

European Agriculture and Biodiversity Charter

INDEX

Biodiversity in Europe: challenges and action 4

Preamble

I. Introduction on Agriculture & Biodiversity 11

A. Impact of agriculture on biodiversity..... 11

B. Conservation of cultivated biodiversity 12

II. European context for Agriculture & Biodiversity 16

A. Biodiversity issues in the European Agricultural Policy 16

B. European context on cultivated biodiversity (animal and plant genetic resources which are or could be of use in agriculture) 19

1. European policies and context for agrobiodiversity 19

2. European context on farm animal genetic resource conservation 20

3. Toward an appropriate legislation and policy framework for cultivated biodiversity? 21

4. The current revision of the EU's regulatory framework for plants and seeds: strong divergent interests between stakeholders. 23

III. General Recommendations and Action Plans on Agriculture and Biodiversity..... 24

Challenge 1: Synergies between agricultural practices and biodiversity 24

Development of a European Farm Evaluation System (EFES) to assess the impact of the agricultural production process and farm management on biodiversity..... 24

Linking of public financial support to good agricultural practices related to biodiversity conservation 25

Enlargement of the protection level and the economic support of High Nature Value Farmland (HNVF) in European countries. 26

Raise awareness in the agricultural sector and in public society about the importance of preserving natural and cultivated biodiversity. 26

<i>Challenge 2:</i>	<i>Conservation and promotion of AGROBIODIVERSITY....</i>	<i>27</i>
	Preservation and maintenance of biodiversity from existing genetic resources for food and agriculture as well as the heritage of knowledge and culture linked to them.	27
	To set up and support European networks of stakeholders working on the conservation, enhancement and management of agrobiodiversity, in order to encourage regional and national initiatives and create new entities, also encouraging knowledge transfer on in situ and ex situ conservation.....	28
	Establishment of a clear European legal framework that will recognize farmers' right to exchange and market their own propagation material (seeds, bulbs, tubers) for biodiversity conservation, dynamic management or plant breeding purposes, regardless of whether the variety is registered or not in the conservation varieties catalogue (EU directive 2008/62).....	29
	Promotion of dynamic on-farm conservation of genetic resources applying protocols of participatory plant breeding	31
	Implementation and promotion of specific marketing actions to promote the cultivation of endangered local varieties and breeding of local breeds.	32
	Promotion and enlargement of GMO-free regions in the European Union.	33

Biodiversity in Europe: challenges and action

Biological diversity, better known for short as biodiversity, is the variety of life on Earth (microorganisms, plants, fungi and animals) and the natural patterns it forms. Three different and interrelated levels of biodiversity are commonly defined: genetic diversity (i.e. the range of genes in all individuals as well as between individuals), species diversity (i.e. the range of species within and between populations) and ecosystems (i.e. the range of habitats, communities, and ecological processes, including intra-ecosystem variations). Although this is not easy to quantify, all levels are important to ensure evolution and the adaptation of individuals to a changing environment.

Definition of biological diversity

The variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.

Source: Article 2, CBD (1992)

Biodiversity certainly has intrinsic value. It is also essential to human life and wellbeing in the sense that humans have always depended on natural resources. More specifically, biodiversity ensures the quality, quantity and stability of ecosystems' goods and services, i.e. the series of material, cultural and spiritual benefits humans draw from the ecological functions played by ecosystems (MEA, 2005). Biodiversity provides raw materials for food, health and shelter (e.g. agricultural products, fish, wood, medicine, wool, etc.) and in doing so, it becomes the basic resource for many economic activities; it regulates and recycles the air, soil and water conditions necessary for our survival; it forms the basis for cultural and recreational activities (such as ecotourism), scientific and educational programmes, as well as spirituality, religion, ethics and emotions.

Biodiversity is the result of both natural processes and human practices. It has, however, been increasingly negatively affected by the latter. In Europe, like elsewhere in the world, although less rapidly than in other regions and continents, biodiversity is deteriorating. 25 % of marine mammals, 15 % of terrestrial mammals and 12 % of birds are threatened with extinction (EEA, 2010). Moreover, 62 % of European habitats and 52 % of European protected species included in the "Habitat" Directive have an unfavourable conservation status (EEA-ETC/BD, 2009).

Among key pressures, rapid shifts in land use have been acknowledged as a major threat (IUCN, 2007, 2009, 2010). Extensive farming land has declined by 2.6% between 1990 and 2006 across Europe¹. So have natural grassland areas. Over the same period, built-up, industrial and artificial

¹ Figures related to land cover (agriculture, natural grassland, industrial areas) come from last available statistics from CORINE, a European Environment Agency programme dedicated to coordinating information on the environment and accessible at <http://www.eea.europa.eu/publications/COR0-landcover>

areas have gone up by 7.9%. Subsequent threats of pollution and overexploitation come next. Cropland, forests and pastures cover almost 80% of the total European land area (EU-25 plus Norway and Switzerland (EEA, 2007)). Unsurprisingly, pressure from the twin trends of the intensification of agricultural and forestry practices, together with land abandonment, plays a great role. Furthermore, invading exotic species spread out, especially in aquatic ecosystems and in the context of a changing climate: more than 10,000 non-native species have been observed in Europe, more than 10% of them having adverse economic or ecological impacts².

The legal and regulatory framework for biodiversity conservation at European level

Reversing biodiversity loss is a major challenge at global, regional and local levels. The European Union, among other bodies, has actively committed its member states to biodiversity conservation for a number of years. Specific legislation, strategies and plans have been set up to create a framework for policy action aimed at providing long-term protection and conservation of nature. They all emanate from legally binding conventions at global level. A selection of the most relevant official literature is provided in the box below (source documents are listed in the Appendix).

Along with international treaties, many policies including directives, regulations, strategies and action plans, have been adopted at European level. The two central legal instruments are the Directive on the protection of wild birds (known as the **Birds Directive**, 2009/147/EC, a codified version of Directive 79/409/EEC as amended) that was enacted in 1979, and the Directive on the conservation of natural habitats and wild fauna and flora in 1992 (the **Habitats Directive**, 92/43/EC). The Birds Directive was the first major EU law to address the issue of nature conservation at European level. The Habitats Directive provided a more inclusive framework for other endangered habitats and species of interest, and tackled the integration of nature protection requirements into other EU policies such as agriculture, regional development and transport. The main EC funding tool supporting the implementation of both Directives is the LIFE-Nature fund. As at today, over 1000 animals and plant species and over 200 habitat types that are important to Europe are protected under the Directives³.

Created under the Habitats Directive, Natura 2000 is the main tool of EU nature & biodiversity policy, and is the transposition of EC commitments under the UN Convention on Biological Diversity. It is a European ecological network of natural protection areas for the most valuable and endangered species and habitats. Applying to bird sites, habitat sites and marine areas, it includes Special Areas of Conservation (under the Habitat Directive) and Special Protection Areas (under the Bird Directive). While the network does not systematically ban human activities nor nationalize land, requirements consist of sustainable management. Provided that some conservation measures are fulfilled, the EU, through the LIFE-Nature fund, may assist member states with co-financing the network.

² See the European Invasive Alien Species Gateway from DAISIE (Delivering Alien Invasive Species Inventories for Europe), accessible at <http://www.europe-aliens.org>

³ http://ec.europa.eu/environment/nature/legislation/habitatsdirective/index_en.htm

Reference international conventions framing biodiversity protection in Europe

The United Nations' **Convention of Biological Diversity** (CBD) is a legal instrument dated 1993 that all EU members states have signed along with other European countries. Its objectives are i) the conservation of biodiversity, ii) the sustainable use of its components and iii) the fair and equitable sharing of the benefits arising from the use of genetic resources. Among a number of requirements, contracting Parties have to develop national strategies and integrate the conservation and sustainable use of biodiversity into relevant sector or cross-sector plans, programmes and policies. Held in Nagoya in 2010, the tenth Conference of the Parties (CoP10) of the CBD led to the adoption of the EU 2020 Biodiversity Strategy, a global Strategic Plan for biodiversity over the 2011-2020 period.

The **Convention on Wetlands of International Importance especially as Waterfowl Habitat** (the Ramsar Convention), which was adopted in 1971 and came into force in 1975, provides a framework for international cooperation for the conservation and wise use of wetlands. Parties are to designate suitable wetlands for inclusion in the List of Wetlands of International Importance, to formulate and implement their planning so as to promote the conservation of wetlands included in the List and the wise use of all wetlands in their territory. For a comprehensive approach to the national implementation of the Convention, many countries have developed National Wetland Policies. In its 1994 work programme for the implementation of the 5th Environmental Action Programme, the European Commission included the Communication on the Wise Use and Conservation of Wetlands (1995), providing the strategic basis for a wetland policy, spelling out the issues that negatively affect wetlands and providing an outline of the actions that need to be taken. It was later replaced by the Water Framework Directive.

The **Convention on International Trade in Endangered Species of Wild Fauna and Flora** (CITES), signed in 1973 and implemented in the EU 9 years later, aims to ensure that international trade in species of wild animals and plants does not threaten their survival. It affords varying degrees of protection to more than 30,000 species of animals and plants. CITES works by making international trade in specimens of selected species subject to certain controls. These controls require that the import, export, re-export and introduction from the sea of species covered by the Convention are authorized through a licensing system. The species covered by CITES are divided into three categories, according to the degree of protection they need.

