

O1 - THE VARIOUS APPROACHES OF AGRO-ECOLOGY IN THE DIFFERENT COUNTRIES.

SYNTHESIS OF THE NATIONAL REPORTS

AUSTRIA – FRANCE – ITALY – LITHUANIA - SLOVENIA

by Osservatorio Europeo del Paesaggio (OEP)



Erasmus+

This project has been funded with support from the European Commission. This communication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.



DOCUMENT INFORMATION

Project Information		
Project name	Teaching agro-ecology in the transitory period and its consequences for the Agricultural Knowledge Systems	
Project acronym	Euro-EducATES	
Project number	2015-1-FR01-KA202-015100	
Project web site	http://www.euroeducates.eu/	
Document Identification		
Document title	Synthesis of the national reports	
Deliverable	O1: The various approaches of agro-ecology in the different countries	
Current status	Final	
Current version	2.00	
Dissemination level	Public	
Version history		
Version number	Date released	Authors and contributors
1.0	June 1, 2016	Salvatore Basile, Domenico Nicoletti (OEP)
1.2	October 7, 2016	Salvatore Basile (OEP), Domenico Nicoletti (OEP), Milena Klimek (BOKU), Phillipp Dietrich (BOKU), Lamia Otthoffer (CEZ - Bergerie nationale), Julie Bluhm (CEZ - Bergerie nationale), Jean-Xavier Saint Guilly (CEZ - Bergerie nationale), Mounia Khachiche (CEZ - Bergerie nationale), Lina Gumbrevičienė (PLŽMMC), Edvardas Makšeckas (PLŽMMC), Ana Vovk Korže (UM) and Jania Lužnik (UM).
2.0	March 15, 2017	

SCOPE

This document summarizes the national reports on the approach of agro-ecology in Austria, France, Italy, Lithuania, Slovenia.

AUDIENCE OF THIS DOCUMENT

Public

ACRONYMS AND DEFINITIONS

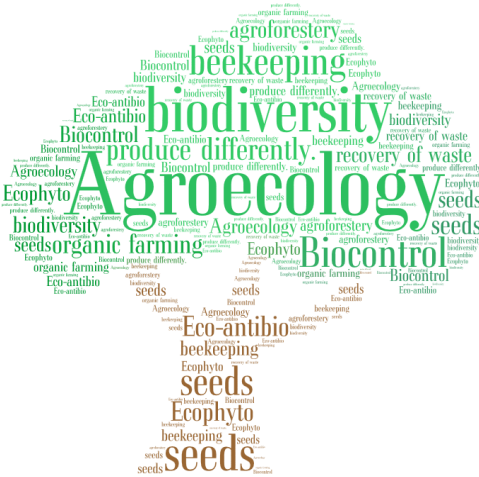
ACRONYMS	DEFINITION
AB	Agriculture Biologique (organic farming)
AAMRD	The Agency of the Republic of Slovenia for Agricultural Markets and Rural Development is the paying authority for the granting, payment, reporting, and control of a wide range of payments and other measures for the implementation of the CAP, EU and the implementation of Slovenian national measures in the areas of agriculture, forestry, fisheries and nutrition.
ACTA	Institutes network of plants and animals, based in France
AE	Agro-ecology
AECP	Agri-Environment-Climate Payments
AEP	Agri-Environmental Payments
AFAF	French association for agroforestry
AIAB Campania	Associazione Italiana per l'Agricoltura Biologica della Campania (Italian Association for Organic Farming – Campania)
AMAP	Association for the maintaining of a rural agriculture
ANEK	Akcijski načrt za ekološko kmetijstvo (sLOVENIA) Action plan for the development of organic farming
BMLFUW	<i>Bundesministerium für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft - Austria</i> Federal Ministry of Agriculture, Forestry, Environment and Water Management - Austria
BOKU	<i>Universität für Bodenkultur Wien</i> University of Natural Resources and Life Sciences, Vienna
CAP	Common Agricultural Policy
CEZ/BN	Zootechnic and animal science training center/National sheep center of Rambouillet
CIRAD	Centre of international cooperation in agronomic research for development
CNRS	National center of scientific research
DGER	General direction of education and research
DRAAF	Regional direction of agriculture food and forests
EIP	European Innovation Partnership
EPEA	Rural evaluation of a farm

ERM	Ecoremediations
EU	European Union
EU-APPB	Agricultural Policy Perspectives Brief of the European Union
Euro-EducATES	Acronym of the project “Teaching agro-ecology in the transitory period and its consequences for the Agricultural Knowledge Systems”
FADEAR	Associative federation for the agricultural and rural employment
FRB	Fondation for the research on biodiversity
GIEE	Economic and environmental interest group
IAE	Agro-ecological infrastructure
IBEA	Impact on biodiversity of rural farms
IBIS	Integrating biodiversity in agricultural farm systems
IDEA	Indicators of farms sustainability
IFOAM	International Federation of Organic Agriculture Movements
IFV	French institute of wine and vineyards
IKC	Institute for control and certification at the University of Maribor
INRA	National institute for agronomic research
ITAB	Technical institute of organic farming
KON-CERT	Institute of Control and Certification of Agriculture and Forestry Maribor - Slovenia
LEADER	<i>Liaison entre actions de développement de l'économie rurale</i> Links between actions for the development of the rural economy
MAAF	Ministry of Agriculture, food and forests in France
MAFF	Ministry of Agriculture, Forestry and Food in Slovenia
MEDD	Ministry of Ecology and sustainable development in France
MFA	Multifunctional Agriculture
MIPAAF	Ministero Italiano per le Politiche Agricole, Agroalimentari e Forestali (Italian Ministry of Agriculture, Food and Forestry Policies)
MNHN	National natural history museum
NGO	Non-governmental Organizations
OAB	Agricultural observatory of biodiversity
OEP	Osservatorio Europeo del Paesaggio (italian)

	European Landscape Observatory
OF	Organic Farming
ONEMA	National bureau of water and aquatic environment
ÖPUL	Österreichische Programm für umweltgerechte Landwirtschaft (Austrian Agri-environmental Programme)
PAC	Politica Agricola Comunitaria (italian) (CAP – Common Agricultural Policy)
PEI	Partenariato Europeo per l’Innovazione (italian) (EIP – European Innovation Partnership)
PGM	Genetically modified plant
PLZMMC	Lithuanian Centre for Programme LEADER and agricultural training methodology
PSR	Programma di Sviluppo Rurale (RDP – Rural Development Programme)
RDP	Rural Development Program
RESOLUTION	Resolution on the Strategic Development of the Slovenian Agriculture and Agri-food Sectors
SAU	Superficie Agricola Utilizzata (UAA - Utilized Agricultural Area)
SIB	Sistema Informativo italiano per il Biologico (Italian Information System for Organic Farming)
SINAB	Sistema di Informazione Nazionale sull’Agricoltura Biologica (Italian Information System on Organic Agriculture)
UE	EU/ European Union
UM	University of Maribor

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THE VARIOUS APPROACHES OF AGRO-ECOLOGY IN AUSTRIA, FRANCE, ITALY, LITHUANIA, SLOVENIA.

