieties produced by laboratory or seed station selections, varietal sieving and participative evolution.

Polyploidy: refers to cells bearing one or several supernumerary sets of chromosomes ($3n$ or $4n$ instead of $2n$).

Protoplast fusion: also called somatic hybridisation, this process consists of provoking the fusion of two cells stripped of their cell wall.

Synthetic biology: a type of research using the principles and methods of genetic science to create informative molecules different from those existing in nature with the aim of constructing new biological systems and functions (artificial genomes, new nucleic acids).

Terminator: nickname given to plant varieties sterilised by genetic manipulation preventing the germination of resulting seeds.

Transgenesis: a biotechnology consisting of the insertion in a living organism of a foreign - a transgenetic - genetic construction, to endow the organism with a new property which it will pass on to its descendants. The new property is controlled by the protein which encodes the transgenesis.

True-breeding plants: the descendants of a homozygotic plant reproducing through auto-fertilization. Theoretically made up of identical individuals across a generation (homogeneity) and from one generation to the next (stability).

Vitroplant: a plant bred in a sterilised laboratory, following in vitro cultivation techniques, through the cultivation of tissues or even isolated cells taken from a disinfected "mother plant" (explant) in a sterile nutritive environment.

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The FPH is an independent foundation based in Switzerland. Its partnerships form a global strategy whose goals are:

- to support the emergence of a worldwide community, which globalisation makes necessary;
- to contribute to the three great changes which humanity will have to confront over the course of the twenty-first century:
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 - the search for a universal ethics of responsibility;
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Over time a web of enormous complexity has been woven around seeds and plant reproduction organs, trapping farmers in a tangle of decrees, laws, directives and conventions. Farmers are denied their say in the incomprehensible regulations affecting their right to produce, multiply, use, exchange and sell the seeds of plants cultivated in their own fields. While the market is becoming globalised and industrial concentration is consolidating the monopoly over the food industry into the hands of a small number of multinationals, industrialised countries' suffocating regulations are spreading across the developing world.

How do international regulations affect farmer seeds? What are the threats to farmers' rights over their seeds, the foundation of food sovereignty? This dossier aims to shed some light on these questions.

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