Adopted in 1979 and taking effect in 1982, the **Bern Convention** is the first comprehensive legal instrument for pan-European nature conservation (it also extends to some States of Africa). A keystone treaty for biodiversity within the framework of the Council of Europe, it aims to conserve wild European flora and fauna and their natural habitats (especially endangered habitats and vulnerable species). The elaboration of the Birds Directive and of the Habitats Directives later on is a direct result of the implementation of this Convention.

Since 1979, the **Convention on the Conservation of Migratory Species of Wild Animals**, also known as the Bonn Convention, has aimed to conserve migratory species and their habitats by providing strict protection for endangered migratory species, by concluding multilateral Agreements for the conservation and management of migratory species that require or would benefit from international cooperation, and by undertaking cooperative research activities.

Sources: see Appendix to access the source documents

Several other European directives are indirectly concerned with biodiversity conservation. The Water Framework Directive (2000/60/EC⁴) and the Marine Strategy Framework Directive (2008/56/EC⁵) have established a framework for Community action against the fragmentation of European water policy. They require all inland and coastal waters to reach ‘good ecological status’ by 2015 and by 2020 for marine ecosystems. Other directives relate to pollution prevention, such as the Nitrates Directive (91/676/ EEC), the Groundwater Directive (2006/118/EC), and the Urban waste water (91/271/EEC) Directive.

Contrary to many other environmental media, soil receives no legal protection although it is a major reservoir of biodiversity. To bridge this gap, the Commission of the European Communities drafted a directive proposal in 2006 to establish a common strategy for the protection and sustainable use of soil (by integrating soil concerns into other policies), preserving soil function, preventing threats to soil and mitigation of their effects, as well as restoring degraded soils to a level of functionality at least consistent with their current and approved future use (CEC, 2006).

Alongside existing legislation, the EU has issued a series of successive strategies and plans that outline binding actions for the member states in the coming years (e.g. the 1995 Pan-European Biological and Landscape Diversity Strategy). The latest EU Biodiversity Action Plan, dated 2006 (**2006 Biodiversity Action Plan**⁶), draws from an EC communication dedicated to "Halting Biodiversity Loss by 2010 – and Beyond: Sustaining ecosystem services for human well-being". In May 2011, ascertaining the failure of the 2010 target, the EC adopted the new **EU Biodiversity Strategy to 2020**. Several targets have been set to address both the 2020 headline target (see box) and the global commitments agreed by the EU and its member states. They pursue three key orientations: protecting and restoring biodiversity and associated ecosystem services, enhancing the positive contribution of agriculture and forestry and reducing key pressures on EU biodiversity and stepping up the EU’s contribution to global biodiversity.

EU 2020 biodiversity strategy

The vision: By 2050, European Union biodiversity and the ecosystem services it provides — its natural capital — are protected, valued and appropriately restored for biodiversity's intrinsic value and for their essential contribution to human well-being and economic prosperity, and so that catastrophic changes caused by the loss of biodiversity are avoided.

2020 headline target: Halting the loss of biodiversity and the degradation of ecosystem services in the EU by 2020, and restoring them in so far as feasible, while stepping up the EU contribution to averting global biodiversity loss.

Source: EC, 2011.

⁴ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2000:327:0001:0072:EN:PDF>

⁵ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32008L0056:EN:PDF>

⁶ http://ec.europa.eu/environment/nature/info/pubs/docs/brochures/bio_brochure_en.pdf

The Reverse project

Whereas biodiversity conservation certainly requires a legal framework and policy action, it cannot be effective without relying on sustainable economic activity. In other words, biodiversity conservation and economic development must go hand in hand. Experience shows that this is possible and replicable. Building on successful initiatives from a number of European regions, this is the ambition of Reverse, a European project to protect biodiversity. Across three areas closely linked to biodiversity - agriculture/food production, land planning and tourism - the project identifies local actions that should be easy to transpose and offers policy recommendations to improve biodiversity conservation.

Reverse in figures

Type of project: European interregional cooperation project – INTERREG IVC Programme

Number of partners: 14 partners involved in the development of biodiversity

Number of countries: 7 European countries (Estonia, France, Germany, Greece, Italy, Slovakia and Spain)

Biodiversity-linked economic areas: 3 (agriculture/food production, tourism and land planning)

Duration: 3 years (January 2010 to December 2012)

The present charter is one of the key outputs of the Reverse project. It forms, with two other identically structured charters, a set of sector policy recommendations aimed at policy-makers at European level, to improve the effectiveness of regional policies in conserving biodiversity while promoting economic development. The three charters focus on agriculture, tourism and land planning respectively.

A word from...

Katarzyna Biala & Karina Makarewicz AEE = impact of agriculture on biodiversity (to be soon received)

Participatory Plant Breeding: Linking Biodiversity, Hunger and Climate Changes

Global food security is threatened by the continuous decline of agrobiodiversity, by the unpredictability of the climate which is expected to increase and by the fact that increasing the accessibility and the availability of food, is more urgent than increasing the food production

per se. Although the three issues, biodiversity, climate changes and hunger are closely related they are almost always discussed separately.

Biodiversity, as a key element of food safety, is directly related to the right to food, one of the fundamental human rights. Crop genetic diversity has been shown to reduce risk exposure to abiotic and biotic stresses both expected to increase as a consequence of climate changes, which will have profound and direct impacts on agricultural and food systems.

An obvious contradiction is that on one side we have been very active and reasonably successful in collecting, characterizing and conserving biodiversity while on the other side modern, industrialized agriculture has moved more and more towards monoculture and uniformity. In other words, most of the interest and concern about biodiversity did not have a substantial effect on crop and animal biodiversity.

We believe that it is possible to develop an alternative model of agricultural research which a) increases both agricultural production and availability and accessibility of food, b) increases crop biodiversity, and c) contributes to adaptation to climate changes: this requires changing one of the fundamental paradigms of modern agricultural development by which the uniformity generated by modern plant breeding programs matches the uniformity of the agricultural environments made similar by using inputs such as fertilizers, pesticides and water thus making our food systems extremely vulnerable.

As modern plant breeding, contrary to the farmers' breeding practiced for millennia, is considered to be one of the main causes of the reduction of animal and crop biodiversity, one of the keys to sustain a type of agriculture in harmony with the environment and to create sustainable food systems is to utilize the available biodiversity in participatory breeding programs which emphasize specific adaptation to a multitude of physical and social environments. Participatory plant breeding is a form of plant breeding that can increase both food and feed production and crop biodiversity at farm level, puts farmers at the center of the entire process of developing new cultivars including seed production and combines modern science with local knowledge.

As more and more of the breeding programs are becoming private, a further development of participatory plant breeding is evolutionary plant breeding which can be largely handled by the farmers themselves. Evolutionary plant breeding consists in deploying in farmers' fields largely variable heterogeneous populations which, by continuously evolving over time, represent a permanent source of novel diversity adapted to the conditions where the populations evolve as well as to climate changes. This is a dynamic, inexpensive and extremely powerful strategy to specifically adapt crops to climate changes, and in general to all possible agronomic environments.

Eventually, participatory and evolutionary plant breeding promotes the use of landraces and wild relatives as these genetic resources may well possess useful genes for adaptation to low input agricultural systems and to climatic changes.

Salvatore Ceccarelli
ICARDA Consultant
Montpellier
France

I. Introduction on Agriculture & Biodiversity

A. Impact of agriculture on biodiversity

With farmers managing almost half of the EU's land area, the agricultural sector is a major source of pressure on Europe's environment. Over the past five decades, the European Union's Common Agricultural Policy (CAP) — which accounts for around half of the EU's budget — has encouraged the sector to become more and more intensive, as has the growing globalization of the world's economy. As a result, the agricultural sector is responsible for a significant proportion of the pollution of surface waters and seas by nutrients, for the loss of biodiversity, and for pesticide residues in groundwater. Reforms of the CAP in the 1990s, and measures taken by the sector itself, have brought about some improvements, but more is needed to balance agricultural production, rural development, and the environment⁷. A comprehensive strategy for agriculture must take all of these different levels into account through suitable instruments, covering the three main fields of biodiversity:

- * the genetic variety of domesticated plants and animals (gene pool, natural heritage, landscapes, etc.), which appears after years (or rather, centuries) of equilibrium between human activities and natural ecosystems,
- * "wild" biodiversity (wild flora and fauna related to farmland); the special attention that is usually afforded to endangered species and ecosystems should not cause us to underestimate this aspect;
- * the life-support systems (including soil microbiota, pollinators, predators, all organisms that support the fertility and productivity of agro-ecosystems).

1. *The benefits of biodiversity for agriculture*⁸

The conservation of biological diversity is a decisive factor in agricultural activities: at the heart of the various biological processes utilized by agriculture, biodiversity allows farmers to produce food and non-food products, as well as services. The constant adaptation of genepools resulting from natural processes and agricultural practices have led to increased yields and better adaptation to varying environments. The use of biodiversity in agriculture thus allows the creation of new varieties and breeds thereby enabling economic, health, technical and ecological objectives to be reached. The sustainable utilization of biological diversity in agriculture contributes to changes in certain practices, by reducing the use of insecticides through the action of beneficial insects, reducing ploughing to increase the soil's biological activity, and preserving yields by increasing pollination.