INTRODUCTION

This document summarizes the national reports on the approach of agro-ecology in Austria, France, Italy, Lithuania, Slovenia, realized by the partners of the Euro-EducATES project.

Speaking about agro-ecology is quite new for public policies. But the research and technical institutes, the actors of agriculture and environment development, teachers, associations... have developed, for years, agro-ecological practices in order to optimise production systems by the natural controls and the organic interactions within the agro-systems.

The various actors and the numerous meanings of the concept of agro-ecology make it possible to define different approaches and work environment for the introduction of agro-ecosystems. Researches carried out around agro-ecology made it possible to clarify the bases and distinguish three periods related to its building.

- **Agro-ecology as a science¹.**

According to Denise Van Dam², as a scientific interdisciplinary approach, agro-ecology has a critical function, which is a product of the questioning of the prevailing intensive agronomic pattern by the overuse of inputs in the agro-ecosystem. It also puts into question the prevailing ecological pattern of nature preservation, which advocates a land spare of biodiversity and food production rather than a land share of the two functions. Agro-ecology is therefore a hybrid system, which has an exploration function towards other conceptual and technical ways; taking roots in the food systems knowledge.

The word appears for the first time in the 30's scientific writings, with Bensing's publishing. Until the 60's, agro-ecology remains a scientific subject centred on ecology principles (*écologie systémique*, Odum, 1971). In the 80's, Altieri (1983b) defines agro-ecology as the applying of ecology principles to the redefinition of agronomy.

The main idea being that the analyse of agro-ecosystem and its sustainability would enable the production of knowledge and practices which would make agriculture sustainable. Outside the plot, the analyse of agro-ecosystem highlighted the whole farming system.

- **Agro-ecology as a social movement³.**

In her book, *Agro-écologie, entre pratiques et sciences sociales*, Denise Van Dam & al, 2012, puts agro-ecology back in its social dimension as a social criticism on the effects of farming modernisation around the world. The sociological dimension leads to the exploration of another way, mainly centred on the research of independence and the economic use of resources regarding a globalised free market. The latter is regulated by rules broken from local productive and ecological constraints.

It was then in the 80's-90's that social movements emerged, defending their food sovereignty and the protection of resources, extending therefore agro-ecology to new environmental, social, economic, ethic dimensions, linked to sustainable development. The associations, the citizens, the consumers seize the food question and are actively involved in the debates about agricultural policy choices, considering the health, food quality and resources preservation stakes. The governance becomes central in the public policies orientations and debates.

- **Agro-ecology as a food system⁴.**

From the two previous schools, agro-ecology becomes the study of interaction between food production and society,

¹ ALTIERI.M.A.. *L'agroécologie. Bases scientifiques d'une agriculture alternative*. Éditions Debard, 1986, Paris

Cf. <http://base.d-p-h.info/fr/fiches/premierdph/fiche-premierdph-2476.html>

See as well : <http://ag-transition.org/3669/la-agricultura-del-futuro-miguel-altieri/>

² Denise Van Dam, Michel Streith, Jean Nizet, Pierre M. Stassart, 2012, *Agroécologie, entre pratiques et sciences sociales*, EducAgri editions, p 29-30.

³ Cf. *REVOLUTION AGROECOLOGIQUE, Le Mouvement de Campesino a Campesino de l'ANAP á Cuba*, 2012. Traduction française : María del Carmen Díaz Aranda, Ed. Sibylle Bui. France

<http://viacampesina.org/downloads/pdf/fr/Revolution-agroecologique.pdf>

⁴ GLIESSMAN, Stephen. *Agroecology: the ecology of food systems*. 2nd édition. Éditions Taylor & Francis, 2007, 384 p

extending the scope to all the food systems (Lieblein & al. 2003), combining, not only the productive dimension but also the sector organisation and consumption dimensions. This concept of *food systems* was taken up later on by Gliessman (2006) and Warner (2007), making the social sciences contribution decisive in the understanding of the food systems building, by integrating the socio-economic and political dimensions through time and space.

These analyses on the base of historical, cultural and political approaches enable us to understand the stakes and risks regarding the building of unfair food systems with all their downward slides.

The whole reference works and publications on agro-ecology are characterised by the fact of gathering hybrid actors composed both by scientists from different countries, North and South countries development agents and agro-ecology workers. In its beginning, the heterogeneous patchwork was essentially dominated by North-American publications. The landscape would change gradually, and we can now see on the European continent, that organic farming is approved as a credible option to the intensive pattern, and this, since 1991, throughout the European (EU) regulation, and important conversion grants, and financial compensation for organic production; whereas Organic Farming (OF) becomes an institution in the USA only after the year 2000 and in a controversial way.

In the EU countries there are different approaches and definitions of agro-ecology, different public policies implemented to encourage the agro-ecological transition of agriculture and different consequences on research and training activities.

In Austria, agro-ecology is at a crossroad (from science to movement), it is inherently connected to the organic farming (as in Italy, Lithuania and Slovenia) and there is a significant experience of organic territorial approach in the province of Upper Austria (Bioregion Mühlviertel). When aiming to understand the role agroecology plays on Austria's landscape, the understanding of its relationship to Organic Farming (OF) and the organic movement is essential. An important lever for the development is represented by the "Bio-Aktionsprogramm 2015-2020". The Agri-environmental Programme allowance for less-favoured areas, a "biobonus". Furthermore, agro-ecology may benefit from the popularity and acceptance of the Organic movement. However, the distance of agro-ecology as a science to agro-ecology as a movement must be bridged in order to have successful future.

In France, agro-ecology is central in public policies (at central and local level), there are specific national programs and action plans. The public policy project "Agroecology, a new production paradigm" aims to promote the evolution of French agriculture into agroecology (the agroecological transition) and the development of practices and innovative systems to achieve the triple performance (environmental, economic and social). This project is accompanied by a second action plan "Teaching agroecology, a new production paradigm". In order to standardize the range of meanings relating to agro-ecology, an official definition was written. As in Austria and Italy, there is a significant experience of Eco(Bio)-Region, BioVallée, in the Drôme Valley.

The ambition is strong but the "weight" of conventional sector can be an obstacle to the generalisation of the organic.