2. *The benefits of agriculture for biodiversity*⁹

Conversely, the evolution of agricultural activity in certain cases enriches biodiversity. Sustainable agricultural practices contribute to managing rural areas, preserving soil from

⁷ European Environment Agency (EEA), <http://www.eea.europa.eu/themes/agriculture>, as in 30/6/2011

⁸ *Biodiversity action plan for agriculture of 2001*, Communication from the Commission to the Council and the European Parliament - (COM2001/0162-3rd volume)

⁹ *Ibid.*

erosion and consequently from biodiversity impoverishment. They create and maintain special ecosystems and habitats, such as the mosaic of cultivated fields and field boundaries demarcated by hedges and ditches, which provide refuge and sources of food for certain flora, fauna and micro-fauna. Agriculture has formed a semi-natural environment where endemic and endangered species have often survived. Non-intensive agriculture thus maintains both wild and domesticated plant and animal species, varieties or breeds, as well as ecosystems, which are at times under threat of extinction. Thanks to selection and research, domesticated plant and animal species also develop their intraspecific variability (e.g. selection of plants adapted to dry environments).

By managing a large part of the Community's territory, in some cases agriculture preserves many specific ecosystems that would disappear if farming activities were abandoned. Clearance of undergrowth and scrub by sheep in areas that are difficult to access, prevention of erosion caused by the action of water and wind through the growth of plant cover, maintenance of flora diversity in semi-natural grassland thanks to pasturage, preservation of biodiversity in Alpine uplands, and conservation of wetlands, etc. are all examples of agriculture's benefits to biodiversity.

B. Conservation of cultivated biodiversity

Biological diversity in agriculture is a subset of natural biological diversity. It is composed of different levels of diversity: the diversity of systems, species, populations within species and individuals within the population, together with the variety of the macro and micro-organisms living in the environment. The balance between the individual components of the agro ecosystem, and thus its overall health, is closely dependent on its level of diversity, because this determines its resilience, i.e. its capacity to return to its former state after undergoing stress of any kind.

The first reduction of diversity in agricultural species took place with the domestication of plants and animals by early farmers. By selecting the types most suitable for cultivation and breeding, a significant proportion of diversity in wild forms was naturally lost. After this selection, new diversity in species has, however, been created by the accumulation of spontaneous mutations or crossings of related species or between different populations of the same species. Man has often driven this evolutionary process, selecting the forms that are best suited to their needs and preferences. In the beginning, the farmer was a breeder, capable of inducing new diversity and of selecting types according to specific goals. Plants and animals, accompanying man in his migrations, have therefore evolved into a variety of types and have been shaped by their new environments and by farmers themselves.

These multiple forms (landraces or farmers' varieties and breeds), each adapted to a different environment and a different culture, were the basis of food supply and the economy in farming communities around the world. Due to their adaptability to the environment in which they had evolved, they overcame or tolerated the adverse climate of that specific environment. Due to their large genetic base, they came through or tolerated the sudden adversity without succumbing to it, thus ensuring an important stability of food production in rural communities. According to Harlan (1975), the landraces are "*equilibrated populations, in balance with the environment and the pathogens, genetically dynamic but also subject to selection by farmers*". A more recent definition reports that: "*A landrace (...) is a variable population, which is identifiable and usually has a local name. It lacks 'formal' crop improvement, is characterized by a specific adaptation to the environmental conditions of the area of cultivation (tolerant to the biotic and abiotic stresses of that area) and is closely associated with the uses, knowledge, habits, dialects,*

and celebrations of the people who developed and continue to grow it” (Del Greco et al., 2007). Landraces/farmers’ varieties and breeds are a significant part of the genetic resources for food and agriculture, containing a large variety of genes useful for the evolutionary adaptation of species and for human needs. A pioneer of modern studies on agrobiodiversity, Nikolaj I. Vavilov⁴ was the first, in the early decades of 20th century, to point out that a wealth of variety in crop species still remained to be revealed to science. His original phyto-geographical method of research led to his main discovery: the areas with the greatest biodiversity are those where the species originated. He called those areas species’ “centres of origin”. Rural communities around the world, especially in those areas, often in developing countries, profited from this diversity until the start of the *Green Revolution*.

The major period of change in agriculture called the Green Revolution, which began about 50 years ago, was characterized on the one hand, by the creation of new production tools (machinery, fertilizers, pesticides) needed to achieve the goals of maximum productivity, and, on the other hand, by the creation of selected varieties and breeds characterized by a narrow genetic base, allowing them to exploit the productive potential of the production tools developed. This led to new, uniform and productive varieties, suited to high-input agriculture.

The evident success of the Green Revolution, in terms of global food production, population growth and the economic development of some areas, came at a high cost with the dramatic impoverishment of agroecosystems and their related rural communities. The old varieties and breeds that were the basis of agriculture before the Green Revolution - less uniform but more adaptable, more rich in diversity and therefore more reliable in hostile environments, producing smaller but more consistent yields - were quickly replaced by a few varieties and breeds selected in environments that were often very different from those to which they were then introduced. Species and varieties traditionally grown locally and suited to a specific territory gradually disappeared. To meet the needs of mechanization, hedges and crop rotation also disappeared.

The extreme simplification of the systems broke the balance and the link between environment and agricultural process: the system became vulnerable.

This vulnerability was evidenced in recent decades by the devastation of entire harvests, both in developing and developed countries, due to the wide spreading of pathogen races to which the commercially available cultivars, homogeneous and closely related to one another, are very sensitive. Increasing biodiversity in crops, or recovering the lost biodiversity, can be a powerful tool for guaranteeing food production against various kinds of threats, including those related to climate change (Ceccarelli, 2009).

At this time, when industrial agriculture showed its vulnerability and its effects on territory and on the social fabric, people realized that much of the diversity created by centuries of evolution and adaptation was disappearing, often together with the related communities. The term "genetic erosion" is used to indicate the process of the disappearance of systems, species, varieties, and breeds caused by drastic changes to the environment or in human activity. In the case of

⁴ Nikolai Ivanovich Vavilov (1887 –1943) was the botanist, geneticist, biologist, geographer, explorer, agronomist and plant breeder who developed the fundamental theory on the centres of origin of cultivated plants. During his activity, he organized a series of botanical-agronomic expeditions, collecting seeds from every part of the globe, and created in Leningrad the world's largest collection of plant seeds at that time. Vavilov identified first five centres of origin of the species, become eight in his last papers: China, India, Central Asia, Near East, Mediterranean Coasts, Ethiopia, Central and South America, especially in mountain areas or highlands. His theory and observations were fundamental for the birth of modern studies on crop biodiversity.

agriculture, the term gives an idea of the meaning of loss of the biological resources, but not that of the loss of culture that accompanies it.

According to FAO statistics, today there are about 7,000 species of plants used by man as food, but only 150 are cultivated. About 75% of food consumed by humans comes from only 12 plant species and five animal species and about 50% of the same food is provided by only 4 plant species (rice, corn, wheat and potato) and three major species of animals (belonging to cattle, pigs and poultry). Even species traditionally grown in the past and particularly important for nutrition in poor countries, as well as in marginal areas of developed countries, are now underutilized or ignored.

The remaining diversity in agriculture, partially preserved in germplasm banks located throughout the world, is still present in cultivation in marginal areas where industrial agriculture is not developed, because of soil, climatic or cultural reasons. Elderly people often maintain old varieties and breeds in their home gardens, because of an attachment to their specific tastes or methods of cultivation, which are different from that of commercial varieties. Especially in Europe, the conservation of local varieties and breeds is related to the deep connection between them and their territory of origin, where tradition has an important role. Nevertheless, because of the old age of their owners and the changing social conditions, those landraces and local breeds are now threatened by extinction.

In those areas where selected varieties have completely replaced landraces and local breeds, there is a strong demand for biodiversity, especially by those who practice organic and low input farming. The characteristics of plasticity, adaptability, and stability of production of landraces are, in fact, particularly useful for a kind of agriculture that reduces the use of chemicals and energy. Vandana Shiva¹⁰ points out that "*the conservation of biodiversity is impossible until it becomes itself a part of the production process*". However, there are two obstacles for those who want to bring biodiversity into the production process: one is related to the availability of varieties and breeds that are suited to low-input agriculture and to local market conditions, and the other one relates to the difficulty accessing propagation material.

One of the possible solutions to these constraints is a radical change of approach in the breeding process, establishing real cooperation between those who create and those who use the genetic material, in order to really meet the needs of a type of agriculture that does not impoverish natural resources and does not pollute the environment. This “participatory” approach is currently applied in specific breeding programmes in several, mostly developing, countries, and is considered an important tool for rural communities for increasing productivity and food safety through the increase of agrobiodiversity in the production process (Ceccarelli and Grando, 2009).

Testing this type of methodology in a European context marks a major change in perspective with respect to the principles of industrial agriculture: diversity against simplification, decentralization against centralization, established varieties suited to the environment instead of adapting the environment to the variety. The farmer is then no longer just a person who "uses" or "preserves", but is also someone who "manages" and "creates" new diversity.

¹⁰ Vandana Shiva is an Indian physician, philosopher, economist and environmental activist who has written more than 20 books and over 500 papers in leading scientific and technical journals about intellectual property rights, biodiversity, biotechnology, bioethics, genetic engineering and eco-feminism. For her fight to change the practice and paradigms of agriculture and food in order to protect local communities, in 1993 she was awarded with the Right Livelihood Award. In 2003, Time Magazine identified Dr Shiva as “an environmental hero”. She currently collaborates with the governments of India and several other countries, as well as Non-Governmental Organisations.

The emphasis on agriculture, starting with the Convention on Biological Diversity (CBD, 1992) stimulated governments and scientific institutions to develop strategies to arrest the loss of biodiversity in agriculture. The objective of the Convention is not only to promote the conservation of biological resources, but also the sustainable use and equitable sharing of the benefits derived from them. The CBD talks about conservation of genetic resources *ex situ* (outside their own environment i.e. seed banks, collections, botanical gardens, bioparks, etc.) and *in situ* (in their own environment of origin, so that they can continue to evolve).

The International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA, 2001), adopted by the FAO Conference, is further deepening the relationship between diversity, agriculture and local communities, putting emphasis on the sustainable use of genetic resources, creating a multilateral mechanism for facilitating access to resources and proposing a system of benefit sharing (also by appropriate funding) that recognizes farmers' role in managing biodiversity. The need to promote and sustain the *in situ*/on-farm conservation of genetic resources is further emphasized.

There are different approaches to biodiversity of agricultural interest in the various European Countries. The type of approach depends on several factors, among them the different characteristics of the agricultural systems and the different national agricultural and environmental policies.

II. European context for Agriculture & Biodiversity

A. Biodiversity issues in the European Agricultural Policy

Europe's biodiversity is inextricably linked to agricultural practices creating valuable agro-ecosystems across the whole of Europe. A large number of highly valued wildlife species and semi-natural habitat types in Europe are dependent on continuing low-intensity agricultural practices and are under considerable pressure as a result of intensification, abandonment of farmland, loss of natural and semi-natural habitats, and climate change.

The environmental sustainability of agriculture has become a major concern, with the Rio Earth Summit (1992) being a notable turning point. Following the Convention on Biological Diversity (1992), the European Commission released a communication on a Community Biodiversity Strategy (1998) and Specific Action Plans have emerged, including actions related to Agriculture [see COM (2001) 162 final]. Furthermore, the European Community's Sixth Environment Action Programme, covering the period from 2002 to 2012 (Decision 2002/1600/EC), and the 2006 EU Biodiversity Action Plan 'Halting the loss of biodiversity by 2010' (COM/2006/216 and annexes), have addressed the challenge of integrating biodiversity concerns into various policy sectors, including the CAP, in a unified way.

The European Union Common Agricultural Policy (CAP) has an important influence on agricultural land use in the EU. As agriculture in Europe strongly influences the management of natural resources and biodiversity, the CAP assumes an important role in managing the environment in the EU's rural areas (*European Environment Agency (EEA) 2009: Distribution and targeting of the CAP budget from a biodiversity perspective (CAP-Tech 12-2009.pdf)*). The various CAP reforms that have taken place since 1992 have resulted in it being significantly reorganized. At present, the CAP is divided into two main pillars: Pillar 1, consisting of direct payments to farmers and market interventions such as subsidies, and Pillar 2, a rural development policy. Among other changes, there is a clear focus on dealing with environmental issues and both pillars can contribute directly and indirectly to biodiversity conservation: Pillar 1 by decoupling direct payments from quantities of agricultural production and by applying cross-compliance rules that focus primarily on preventing environmental damage by farm operations; and Pillar 2, by specific instruments such as the agro-environment measures, **but also payments related to Natura 2000 areas, the Water Framework Directive, Natural Handicap Areas, forests and environmental investments.**

Cross-compliance rules were made compulsory to all farmers receiving direct payments (both under Pillar 1 and Pillar 2). The cross-compliance system respects statutory management requirements and good agricultural and environmental condition standards, many of which are related to biodiversity. However, its implementation at Member State level has proved problematic. Both the control and the sanction systems are weak and ineffective and cannot guarantee minimum environmental standards (Birdlife International, 2011). Moreover, cross-compliance rules can only make a small contribution to biodiversity conservation because they do not have a clear focus and cannot really ensure active management of ecosystems that are rich in biodiversity. Finally, implementation of the statutory management requirements, including the biodiversity related Birds and Habitats Directives, can be extremely difficult at farm level due to the absence of prescriptions and guidance (European Court of Auditors, 2008).

The benefits of current support under Pillar 2 are also questionable. Although the Agro-environment Schemes are very promising for biodiversity, only a tiny proportion of the entire CAP budget is dedicated to these schemes and they often involve practices with no clear environmental benefit. **On the other hand, rural development support under 'Pillar 2' varies considerably between Member States with regard to the payments per hectare of farmland under agri-environment and natural handicap areas measures, suggesting a great divergence of policy implementation among Member States with regard to the use of measures that may support biodiversity conservation (European Environment Agency (EEA) 2009: *Distribution and targeting of the CAP budget from a biodiversity perspective (CAP-Tech 12-2009.pdf)*.** Other rural development measures are often used to support environmentally destructive practices. For example, Less Favoured Area (LFA) payments aim to address the problem of land abandonment, preserve farmland landscapes, and support the rural community. However, they go to all farmers in designated areas, regardless of whether they practice environmentally friendly farming (Birdlife International, 2011a). At the same time, they do not differentiate between non-HNV (High Nature Value) farming systems and HNV farming that delivers public benefits (EEA, 2010).

High Nature Value Farmlands are defined as “those areas in Europe where agriculture is a major (usually the dominant) land use and where that agriculture supports, or is associated with, either a high species and habitat diversity or the presence of species of European conservation concern, or both” (Andersen 2003). Thus, HNV farmlands are qualified as areas where farming practices are associated with high biodiversity value and they often include Less Favoured Areas (LFAs), which are defined as agricultural areas that are geographically and economically marginalized due to natural disadvantages. Furthermore, it is widely acknowledged that agricultural practices affect many other habitat types beyond agricultural land in the narrow sense. These habitat types include types of heath, wetlands, forest and even sand dunes (EEA, 2010). However, there is variance across Europe in the types of habitat affected and their specific links to agricultural management practices.

Despite the different reforms, the CAP has not changed sufficiently to reduce biodiversity loss (Cooper et al., 2009). In several EU countries, direct support is provided on a historical basis, which, in practice, favours more productive land, usually farmed intensively. Millions of subsistence and semi-subsistence farmers, many of them from new member states, who are practising traditional farming practices that maintain Europe’s natural and cultural heritage, do not receive the necessary support and often do not receive any subsidies at all (Birdlife International, 2011a). Positive environmental side effects in relation to biodiversity resulted from the obligatory set-aside of arable land and the incentive measures for long-term set-aside, which were introduced during the McSharry reform (1992) in order to limit overproduction. However, decoupling caused arable set-aside to be abolished, as noted in the ‘Health Check of the CAP’ (2008). Furthermore, a study by Birdlife International (2011b) in three key European countries (Spain, Germany and the Czech Republic) has shown that the level of subsidies was not found to reflect conservation values or level of public goods delivery.

Reports on the conservation status of species and habitat types, targeted by the Habitats Directive, show consistent negative trends. Habitat types linked to agro-ecosystems generally have a relatively poor conservation status, with only 7% of assessments being favourable, compared to 17% for habitat types not related to agro-ecosystems [COM/2009/358 final]. This has generally resulted from the intensification of more productive land or the abandonment or forestation of less productive land, leading to the gradual disappearance of low-intensity high nature value farming systems (Cooper et al., 2009).

Given the limited success of the EU in halting the loss of biodiversity by meeting the 2010 Targets as set in the Sixth Community Environment Action Programme, major efforts will be needed to reach the new Targets of the Biodiversity Strategy to 2020 (COM/2011/244). The critical role of the CAP in helping meet the EU's biodiversity targets is broadly highlighted in this new Strategy and particularly in Target 3.A, which is directly relevant to Agriculture and also indirectly linked with Targets 1 and 2. Target 3.A is set as follows: “By 2020, maximize areas under agriculture across grasslands, arable land and permanent crops that are covered by biodiversity-related measures under the CAP so as to ensure the conservation of biodiversity and to bring about a measurable improvement in the conservation status of species and habitats that depend on or are affected by agriculture and in the provision of ecosystem services as compared to the EU2010 Baseline, thus contributing to enhance sustainable management.” The above-mentioned ‘measurable improvement’ is to be measured against the quantified enhancement targets for the conservation status of species and habitats of EU interest in Target 1 and the restoration of degraded ecosystems under Target 2.

The **recently announced** reform of the CAP should be an opportunity to enhance synergies and maximize coherence between Agriculture and Biodiversity protection objectives as foreseen in the general framework of the European policy for sustainable development.