About the historical approach, In France, from the 1970's, some emblematic characters as René DUMONT, Claude BOURGUIGNON, Pierre RABHI, Marc DUFUMIER, Dominique SOLTNER and some others have warned us on the quick deterioration of the soil fertility in micro-organisms, on the decrease of humus rates, and on the European agricultural lands productivity, whether tropical or subtropical. They contributed to develop efficient alternative techniques, which require a good technical knowledge on the ecological functioning of soils. They promoted both an agro-systemic and eco-systemic vision of agriculture¹. Agro-ecology becomes a scientific approach to operate in order to ensure the agricultures environmental sustainability.

In parallel with scientific movements, which defend the agro-ecology legitimacy, the activists such as alternative rural

¹These new approaches find themselves in a larger debate opposing naturalism and humanism, *natura naturans* versus *natura naturata*. The Man dominates and controls nature or the Man is part of the Nature system. Cf. Catherine Larrère et Raphaël Larrère, *du bon usage de la nature. Pour une philosophie de l'environnement*. Ed alto aubier. 1997

agricultural organisations, defend the « rural agro-ecology ». These are mainly unions, such as, la Confédération paysanne (the Rural Confederacy), la Fédération associative pour le développement de l'emploi agricole et rural (FADEAR) ou le syndicat des simples (an association of producers gatherers of aromatic and healing plants). But they are groups in favor of « rural semence » (as the Réseau Semences paysannes/ Rural semence Web), pro-organic farming organisations (as Nature et progrès (Nature and progress), an association which defines itself as « a federation of consumers and professionals involved since 1964 in agro-ecology »), or other kinds of movements, such as the « Mouvement inter-régional des Associations pour le Maintien d'une Agriculture Paysanne » (AMAP), the association « Terre & humanisme » created by Pierre Rhabi, which says it defends « agro-ecology at human size », or even the association « Accueil paysan », specialised in the farm tourism.

These activists' movements of the civil society reject the Green Revolution and the industrialisation of agriculture. They criticise intensive agriculture and productivism, particularly genetically modified plants (GMP), and, above all, the « industry of seeds and plants improvement ». Finally, they agree on the idea of a « rural agriculture » rooted in traditional know-hows and the respect of the living. Other ecologist organisations¹, launchers of civilian alerts and spearhead of « rural agro-ecology », are real go-betweens of an activist agro-ecology, which constantly questions the current public policies.

That is in this environment of ideas ferment, of activism and research that French agro-ecology is developing, to meet society expectations.

In Italy, agro-ecology is considered today a transdisciplinary field of enquiry that is capable of changing our common vision of both agriculture and society (Caporali). There isn't a national programme. The Agro-ecological transition (in particular with organic farming) started from the farmers, without public support, rather to respond to consumer's demand. The organic sector shows concrete agro-ecological solutions for agriculture and food systems. The Bio-districts experience, originated in the year 2004 by AIAB Campania in Cilento area (Province of Salerno), is today spreading across the country (15 Bio-districts in 10 regions).

In Lithuania, the agro-ecology is not a priority area of the national policies, however the sustainable agriculture and sustainable rural development are defined as a priority. The organic farming has a history of 25 years in the country. The number of organic farms increases due to support by the European Agriculture Fund for Rural Development, mainly. The Lithuanian Institute of Agrarian Economics implemented a project on the ecovillages. The aim of the project is to collect experiences and good practices in the Baltic Sea area and foster the development of ecovillages as a more sustainable way of living in the region.

In Slovenia, the agro-ecology as a sustainable agriculture concept is not officially applied in the strategic policy, but some sustainable principles linked with agroecology are already carried out, especially at local and regional level, mostly due the preserved traditional agricultural management and knowledge of small family farms. Organic farming is gaining increasing importance in the Slovenian agricultural area. Alternative sustainable agriculture practices, such as biodynamic and permaculture, have gained a big support mostly among the general public and local farmers.

¹ We can refer to: Agir pour l'environnement, Les Amis de la Terre, or anti-pesticides groups, Générations futures et l'Association pour la promotion des produits naturels peu préoccupants (Aspro PNPP).

DEFINITION AND EVOLUTION OF AGRO-ECOLOGY

This section presents the various world-wide approaches towards agro-ecology, resulting in different understandings in Europe and in particular in the five countries participating in the Euro-EducATES Project: Austria, France, Italy, Lithuania, Slovenia.

The understandings and meanings of AE differ regionally due to varying agricultural, environmental and political contexts (see table 1). Stemming from a healthy scientific debate AE has burgeoned through the mainstreaming of agroecological approaches in recent policies, e.g. the greening of CAP 2014-2020 (EU-APPB Agricultural Policy Perspectives Brief of the European Union, 2013). Its proliferation of use is, however, perhaps obfuscating its various definitions.

Altieri, 1987: 6	"A discipline that defines, classifies and studies agricultural systems from an ecological and socio-economic perspective."
Altieri, 1995: 4	"The application of ecological concepts and principles to the design and management of sustainable agroecosystems."
Francis et al., 2003: 2	"The integrative study of the ecology of the entire food systems, encompassing ecological, economic and social dimensions."
Dalgaard, Hutchings and Porter, 2003: 39	"An integrative discipline that includes elements from agronomy, ecology, sociology and economics", "the study of the interactions between plants, animals, humans and the environment within agricultural systems."
Wojtkowski, 2004: 10	"The interactions among natural processes in artificial systems designed to meet human goals."
Gliessman, 2007: 18	"The science of applying ecological concepts and principles to the design and management of sustainable food systems."

Figure 1: Selected definitions of Agroecology (Wibbelmann et al., 2013, p. 3)

Recent literature has helped define and categorize different understandings and definitions of agroecology. In Wezel et al. (2011) the authors systematically categorize different perspectives of agroecological traditions in various key-playing countries. They describe the different traditions of AE through examples from these key countries. The three categories given are AE as a *scientific discipline*, a *movement*, and a *practice* and their meanings are described below in Figures 2 and 3.

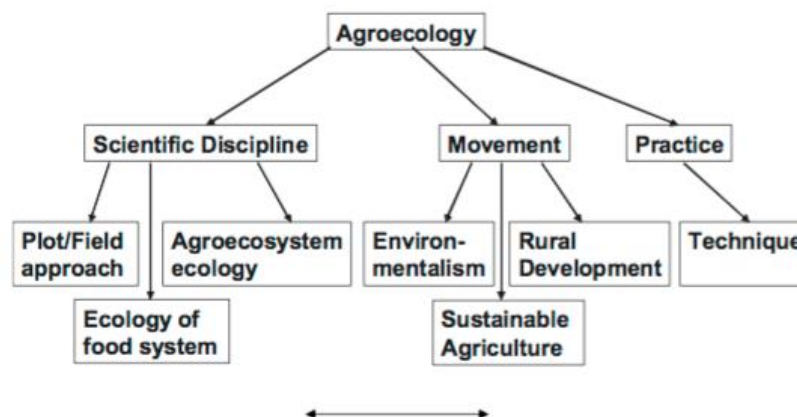


Figure 2. The diversity of current types of meanings of agroecology (Wezel, et al., 2011, p. 3)