One of the objectives of the CAP 2014-2020 is the “*sustainable management of natural resources and climate action, with a focus on greenhouse gas emissions, biodiversity, soil and water*” [COM(2011) 625 final/2]. The need of a “greening” of the first Pillar is underlined, because market prices do not reward farmers adopting practices that are particularly favourable to environmental and climate objectives as providers of such public goods.

In addition, Rural development have to allow to significantly contribute towards the completion of the implementation of both the Natura 2000 and Water Framework Directives and to the achievement of the EU's 2020 biodiversity strategy.

The three scenario proposed pay different attention in achieving the objectives of the EU 2020 Biodiversity Strategy. The most accredited scenario at the moment (the integration scenario) provides different tools to support actions related to biodiversity protection: a greening component of direct payments through measures that go beyond cross-compliance, an enhanced cross-compliance to better address climate change, the implementation of the Water Framework Directive and a stronger rural development policy with reinforced strategic targeting. This scenario is considered the most suited to contribute in achieving the 2020 biodiversity targets. Nonetheless, the integration scenario, while contributing to an increase of connective elements in the Green Infrastructure¹⁰ (GI), may cause a loss of nodes and further fragmentation with respect to the *Status Quo* scenario (Lavallo et al. 2011). This is caused by an estimated overall increase of arable lands, a slight overall decrease in permanent crops and a decrease in semi-natural vegetation, more pronounced in the integrations than in the Status Quo scenario. The integration scenario, instead, is considered to preserve better than the Status Quo scenario the pastures and buffer zones along the rivers (Lavallo et al., cit.).

¹⁰ The concept of Green Infrastructure (GI) has been introduced to describe the need to enhance, preserve and restore biodiversity through the improvement of landscape connectivity. The objective of the GI is to mitigate the fragmentation and erosion of the natural/semi-natural ecosystems due to the intensification of land management and the expansion of what is now often termed grey infrastructure. If interpreted as a network of inter-connected habitats, the GI includes also agricultural areas conducive to hosting fauna. Lavallo et al. (2011), a study carried out by the European Commission and JRC (Joint Research Centre Institute for Environment and Sustainability) identifies the agricultural land use classes considered as part of the GI (forest, semi-natural vegetation, permanent crops, pastures, abandoned arable, abandoned permanent crops, abandoned pastures) and those considered not part of the GI (cereals, maize, root crops and other arable).

European context on cultivated biodiversity (animal and plant genetic resources which are or could be of use in agriculture)

The conservation and sustainable use of agro-biodiversity is becoming a great challenge for European countries. It is recently seen as an ecosystem service that helps to cope with climate change conditions as the "long-term sustainability of many services depends on the maintenance of genetic variability." (MEA, 2005, 80).

Nevertheless, there is no overall policy on genetic resources for agriculture in Europe. The issue is dealt with by eight commission departments in different types of regulations and programmes pursuing often conflicting objectives with conflicting measures. The main legislative framework on genetic resources is given by Zootechnics and Seeds EU Legislation driven by DG SANCO, and the Rural Development Policy of the CAP and the council regulation EC 870/2004 driven by DG AGRI.

1. European policies and context for agro-biodiversity

The issue of agr-biodiversity in European strategies and programmes is supported by interesting and important principles but its development is confronted with legal or budgetary barriers.

The Biodiversity Action Plan for agriculture (COM/2001/0162final) has a specific chapter dedicated to genetic resources, stressing their importance for animal and plants, and the need to explore *in situ* conservation after having worked on *ex situ* conservation. In the specific chapter on seed legislation, it is noted that "The conservation and improvement of in situ/on-farm plant genetic resources also depends on the effective possibility of sustainable uses and hence on legislation which makes it possible to market diversified genetic materials". Actually, it appears that seed laws have had an unintended negative impact on cultivated agrobiodiversity "reducing the numbers of cultivars grown and impinging on the ability of farmers to grow older varieties or landraces not present in the catalogue" (Negri et al., 2009).

The EU programme (2006-2011) on the conservation, characterization, collection and utilisation of genetic resources in agriculture (Council Regulation (EC) 870/2004) was implemented then to promote genetic diversity and information exchange between member states and the European Commission for the *in situ* and *ex situ* conservation and sustainable use of genetic resources in agriculture. Seventeen actions have been undertaken within the framework of the programme. Twelve of these actions are related to plants and five to animals, but the resources allocated to meet the challenges are insufficient (budget: €10 M for 178 implementing organizations, for five years).

In the CAP's Rural Development Policy (Council Regulation (EC) 1698/2005), complementary opportunities are given to support "genetic resource conservation". The first one with the Agri-environment payments to rear local endangered breeds of farm animals and to preserve threatened plant genetic resources (Articles 39(1) to 39(4)). The system of direct payment (by surface engaged) rarely offers appropriate support to endangered breeds or varieties. The second, with new opportunities offered at national and regional level for specific support for the conservation of genetic resources in agriculture (Article 39(5)). This last article **seems to have been** applied by only seven member states.

An other EU financial instrument is the 7th Framework Program for research activities, there is no specific “genetic resources and biodiversity program”, however various entry points exist among which theme 2, Food agriculture and fisheries, and biotechnology. Different research programs are or have been focused on genetic resources and agrobiodiversity (Farm Seed opportunities, Solibam, Diverseeds, Biobio, PGR Secure are examples). The challenge is to transfer the results and to involve agriculture stakeholders in these programs.

In parallel, in 2008 the Council of Europe and the Planta Europa network submitted a European Strategy for Plant Conservation to the Scientific Body of the CBD (SBSTTA) essentially dedicated to wild species and crop wild relatives. One of the targets of the 2008-2014 phase was to “Prepare a European inventory of traditional, local crop landrace varieties” (Negri & al, 2009), which, as far as we are aware, has been partially achieved at this point in time.

Finally, the last Biodiversity Strategy to 2020 (COM/2011/244) takes into account agrobiodiversity in its 3rd target; action 10 specifically points out the necessity to conserve Europe’s agricultural genetic diversity: “The Commission and member states will encourage the uptake of agri-environmental measures to support genetic diversity in agriculture and explore the scope for developing a strategy for the conservation of genetic diversity.”

2. European context on farm animal genetic resource conservation

The management of local breed conservation was defined in the “Global Plan of Action for Animal Genetic Resources” in the first International Technical Conference on Animal Genetic Resources for Food and Agriculture organized by FAO (3-7 September 2007, Interlaken, Switzerland) and it was signed by 109 States, the EC and 42 Organizations. The Global Plan of Action contains strategic priorities for the sustainable use, development and conservation of animal genetic resources, as well as provisions for financing its implementation and follow-up (see report “Funding Strategy for the implementation of the GPA” FAO, 2010). European institutions have developed the European Farm Animal Biodiversity Information System (EFABIS) as a contribution and gateway to transfer data from national inventories to the global information system DAD-IS at the FAO.

Recently, “A global view of livestock biodiversity and conservation”¹⁰, a project funded by the EC, reviewed the main drivers of biodiversity loss and the main strategies for the characterization, evaluation, prioritization and conservation of livestock genetic resources. More data are stored in databases of projects like: EuReCa (“Toward self-sustainable European Regional cattle breeds”), HERITAGESHEEP, EU GENRES (“European Genetic Resources”) and ELBARN¹¹.

In the reports of these projects a redundant problem is highlighted: In addition to the agricultural and rural policies, EU has designed new legislation for veterinary and food safety, mainly to cope with newly-discovered health hazards, like BSE and dioxin contamination. Therefore, there is now a considerable amount of food safety legislation, on animals and animal products within the EU¹². On the other hand, maintenance of local breeds and development of local food products may be hindered by this kind of legislation, because big investments are needed by a

¹⁰ www.globaldiv.eu

¹¹ www.elbarn.net

¹² http://europa.eu/legislation_summaries/food_safety/index_en.htm

farmer to comply with the regulations. For the small-scale farmer with a few local cow breeds, the investments are particularly high for committing to a specific on-farm product (e.g. cheese).

Moreover, the EU zootechnical legislation regulates free trade in breeding animals and their genetic material (http://ec.europa.eu/food/animal/zootechnics/legislation_en.htm). It also lays down rules for entering animals into herdbooks, recording performance data, and estimating breeding values and acceptance for breeding purposes (Hiemstra and al, 2010).

3. Toward an appropriate legislation and policy framework for cultivated biodiversity?

The challenge for the EU and EU member states is now to have a specific policy framework for local breeds and varieties that really offer the possibility of increasing the use of biodiversity in agriculture.

For seeds and plants, encouraging policy signals came from the EU seed regulation system, but the framework for conservation varieties is still not well suited. The current revision of the EU's regulatory framework for plants and seeds could be an opportunity to give an appropriate status to agro-biodiversity, its marketing and its property rights.

a) *Contents, limitations and inadequacy of conservation variety regulations (adapted from AC Moÿ, 2010)*

The specific context of conservation varieties (Dir 95/98) was clarified by three new EU directives, in 2008, 2009 and 2010¹³. This new space reserved for conservation varieties reflects a recognition of the specificity of certain varieties, including their heterogeneity and instability. The changes proposed must be considered a step in this overall process, targeting a particular type of variety and answering some of the new objectives to be included: agro-biodiversity conservation and environmental protection (i.e. organic and low input agriculture).

Homogeneity and stability limitations. The 2008 directive was supposed to respond to the difficulty including local varieties by providing less stringent registration criteria but these registration rules allow little tolerance with respect to homogeneity (10% of off-types) and are strict on stability. It did, however, set the goal of allowing the marketing of seeds of "primitive races" defined as "a set of populations or clones of a plant species naturally suited to environmental conditions in their area."

A diverse population is so, by definition, for all of its components and not only for 10% of off-types. The proportions of each component can vary from year to year. The proportions of each component can vary from year to year. No population, let alone group of populations, can

¹³ EU Directive 2008/62/EC allows for certain exceptions for acceptance of agricultural landraces and varieties that are naturally suited to the local and regional conditions and threatened by genetic erosion and for the marketing of seed and seed potatoes of those landraces and varieties. It provides for certain exceptions for the marketing of seeds of landraces and varieties that are naturally suited to the local and regional conditions and threatened by genetic erosion.

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:72008L0062:EN:NOT>

EU Directive 2009/145/EC allows for certain exceptions for acceptance and the marketing of vegetable landraces and varieties that have been traditionally grown in particular locations and regions and are threatened by genetic erosion and of vegetable varieties with no intrinsic value for commercial crop production but developed for growing under particular conditions.

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32009L0145:en:NOT>

2010/60/EU allows for certain exceptions for marketing of fodder plant seed mixtures intended for use in the preservation of the natural environment.

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32010L0060:EN:NOT>

become "homogeneous" and "stable" on demand.. This internal contradiction of the EU directive must necessarily bring it to evolve to allow consideration of more flexible criteria for homogeneity and stability.

The obligation to provide proof that a particular variety was traditionally cultivated in the region could also greatly restrict the opportunities offered by this directive, as it prevents varieties from recent local selections/adaptations from being taken into account.

The geographical limitation on the sale of seeds in the same region of origin can be justified, in some cases, to strengthen the protection of local designations, but cannot be justified in most other cases.

Finally, for species with limited distribution, the *quantitative restrictions* proposed can also be a major obstacle to the effective conservation of biodiversity for economic reasons, as a minimum production volume must be exceeded for efficiencies of scale to be achieved.

With the regulation on vegetable varieties, created to respond to particular growing conditions (2009/145/EC), the European Commission has removed some of these barriers: the variety may have evolved or been selected recently, and its seeds can be marketed outside the region of origin. The directive does not limit varieties of "use for home gardeners," and it allows the sale of seeds for professional use. It also removes restrictions on quantity, but reintroduces them with an indirect limitation through the packaging, "the relatively high price of seeds sold in small packages leading to quantitative restrictions."

The 2010 Directive is limited to fodder plant seed mixtures.

These legal frameworks currently limit the potential of participatory research into seed selection and on-farm conservation, management, and marketing by restricting farmers' access to diverse seeds. This concern is also apparent in the final report of the evaluation of European seed legislation prepared by the Food Chain Evaluation Consortium (FCEC). FCEC's concern is that the new Directive may well be restrictive if implemented incorrectly and FCEC is not certain that member states will understand how to implement it with the flexibility, freedom and adaptability that the Commission intended (FCEC, 2008).

b) Genetic resources of fruit plant species, toward a further loss of biodiversity?

Council Directive 2008/90/EC "on the marketing of fruit plant propagating material and fruit plants intended for fruit production" defines a legal framework for the fruit plant species that is more stringent than it was before. Indeed, the directive requires a specific reference for the marketing of propagation material of fruit plant species (including plants for fruit production) for the variety to which it belongs, which is either legally protected, officially registered or commonly known (i.e. registered in another member state or already marketed before 30/9/2012, provided that it has an officially recognized description). The suppliers also have to be officially registered and subjected to controls on the safety certification of propagation material marketed.

Nevertheless, the exceptions allowed for local circulation and for suppliers marketing only to non-professional end consumers are not binding, and in fact, some member states have not implemented them yet. Consequently, some EU associations involved in organic farming and in biodiversity conservation consider that, despite the declared intention to help preserve genetic diversity, this directive may increase bureaucracy in the spreading of genetic resources, thus contributing to a further loss of biodiversity. The chance for the local communities involved in the conservation of genetic resources to have easier access to propagation material would be in accordance with one of the main statements of CBD and ITPGRFA, namely the equitable

distribution to the local communities of the benefits arising from the use of the genetic resources: unfortunately, it is not compulsory for member states to implement these dispensations.

4. The current revision of the EU's regulatory framework for plants and seeds: strong divergent interests between stakeholders.

The market for seeds and propagation material (production and sale) is strictly regulated by a long series of 12 Directives, many of which date back to the sixties and seventies. In 2008, the DG SANCO started the process of reviewing the legislation regarding “Seed and Propagation Material”, with the aim of defining new objectives and needs that the seed legislation should address in the future¹⁴.

In this context, its services have elaborated a document named "Options and analysis of possible scenarios for the review of the European Union legislation on the marketing of seed and plant propagating material". In these scenarios, conservation varieties are considered to be “niche markets”. The debate is hot at the moment and the first set of legislative proposals is expected for mid-2012.

As well as this legislation review, the EU legislation on plant variety rights is under external evaluation as well. This evaluation was finalized in June 2011. During the evaluation, “Representatives from six member states indicated that there may be some tensions between the EU programmes and the Community Plant Variety Rights Acquis (CPVR), particularly regarding transfers of plant genetic resources between different stakeholders and overly stringent uniformity requirements” (Evaluation CPVR Acquis DG SANCO 2011). The results of this evaluation were presented in October 2011 at a conference entitled ‘EU plant variety rights in the 21st century’. The main conclusions presented seem to essentially point out the necessity to reinforce the plant breeders’ rights towards growers cultivating farm saved seeds¹⁵.

On the whole, the revision of these two main legislative frameworks aims to simplify the legislation, to change the governance, and to take into account new technologies (transgenesis and all other biotechnologies) in the legislative framework of the marketing of Seed and Propagation Material and of plant variety rights, but the challenge is to properly take into account the specificities of agro-biodiversity.

In the “Farm Seed Opportunities” (FSO) research project (www.farmseed.net) the conclusion states that “all the diverse varieties having no correspondence with the DUS criteria¹⁶ may be important for increasing genetic diversity in the field – specifically in organic and low-input agriculture -, playing a key role also in facing climate change. All of this could be considered part of the European informal seed system.

Finding the right balance between formal and informal seed systems within the European context should be one of the objectives of the regional strategy for on-farm conservation of Plant Genetic Resources For Agriculture”.

¹⁴ http://ec.europa.eu/food/plant/propagation/evaluation/index_en.html

¹⁵ http://ec.europa.eu/food/plant/propertyrights/index_en.htm

¹⁶ DUS stands for Distinct Uniform Stable. DUS tests prove if the new variety is clearly distinguishable from all other existing varieties within the crop concerned (Distinct), whether the variety remains uniform during propagation (Uniform) and whether the characteristics of the variety remain stable during repeated propagation (Stable).

III. General Recommendations and Action Plans on Agriculture and Biodiversity

Challenge 1: Synergies between agricultural practices and biodiversity

1st RECOMMENDATION

Development of a European Farm Evaluation System (EFES) to assess the impact of the agricultural production process and farm management on biodiversity. EFES should be developed on the basis of indicators proposed by EEA in the framework of EU Biodiversity Strategy 2020 “Our life insurance, our natural capital” [COM(2011) 541 final], Annexes to impact assessment [SEC(2011) 244 final].

Intensive Agriculture has a negative impact on the environment and biodiversity: it pollutes water and soil, the agro-ecosystem becomes simplified, unstable and low in biodiversity. In contrast, a responsible type of sustainable agriculture can contribute towards the suitable management of the environment and, therefore, towards the conservation of Biodiversity. If negative impacts are not perceived by the agricultural sector itself, and if sustainable agriculture is not respected and promoted by environmental and Agricultural European Policy, any co-responsibility effort will be unsuccessful.

Action plan related to the 1st recommendation

- **Implementation of the proposed indicators (SEBI indicators¹⁷)** to monitor the impact of the agricultural practices on biodiversity and the evolution of the situation, at local and farm level. **Implementation of SEBI Agriculture Indicators including the use/preservation of agricultural genetic resources and the conservation of soil biodiversity.**
- Definition of the procedures of Impact Analysis and Impact Assessment.
- Definition of correction and compensation tools
- Distribution of soil health assessment tools to European farmers
- Improvement of the definition of limitations to intensive farming in Natural Protected Areas and Natura 2000 sites.

¹⁷ <http://biodiversity.europa.eu/topics/sebi-indicators>

2nd RECOMMENDATION

Linking of public financial support to good agricultural practices related to biodiversity conservation

The adoption of biodiversity-friendly agricultural practices has to be supported by public funds. **One of the objectives** of this recommendation is to link farmers' access to RDP funds to the European Farm Evaluation System (EFES) foreseen in previous recommendation.