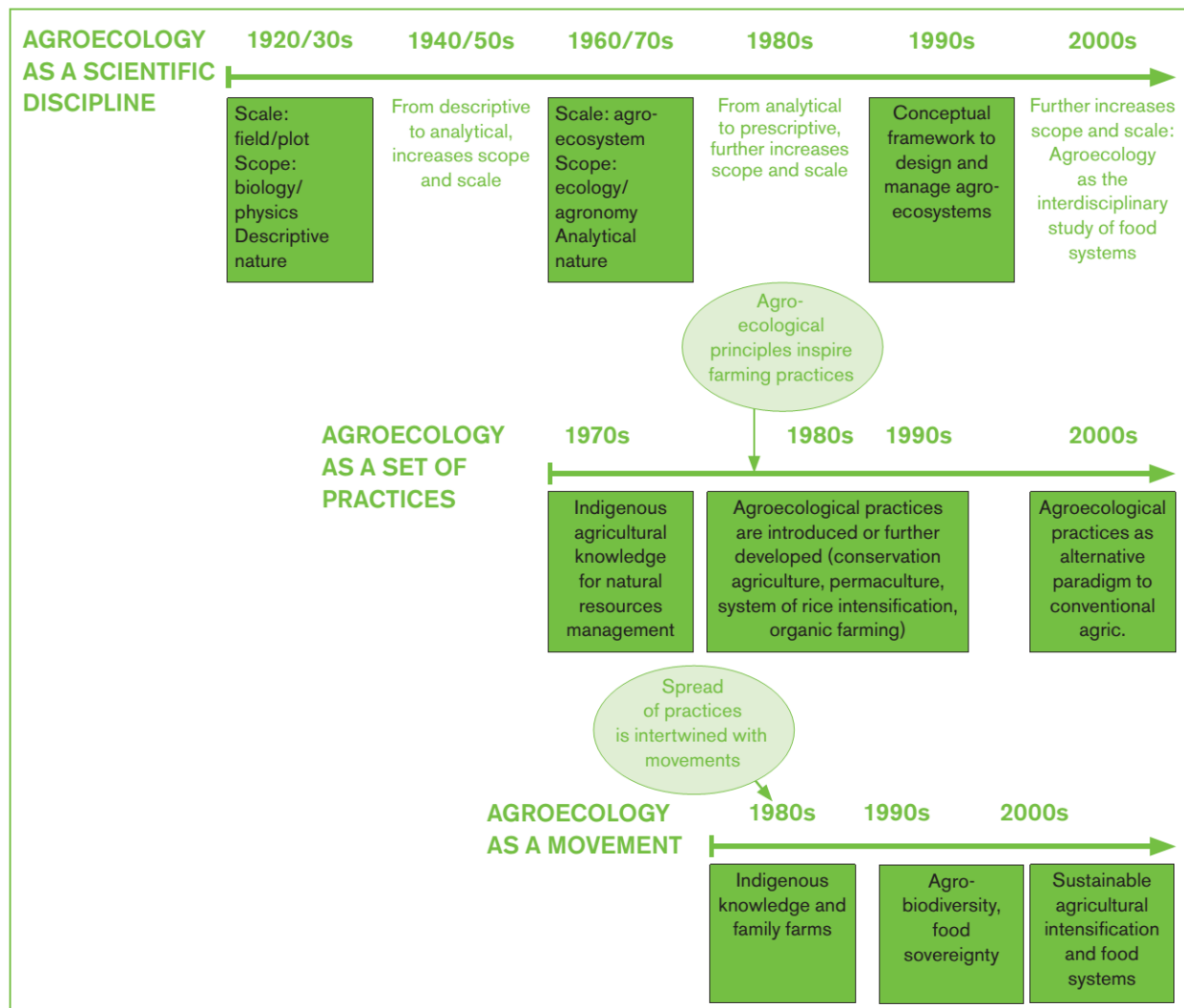


Figure 3. Temporal changes in scale and dimension of the definition of agroecology and in applied research (Silici, 2014).

The inability to accept Agroecology's wider societal implications in the food system today is considered by many researchers as an archaic practice. When looking along the timeline of its history, definitions pertaining solely to agronomy, ecology, zoology and botany (considered as the main disciplines to have contributed to AE's beginnings from the 30s-60s (Wezel, et al., 2011)) are acceptable when defining borders of an experiment or acknowledging a field trial. Yet today, many researchers are embracing a new trend, while acknowledging the more narrow definitions of AE (Altieri, 1983; Gliessman, 1984). Such trends are moving forward to embrace broader definitions of AE such as "the ecology of food systems" (Francis et al., 2003). Even Altieri, perhaps the most well-known professor of Agroecology who began firmly rooted in the scientific discipline of AE, has begun the shift to include the social, as seen in his 'Agroecology in Action' website:

"To put agroecological technologies into practice requires technological innovations, agriculture policy changes, socio-economic changes, but mostly a deeper understanding of the complex long-term interactions among resources, people and their environment. To attain this understanding agriculture must be conceived of as an ecological system as well as a human dominated socio-economic system"

(Miguel Angel Altieri, 2016).

This transition from AE as a scientific discipline to its empirical, socio-cultural inclusion and practice has been more prevalent in South, Central and North America. These movements include examples such as Via Campesina in South and Central America and Brazilian involvement in connection to rural development (which led to the first integration of agroecological approaches in policy (MDA & Agrário, 2013). In the US the broader definition has expanded its use particularly in higher education with many practical AE educational programs and field studies.

Europe in general has remained scientifically rooted, yet many movements are self-proclaimed agroecological followers. In Austria in particular, due to the immense public, political and institutional support of organic farming, many connections can be made to AE movements. In Italy AE is inherently connected to the development of organic farming, especially recently with the new territorial approach of the bio-districts/Eco-Regions, in line with the Organic 3.0 model, more holistic and dynamic.

Organic 1.0: yesterday – the pioneers,

Organic 2.0: today – business and regulations,

Organic 3.0: future – feeding the world sustainably - shift of conventional agriculture in the direction of organic agriculture and agro-ecology. From exclusion to inclusion, encouraging aggregation and relations with the other actors of the territories (as in the case of Bio-districts/Eco-regions). **Conventional can learn from organic!**

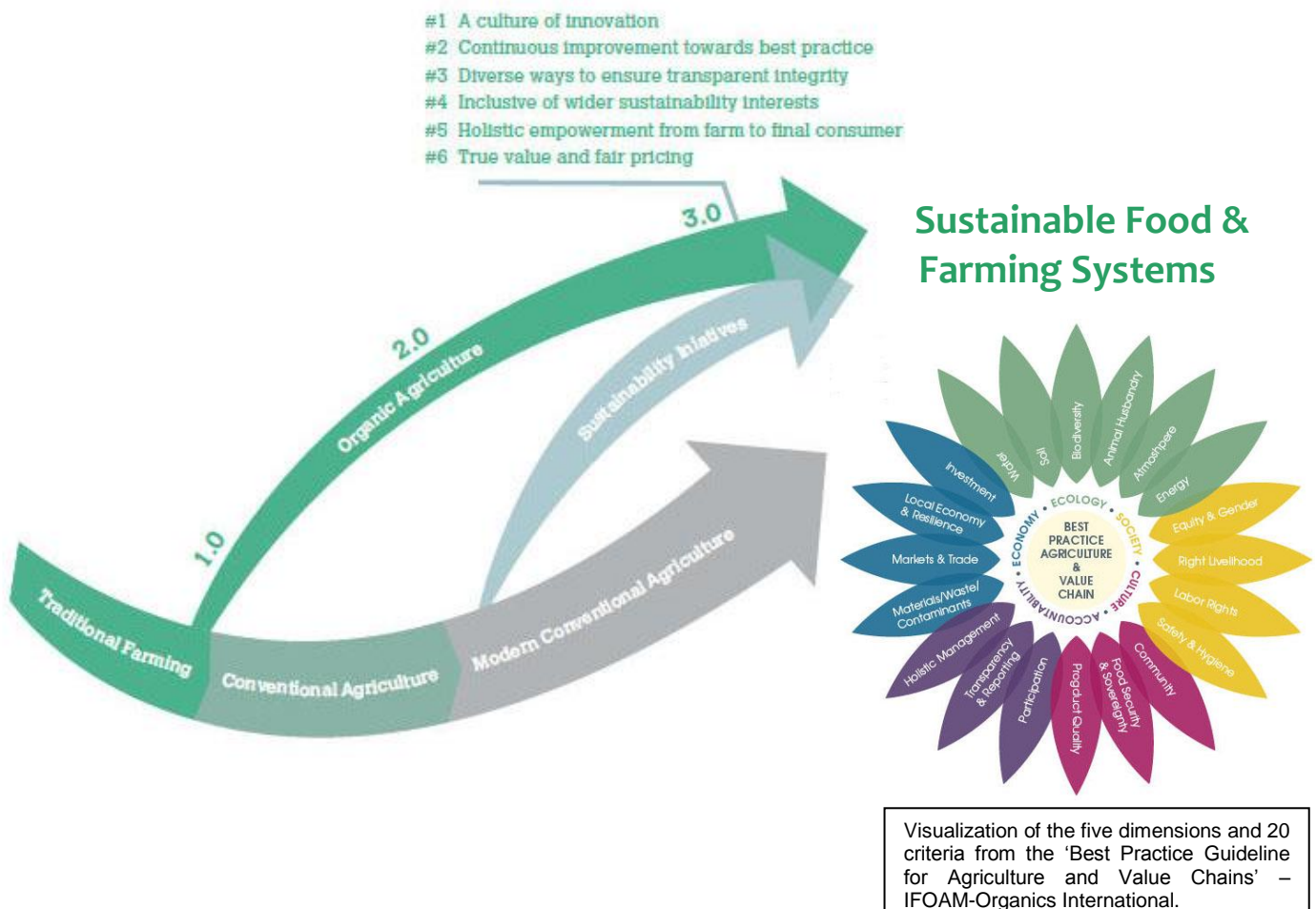


Figure 4. Organic 3.0 – IFOAM Organic International – SOAAN, 2015

“Organic 1.0 was started by our numerous pioneers, who observed the problems with the direction that agriculture was taking at the end of the 19th century and the beginning of the 20th century and saw the need for a radical change.

Organic 2.0 started in the 1970s when the writings and agricultural systems developed by our pioneers were codified into standards and then later into regulatory systems.

Organic 3.0 is the third phase of the organic movement – the next paradigm. Organic 3.0 is about bringing organic out of a niche into the mainstream and positioning organic systems as part of the multiple solutions needed to solve the tremendous challenges faced by our planet and our species. It is about developing the new collective vision for the organic sector and about actively engaging with major global issues”¹.

AUSTRIA

definition and evolution of agro-ecology

In **Austria** agro-ecology is in an active period of transition. We include here what we call a *working definition* which describes part of a longer process towards a comprehensive definition: AE in Austria is a multi-layered definition that ultimately fits into Francis’ “**the ecology of food systems**” (2003). This ecology of a food system includes not only the well accepted scientific and practiced definitions of AE as a biophysical science focused on ecological aspects of sustainable agriculture, but also Austria’s current transition towards and recognition of transdisciplinary work with the AE social movement. Additionally, organic farming is part of the agroecological vision in Austria and shares a systemic and holistic avenue towards this ideal ecology of food systems.

AE in Austria is inherently connected to the development of organic farming and the *organic movement*. Therefore, this section of the report provides a brief overview of the development of OF in Austria during the last decades. Through the representation of the origins of AE in Austria this section also attempts to distinguish AE from OF.

Austria has widespread public and political support of the organic agenda. This support is mirrored in the institutionalisation OF underwent during its development. Historically, in the 1980’s Austrian policy made a pointed turn to support small farm holders, traditional production ways and curb excessive production—a repercussion of post WWII (World War II) influences (http://oega.boku.ac.at/fileadmin/user_upload/Tagung/2006/06_Kroegeer.pdf). This turn toward organic production was pushed by the Austrian chancellor at the time² (Schermer, 2015). This push has resulted in 20% of Austrian land being certified organic at 524, 435 ha, and 20% of products consumed are organic, making Austria both in production and consumption one of the most supportive countries of the organic movement (<http://www.gruenerbericht.at/cm4/jdownload/send/2-gr-bericht-terreich/1523-gb2015-pdf>).

The origins of OF in German-speaking countries can be traced back until the early 20th century as a response to a crisis in agricultural science and production, the emergence of ecological orientated sciences; the appearance of the Life and Food Reform movements and growing awareness of far eastern farming cultures in the western world (Vogt, 2007).

In 1924, Austrian Rudolph Steiner began to elaborate biodynamic agriculture³, which is based on the anthroposophic⁴ worldview with the initiation of the lecture series in biodynamic agricultural courses. Subsequently in 1932 the

¹ André Leu, *President IFOAM Organics International*, Urs Niggli, *Chair SOAAN*, 2015.

² Schermer, M (2015). From “Food from Nowhere” to “Food from Here”: changing producer-consumer relations in Austria. *Agriculture and Human Values* 32/1, 121-132.