Action plan related to the 2nd recommendation

- Use the European Farm Evaluation System (EFES) to give farms that respect biodiversity-friendly agricultural practices a privileged access to RDP funds, e.g. raising the access score on the basis of the EFES.
- Favour credit access to farmers (through public warrantee) for specific investments that will enable them to limit the impact of the agricultural practices on the environment, to preserve biodiversity and to contribute in achieving connectivity of landscape features, so boosting the establishment of the Green Infrastructure.
- Include in the new RDP specific measures for farmers adopting practices contributing to Green Infrastructure.
- Include, in the CAP first pillar, direct payments rewarding agricultural practices with a positive impact for biodiversity, recognizing farmers protecting biodiversity as public goods providers
- Encourage member States to implement the Water Framework Directive (2000/60/EC) and identify the related operational obligations for farmers to be included in cross compliance as proposed by the *integration scenario* of the legal proposals for Common Agricultural Policy towards 2020¹⁸ -
- Promote the Payment for Ecosystem Services (PES)¹⁹ practice, also identifying potential public or private bodies interested in “buying” services issued from biodiversity-conserving management practices.

¹⁸ http://ec.europa.eu/agriculture/cap-post-2013/legal-proposals/index_en.htm

¹⁹ Payments for Ecosystem Services (PES), also known as Payments for Environmental Services (or Benefits) is the practice of offering incentives to farmers or landowners in exchange for managing their land to provide some sort of ecological service.

3rd RECOMMENDATION

Enlargement of the protection level and the economic support of High Nature Value Farmland (HNVF) in European countries.

The maintenance of HNV farmland is a clear policy priority for the EU, critical to meeting its commitments to biodiversity and representing a pressing rural development challenge. HNMF constitutes a key to the survival of much of Europe's natural biodiversity and the maintenance of landscapes, but often also plays a key role in rural vitality, supporting the tourism and recreation industry, and preserving cultural and gastronomic traditions. In most cases, HNV systems suffer from low competitiveness, and face decline and ultimately collapse if not adequately supported. Not all EU countries have accomplished the task of identifying HNV farmland resources, assessing their condition, and creating accurate baseline figures against which to assess the impacts of the current rural development programmes post-2013.

Action plan related to the 3rd recommendation

- Encourage member States and Regions to define the HNMF at national and regional level choosing appropriate homogeneous indicators at European level, on the basis of available developed indicators.
- Take into account as indicators for the definition of HNMF the use of landraces and the presence of wild crop relatives.
- Encourage member States and Regions to define HNMF management plans and its monitoring indicators
- Define the access criteria to Rural Development Plan funds for farmers operating on HNMF.
- Raise awareness among farmers of the value of HNMF, at European, National and Regional level, in collaboration with public authorities, protected areas, Universities and Research Institutes and farmers' associations.
- Create a mapped inventory of HNMF at national and regional level.
- Raise awareness among the public of the ecological value of HNMF and the value of their products for the biodiversity protection.
- Promote the HNMF concept among European Countries that do not currently use it.

4th RECOMMENDATION

Raise awareness in the agricultural sector and in public society about the importance of preserving natural and cultivated biodiversity.

Even if Biodiversity is a well-known concept in European countries, is still necessary to raise awareness in the agricultural sector and in public society about the importance of preserving

natural and cultivated biodiversity. The RDP and the CAP do not currently allocate enough money for this kind of activity.

Action plan related to the 4th recommendation

- Provide a communication plan for farmers and farming sector representatives regarding the issues and advantages generated by biodiversity and raise awareness among them of the environmental, technical and economic advantages of cultivating biodiversity.
- Support participatory projects aimed at involving farmers, breeders, tour operators, Environmental Associations, Farmers Associations, Commercial (Trade) Chambers and politicians at local level in decision-making about measures on agro-biodiversity protection and mitigation of the impact of agriculture on biodiversity.
- Strengthen efforts in terms of the distribution and transfer of best practices to agricultural professionals.
- Distribute existing communication media regarding crop biodiversity and the links between Agriculture and surrounding Biodiversity.
- Organize open days and training days to raise awareness among representatives or professional managers.
- Organize demonstration days in the field or in benchmark farms.

Challenge 2: Conservation and promotion of agro-biodiversity

5th RECOMMENDATION

Preservation and maintenance of biodiversity from existing genetic resources for food and agriculture as well as the heritage of knowledge and culture linked to them.

Some EU regions and countries have developed national or regional strategies for the protection of existing biodiversity of agricultural interest, in accordance with EU statements [Reg. 870/2004/CE, COM (2001) 162]. In order to preserve and maintain the potential for evolution of genetic resources, both the *ex situ* and *in situ* conservation of such resources must be promoted. *In situ/on-farm* conservation also makes it possible to maintain the close connection that exists between each resource and its traditional area of cultivation/breeding.

Action plan related to the 5th recommendation

- Promote and support the creation of permanent regional and national inventories of endangered genetic resources and a heritage of knowledge about food and agriculture through the exploration of rural areas, especially marginal and upland areas.
- Support the maintenance and coordination of *ex situ* collections/inventories of such resources (seed banks, *in vitro* collections, inventory orchards, botanical gardens).
- Support (promote/enforce) the recovery and revitalization of knowledge related to such resources through sociological and anthropological researches, studies, and interviews.
- Support the effective *in situ* (on-farm) conservation of genetic resources threatened with genetic erosion by providing incentives for farmers in the next European Rural Development Programme.

- Recognize farmers involved in *in situ* conservation as providers of public goods. It is **considered relevant** to change the rules concerning access to the Rural Development Programme funds (measures for the agro-environment): funds are currently linked to the size of the cultivated area and not to the value of the public good conserved.
- Implement the “Priority Activities” recommended in the FAO Second Global Plan of Action (GPA) for Plant Genetic Resources for Food and Agriculture²⁰ at EU, national and regional level, even developing an EU Plan of Action in order to meet the specific needs of European agriculture.
- Encourage policy-makers to provide financial support to national activities intended to achieve the objectives of the FAO Second GPA.

6th RECOMMENDATION

Setting up and support of European networks of stakeholders working on the conservation, enhancement and management of agro-biodiversity, in order to encourage regional and national initiatives and create new entities, also encouraging knowledge transfer on *in situ* and *ex situ* conservation.

The FAO Second GPA for Plant Genetic Resources for Food and Agriculture affords significant importance to the network activity, in particular to the collaboration among stakeholders, including farmers, breeders, gene banks, crop working groups, researchers, NGOs, small-scale seed producers, distribution enterprises and technology transfer bodies. The participation of all stakeholders, in particular women farmers and local breeders, is expressly advocated. Particular attention is given to the networks’ capacity to implement the International Treaty on plant genetic resources for food and agriculture²¹, especially the Multilateral System of exchange of genetic material. In some European regions, similar networks are established by law: as an example, the Regional Acts of some Italian regions about the conservation of native agro-biodiversity provides the Conservation and Safety Network as a tool to promote *in situ* (on-farm) conservation, giving farmers easier access to genetic material, technology and public funds, also allowing the enhancement of the economic value of biodiversity and knowledge transfer.

Action plan related to the 6th recommendation

- Mapping of relevant European Stakeholders and national entities working on biodiversity and creation of the European Network.

²⁰ This Plan was adopted by the FAO Council in Rome on 29 November 2011 as a new global framework aiming at the conservation and sustainable use of the world’s diversity of plants on which food and agriculture depend. It underlines the commitment of the governments to ensure that management of plant diversity continues to be a key element in global efforts to alleviate poverty and increase food safety in times of climate change. The text is available at the site http://typo3.fao.org/fileadmin/templates/agphome/documents/PGR/GPA/GPA2/GPA2_en.pdf

²¹ www.planttreaty.org

- The European Network will include national and regional research bodies, *ex situ* collection, gene banks managed by local communities and networks of farmers (e. g. the European Coordination of Let's Liberate Diversity, bringing together national farmers' associations representatives involved in promoting local and sustainable agriculture).
- The European Network will favour *in situ* and *ex situ* conservation, encouraging knowledge transfer on the conservation and management of genetic resources.
- The European Network will promote stable cooperation between research institutes and farmers involved in the protection/management of biodiversity.
- The European Network should be linked to the European network for rural development to share good practices on agrobiodiversity, and participate to the evolution of the RDP.

7th RECOMMENDATION

Establishment, inside the reviewing of legislation on marketing of seeds and propagating material, of a clear European legal framework that will recognize farmers' right to exchange and market, for biodiversity conservation, dynamic management or plant breeding purposes, their own propagation material (seeds, bulbs, tubers) not satisfying the stringent legal requirements actually in force.

European regulations for conservation varieties have evolved (EU Dir: 1998/95, 2008/62, 2009/145), establishing in the official varieties catalogue specific sections for amateur and traditional varieties threatened by genetic erosion, for which a partial dispensation from the Distinctiveness Uniformity and Stability criteria is allowed. However, the very strict registration criteria can only be applied in a few cases, because the farmers' informal system of seed exchange and the materials involved have very heterogeneous characteristics; it is hard to apply the rules governing industrial seed production to such a complex system. At present, EU legislation concerning the marketing of seeds and propagating material (PM) is under further review. At the moment, farmers cannot sell or exchange seeds or PM of non-listed varieties. This may led to a further loss of diversity, in disagreement with the CBD strategic plan (CBD, Tenth meeting of the Conference of the Parties, Nagoya, 2010) target 15, which requires that “*by 2020, the genetic diversity of cultivated plants (...) is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity*”, and with the statements of EU Biodiversity Strategy to 2020 [COM(2011) 541 final]. European farmers expressed their opinion and requests in the Declaration of Szeged.²² As well, the opinion of the advocate general of the EU court of justice on the case C-59/11²³, delivered on 19 January 2012 give a new lightening on the effect of the EU laws on seed marketing “(…)the present case demonstrates that the restriction of biodiversity in European agriculture results, at least in part, from rules of EU law (...).