³ Biodynamic approaches farming, gardening, food and nutrition in a holistic, ecological and ethical manner based on the ideas of Rudolph Steiner. It entails a “view of nature as an interconnected whole, a totality, an organism endowed with archetypal rhythm. Biodynamic farming involves managing a farm utilizing the principles of a living organism.” (<http://www.demeter-usa.org/learn-more/biodynamic-principles-practices.asp>; 29.02,2016)

⁴ “Anthroposophy is a human oriented spiritual philosophy that reflects and speaks to the basic deep spiritual questions of humanity, to our basic artistic needs, to the need to relate to the world out of a scientific attitude of mind, and to the need to develop a relation to the world in complete freedom and based on completely individual judgments and decisions.” (<http://www.waldorfanswers.com/Anthroposophy.htm>; 29.02,2016)

precursor of the Demeter¹ association and in 1954 Demeter itself was founded wherein biodynamic farms organised themselves. During the same time Hans and Maria Müller from Switzerland and Dr. Hans Peter Rusch worked on the establishment of organic biologic farming (organisch-biologischer Landbau) principles (Pirklhuber & Gründlinger, 1993; Freyer et al., 2001; Groier & Gleischer, 2005; Freyer et al., 2015; BioAustria, 2016b) focusing on the important role soil health plays in a healthy farming system. These two groups of organic pioneers laid the foundation for the modern organic movement.

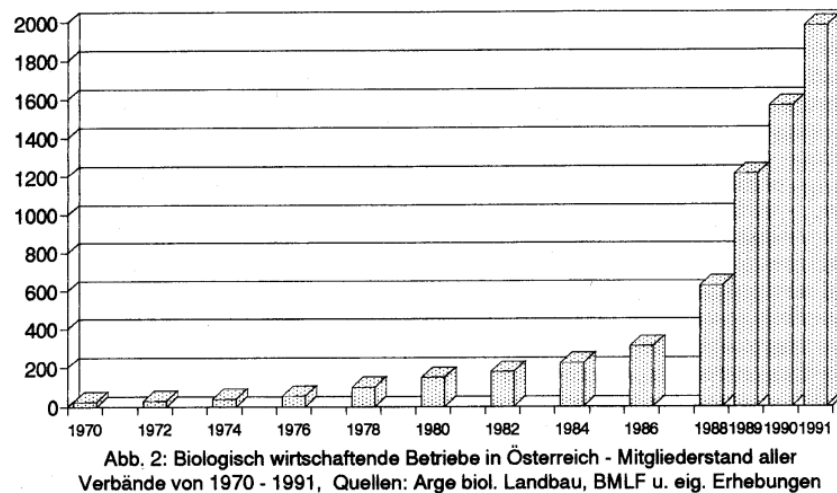


Figure 5: Development of Organic Farms in Austria between 1970 – 1991 (Pirklhuber & Gründlinger, 1993, p.29)

OF developed in Austria through seven steps (Pirklhuber & Gründlinger, 1993; Freyer, et al., 2001; Groier & Gleischer, 2005; Furtschegger & Schermer, 2015; Gesundheit, 2015; RollAMA, 2015; BioAustria, 2016b):

- i.) in 1927 in Carinthia the first farms that identified themselves as ‘organic’ by name were noted;
- ii.) in 1962 the first Organic associations (*Fördergemeinschaft für gesundes Bauerntum (ORBI)*) were established;
- iii.) a phase of formal consolidation and increasing number of Organic associations including advisory and extension services were established as well as organic farms (see figure 3); research in organic leads to organic in the field and in 1983 *Biologische Landwirtschaft* (English: OF) was included into the *Codex Alimentarius Austriacus*² and therefore a legally binding concept;
- iv.) at the end of the 1980s, OF guidelines and support for conversion from conventional to OF were ameliorated;
- v.) since the early 1990s, OF began to experience its fastest development in number of farms and area (see figure 4) due to policy support (BIO-Aktionsprogramm; see Chapter public policies), direct payments to organic farms and the engagement of large Austrian supermarket chains in organic retail;
- vi.) since 2000, the organic market in Austria has become “internationalised”, consolidating the number of its organic farms; BIO-Austria is formed in 2005 resulting in the largest organic association in the EU;

¹“Demeter is the brand for products from biodynamic agriculture. (...) [and] with more than 80 years, the oldest agricultural association with more than 3,200 farms worldwide and around 100,000 hectares land. As an international organic brand, Demeter is represented in all continents – from Argentina to Hungary – agriculture follows Demeter guidelines in 38 countries. Gardening, food and nutrition in a holistic, ecological and ethical manner based on the ideas of Rudolph Steiner. It entails a view of nature as interconnected.” (http://www.naturata.com/en/qualitaet/demeter_qualitaet.html; 29.02.2016)

² The *Codex Alimentarius Austriacus* is a collection of regulations, standards and product descriptions for a wide variety of foods, which was developed more than 115 years ago (<http://www.lebensmittelbuch.at/>)

- vii.) steady growth of the Austrian organic market (around 7,3% of total Austrian food sales in value in 2014 – in figures 8 the total value of organic share in specific product groups is indicated) and the conventionalization debate escalates.

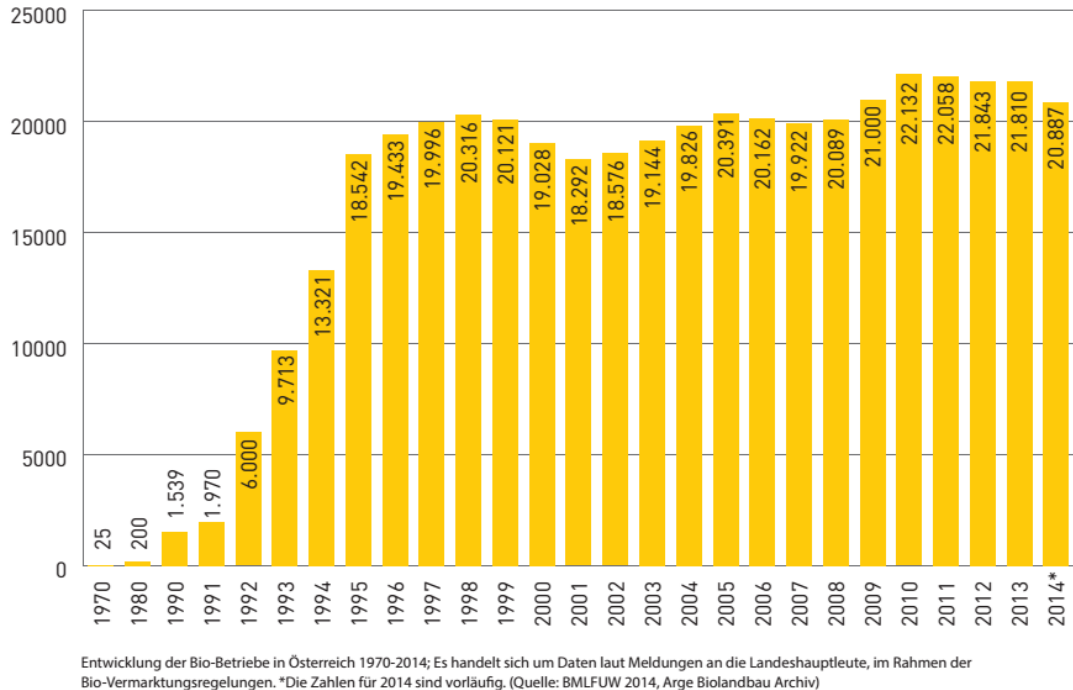


Figure 6: The development of Organic Farms in Austria between 1970 – 2014 (BioAustria, 2016a).

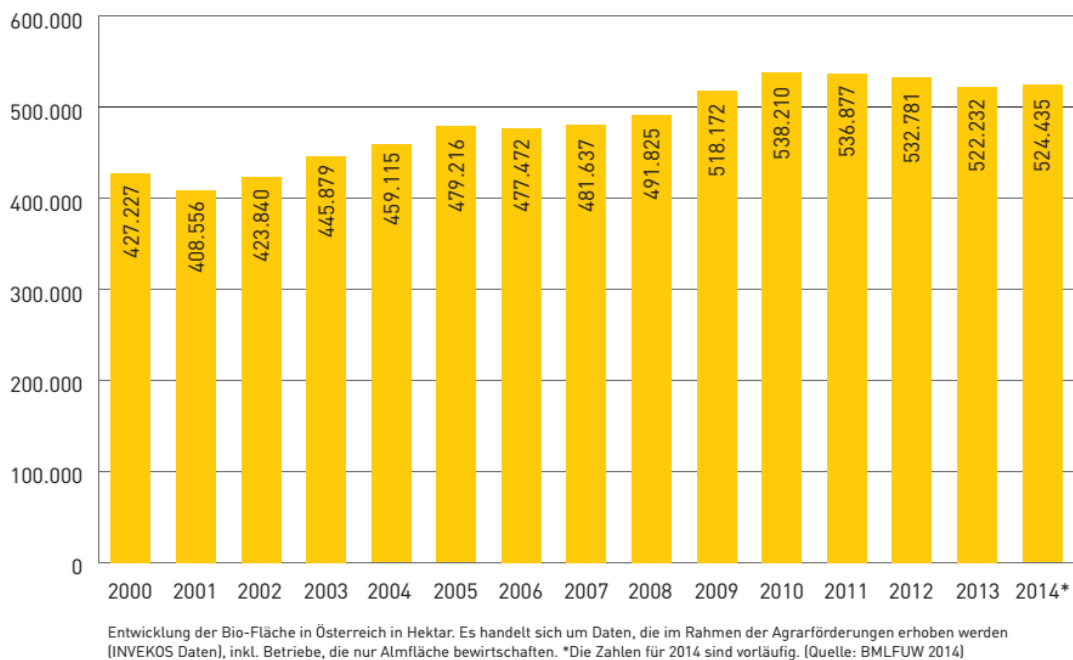


Figure 7: The development of area under Organic cultivation in Austria between 2000 – 2014 (BioAustria, 2016a).

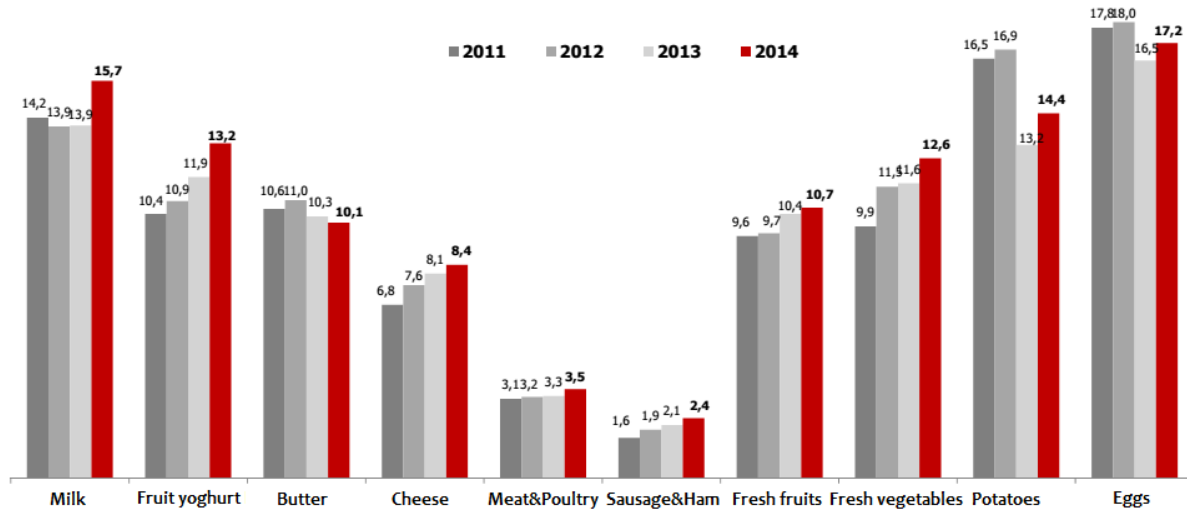


Figure 8: Organic share of the total value in specific product groups between 2011 and 2014 (RollAMA, 2015, p.3)

Stemming from German ecologists, AE's origins first began in Germany (Wezel & Soldat, 2009). Austria, having a similar academic background, also has a longstanding tradition with AE as a scientific discipline. As AE is prominently acknowledged in academic settings, it is most accepting of popular definitions more aligned to the scientific disciplines. In interviews with staff at the University of Natural Resources and Life Sciences, Vienna¹, AE in Austria was explained as 'everything dealing with agriculture.' Yet questions concerning outside farm influences from culture and society were deemed as outside of the frame of reference. The definition seemed to resemble that of:

"The definition of agroecology provided by the Department of Crop Science (section of agroecology) at the University of Göttingen (2008), probably summarises both the evolution and the most common current definition of agroecology in Germany best: 'Agroecological analyses focus on plant and animal communities, food web interactions, and conservation biology in temperate as well as tropical agricultural landscapes and agroecosystems'".

(Cited from: Wezel, et al., 2011).

Staff at BOKU claimed not to have any defined borders when it comes to defining AE, yet their specialized focus on soil, plants, and insects and their interaction within agricultural systems define the borders of the research done. Experiments and research seemed to deal with a very positivist approach of quantitative nature, rarely or not associating to the dimension of AE as a movement at all. Implemented projects such as the evaluation of the impacts of agro-agricultural production methods on wild life highlight these very biophysical interpretations of AE at the university, as a scientific discipline but also as a practice through experimenting with different agroecological techniques. Although policy was seldom mentioned, some governmental programs are known to support the more widespread use of such techniques (ÖPUL Österreichisches Programm für umweltgerechte Landwirtschaft, 2015) and field trials.