²²On 24 February 2011, farmers from 17 European countries produced the Declaration of Szeged, Hungary, asking the European Union and the Contracting parties of the International Treaty for Plant Genetic Resources for Food and Agriculture (ITPGRFA) to put in place policies that support the implementation of articles 5,6 and 9 (concerning support to on-farm conservation, sustainable use of genetic resources and farmers' rights)

²³ See full text on <http://curia.europa.eu/>

Action plan related to the 7th recommendation

- Encourage European policy-makers to recognize that farmers are contributing positively not only to conservation but also to the increase of biodiversity for food and agriculture: for this reason, they should be granted easier access to genetic resources for conservation and dynamic management, and this should be included in legislation on Farmers' Rights, as specifically requested in the Declaration of Szeged.
- Encourage the European Commission to choose, among the five scenarios proposed for the reviewing of Community legislation on marketing of seeds and propagating material, a scenario taking into account the fundamental role of farmers in protecting and promoting biodiversity, recognizing their right to select, develop, grow, exchange and sell genetic resources for conservation purposes.
- Encourage the European Commission also to foster appropriate strategies aimed at the spreading of propagating material, so facilitating the farmers' access to genetic resources.

The current revision of the EU's regulatory framework for plants and seeds: strong divergent interests between stakeholders.

The seed industry, represented by the European Seed Association (ESA), seems to be satisfied with the direction taken by the current revision - "Their recommendations are to a large extent similar if not identical to those ESA's different responsible Working Groups have elaborated" said ESA Secretary General Garlich von Essen. But he is, however, conscious and preoccupied about the fact that "Seeds and plants have become part of a highly controversial societal debate in Europe. It is this societal debate about the future of farming, and the use of new technologies (including but not restricted to genetic modifications), the quality and security of food supply that is likely to have an unprecedented impact on the legislative framework". (Cultivar Seed Oct 2011)

At the moment, the position of stakeholders working on the dynamic conservation of biodiversity is drastically different from this position. On 24 February 2011, the 7th anniversary of the European signature of the ITPGRFA, farmers and farming sector professionals from 17 European countries met in Szeged, Hungary, and prepared a statement to be addressed to European governments, the European Union and the Governing Body of the International Treaty on Plant Genetic Resources for Food and Agriculture. This statement was prepared one month before the Bali ITPGRFA meeting in March 2011, and asked for the right:

- * to choose freely, select, develop and grow their own seeds (except for GMOs) and then to sell the crops, irrespective of whether they come from varieties listed in the catalogue or not;
- * to be granted free access to plant genetic resources in ex situ seed banks;
- * to exchange and sell seeds for conservation purposes and for the dynamic management or selection on the farm used for agricultural production. In this respect, we demand explicit recognition of farmers' rights to select and conserve their own seeds and, for this reason, to exchange plant genetic resources of varieties not listed in the catalogue, as breeders are doing;
- * to reproduce their own seeds in order to adapt them to local conditions. An explicit recognition of the right to use freely, and without need for a license, is needed for all varieties, regardless whether or not the varieties are protected by industrial property rights, in order to be able to develop new varieties;
- * to protect their seeds from genetic contamination and appropriation through contamination by patented genes.

(Declaration of Szeged, 2011, <http://www.liberate-diversity-hungary2011.org/>)"

8th RECOMMENDATION

Promotion of dynamic on-farm conservation of genetic resources applying protocols of participatory plant breeding

Low-input agriculture, especially in certain contexts such as marginal areas, requires greater biodiversity to be included in the farming system. Notably, there is a lack of varieties suited to the specific needs of organic agriculture. The principles of Participatory Plant Breeding suggest a pattern of action that would allow the management of biodiversity available both inside and outside of the region, to select or create suitable varieties for such specific needs, thus increasing the level of biodiversity present in the system.

Action plan related to the 8th recommendation

- Provide incentives for the dynamic management of genetic resources, funding projects essaying participative protocols of characterization, evaluation, multiplication and breeding of different kind of materials, in order to obtain varieties suited to low-input agriculture and to specific agro-environmental contexts.
- Provide incentives for the experimental construction of networks of exchange and seed banks managed by communities of farmers, where both local and newly created varieties are maintained on-farm.
- Promote stable cooperation between research institutes and farmers involved in the protection/management of biodiversity.
- Promote the dissemination of knowledge related to peculiarities and use of such resources, providing incentives for training, the creation of networks, and the organization of meetings, conferences and publications.
- **Support the characterisation of technical, nutritional, organoleptical, social interests of these new genetic resources to allow their promotion among agricultural stakeholders, and final consumers.**

9th RECOMMENDATION

Implementation and promotion of specific marketing actions to promote the cultivation of endangered local varieties and breeding of local breeds.

The market can be a strong incentive for the on-farm conservation of endangered genetic resources. In order to make it profitable for farmers to cultivate/breed these resources, appropriate public economic support - up to now available only for PDO, PGI (REG CE 510/2006) and organic products (REG CE 834/2007) - is needed. In addition, marketing actions such as labelled certification can add value to the product, raising its price and promoting on-farm conservation. The promotion strategies for endangered genetic resources, not included in the PDO or PGI certification system, are not homogeneous in the different EU countries and public or private initiatives often lack coordination and sometimes pursue diverging objectives.

The Jakarta charter on business and biodiversity (CBD and UNEP, Third Business and the 2010 Biodiversity Challenge Conference, Jakarta, 2009), affirms that “sustainable management of biodiversity and ecosystem services are a source for future business operations as well as a condition for new business opportunities and markets”. It declares also that “(...) integrating biodiversity into business can also contribute to poverty reduction and sustainable development”. The tools suggested are “voluntary corporate actions as well as market-oriented enabling policies and approaches (...), international standards and certification systems and related initiatives.”

Quality Agricultural Products

Agricultural products benefiting from a quality label, such as designation of origin (PDO, PGI) or an organic label, create environmental added value in addition to their economic and social returns.

Most origin-linked products are produced by small-scale farms including several workshops. Production specifications are likely to include traditional environmentally friendly cultural and breeding practices. They are generally the result of the ongoing adaptation of agricultural practices to increasingly difficult pedo-climatic conditions. These natural constraints require technical improvements allowing on-site processing, longer preservation and the enhancement of diminished agricultural potential.

Farming practices for quality organic products have to include crop rotation and a certain percentage of locally produced animal feed. These production methods contribute to promoting diversified territories.

Quality products, therefore, favour variety in terms of cultivation and landscape while inducing sustainable management for agricultural lands with high biodiversity.

Action plan related to the 9th recommendation

- Draw up a European programme to promote the marketing of local traditional endangered genetic resources. The programme should include an assessment of the current situation regarding the production of local, traditional, endangered varieties and local endangered breeds, the development of production criteria, certification procedures and labelling, and the assessment of funding needs and sources.

- Encourage the creation of a national organisation dealing with the marketing of products from local traditional varieties and local breeds. The organisation should include a wide range of stakeholders and interest groups like farmers, food producers, tourism organisations, marketing organisations, and trade agencies.
- Increase public marketing support for regional producers of endangered varieties and breeds linked to the territory.

10th RECOMMENDATION

Promotion and enlargement of GMO-free regions in the European Union.

Possible contamination by GMOs of crops from conventional and organic farming (Altieri 2005, Binimelis 2008), as well as of wild relatives (Binimelis et al. 2009, Sanvido et al. 2007), weeds (Muller et al., 2009) and non-target organisms living in the environment (Lu et al. 2010), is irreversible. These effects become particularly relevant in centres of crop origin and diversity (Dyer et al., 2009, Engels et al., 2006), where significant contamination of the landraces still present is revealed (Pineyro-Nelson et al., 2009). The question is strongly debated (Devos et al. 2008), **but we argue that coexistence is not possible**. In addition, the GMO agriculture system increases the extreme simplification of agro-ecosystems, which are already based on few genotypes that are strongly related: the resistance introduced with plant engineering is based on single genes (vertical resistance) that can be easily overcome, thus seriously affecting the resilience of the system. This kind of approach is not compatible with biodiversity conservation. Furthermore, the changes caused to wild flora by the increased use of total herbicides, as well as those caused to wildlife by the insertion of genes codifying toxic compounds for insects, seriously threaten wild biodiversity and the overall balance of the agro-ecosystem.

Action plan related to the 10th recommendation

- Create a European Regulation in order to recognize GMO-free regions in the European Union.
- Develop and apply communication plans targeting farmers and the general public, which emphasize the consequences of GMO use regarding environmental, social and economic issues. The communication plan will be based on scientific results.