¹ Also known as BOKU. BOKU is the leading university in Austria concerning AE as a scientific discipline and as a practice.

Aside from these more formerly recognized traditions of scientific discipline and practical implementations of techniques, there are many related movements within Austria. These movements do not necessarily explicitly employ or define AE, yet they share certain congruencies.

As representatives from the Division of Organic Farming, and from a working group recognized for examining social change while focusing on transdisciplinary systems through sustainable agriculture, the authors find it important to stress their point of departure. We see the need to include social and economic aspects into our working group's definition of AE as well as agroecology's relationship with the organic movement.

There has been little written about agroecological and the organic movements. There has been more written about the relationships or the differences of agroecology as a practice or science and organic farming, hence leaving out the external movement aspects. See figure 8 below, for a comparison of organic farming and AE's central attributes as seen by Bellon et. al, (2009). Many proponents of AE define organic farming as a production system (Altieri & Nicholls, 2003). The conventionalisation debate of organic agriculture (Bartel-Kratochvil, et al., 2009; Darnhofer, Blanc, et al., 2009; Darnhofer, Lindenthal, et al., 2009; Darnhofer, et al., 2010) is often referred to in this context, as agroecologists often see the addition or the umbrella of agroecology to organic agriculture as a possibility to further guide the current organic system by including additional agroecological principles. Because of agroecology's distance from institutionalisation to the extent of organic with standards, regulation, certification, and political agendas, it is also seen as a possibility to circumvent some of the economic and institutional interests and to replace resulting hindrances with possibilities that come from a less manipulable form of sustainable agriculture (Altieri & Nicholls, 2003). Agroecology is seen by some as a possibility to rescue organic farming from the risks of conventionalization by offering a broader approach:

“...we could conclude that organic farming is a specific set of certified practices, and sustainable agriculture is a long-term goal. Agroecology is the term best suited for serious study of the many interacting components in the complex structure and function of agricultural systems, and a palatable way to introduce practical systems research into academia. Some of the confusion and overlap in use of these terms is the confounding of ideas and language used to describe systems with courses in the university that challenge the long-term viability of current systems”. (Francis, 2009, p. 288-289)

	Organic Farming	Agroecology
Definition	System of farm management and food production	Various e.g. Interdisciplinary study and design of agricultural and food systems (Gliessman, 2007)
Initial paradigms	Soil fertility (and soil sciences)	Ecology (and entomology)
Key concepts	Farming system ; Value chain	Agroecosystem; Food sovereignty
Reference models	Mixed livestock-cropping	Traditional multistratified systems
Agricultural forms associated	Biological, Biodynamic, Organic	Alternative, Sustainable agriculture, Integrated Pest Management
Key actors	Farmers, processors, consumers	Diversified small farmers
Technologies	Use of natural substances and processes; no GMOs	Nutrient cycling; biological crop protection; possibly chemical inputs
Food	Quality, content, health	Agri-food systems, sovereignty
Biodiversity	Impact oriented (effect of practices on biodiversity)	Resource oriented, enhancing agrobiodiversity
Regulations	Historical recognition, IFOAM principles, and national rules	No international standards acknowledged
Certification	Mostly third-party	Participatory guarantee systems

Figure 9. Comparative analysis of central attributes in Organic Farming and Agroecology (Bellon, et al., 2009, p. 3).

Regardless of the continued confusion over definitions and relationships of AE and organic farming as well as the lack of discussion about the relationships between AE as a movement in comparison to organic farming as a movement, they nonetheless share a relationship that affects each other. Part of this relationship is seen and manifested at the political level. Due to funding circumstances and a political agenda for sustainability and organic farming in Austria, such policies have implications for agroecological agendas as well. See in the section *Public Policies* (political landscape for AE and organic) below.

From the first forerunners nearly one century ago up until today OF underwent a diversification and harmonisation in values, regulations, organisations and institutions. In the last twenty years the evolution of both the “institutionalization of organic farming” (Michelsen et al., 2001) and its conjointly appearing with the uptake of OF regulations into legal frameworks have evoked a further debate on the “conventionalisation” of OF and marketing. This debate has brought about a line of questioning confronting organic ethics and their role in the organic food system (Bartel-Kratochvil, et al., 2009; Darnhofer, Blanc, et al., 2009; Darnhofer, Lindenthal, et al., 2009; Darnhofer, et al., 2010). This confrontation of the organic ethics has also spurred the elaboration of the four principles of OF via a consultative process by the International Federation of Organic Agriculture Movements (IFOAM). Whereas the four IFOAM principles strongly entail an eco-centric and holistic view:

“Humans and nature are connected, but ecosystems and nature have precedence over human interests (Hay 2010), a statement which might be discussed controversially in the organic movement.” (Freyer & Bingen, 2015, p. 19)

Freyer and Bingen (2015) offer a deontological dimension as a guidance for further development of the organic sector as part of the *organic movement*. This includes the increased importance of standards and its surrounding institutionalisation such as third party certification (Fouilleux & Loconto, Forthcoming 2016). This third party certification imparts a major challenge for the whole organic sector in its role of being recognised as a *movement* with claims targeting the current food regime due to its consequentialist dimension. The consequentialist or teleological perspective argues:

“the purpose sanctifies the means” (“Der Zweck heiligt die Mittel”) (Schroth 2009). Consequentialism declares the rightness of the outcome or the good result of the action as the moral instance of their acting (Barnett et al. 2005, p. 5). It is also clear that a growing number of actors apply the IFOAM Standards because they are mandatory and not from a sense of duty or moral obligation. This utilitarian orientation favors the individual and consumer perspective rather than a community- and citizen based approach (Carruthers 2009, p. 299). Such approaches arise in organic practices that are followed primarily to maximize profit, with little or no attention to social and economic justice or ecological concerns. This position essentially disregards the IFOAM Principles.” (Freyer & Bingen, 2015, p.21)

These tendencies in OF could be an opportunity for the emerging importance and future of AE, however they can also embody weakness if AE becomes more institutionalized such as OF.

FRANCE

definition and evolution of agro-ecology

In **France**, in order to standardize the range of meanings relating to agro-ecology, an official definition was written in the framework of the “Loi d’Avenir” law in 2014¹: **agro-ecology is the « Application of ecological science by studying, conceiving and managing sustainable agro-systems»**. it assumes that «agro-ecology is not limited to organic, but is a production system which favours the farm autonomy and the improvement of their competitiveness by lessening the consumption of energy, water, fertilizers, phytopharmaceutical products and veterinary medicines. It comes to integrating the ecological dimension as a competitiveness factor».

¹ Cf. Journal Officiel : Légifrance/ <http://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000029574297&categorieLien=cid>

Yet, we can see that the scientific literature gives a wider place to organic farming and considers it as one of the most advanced prototypes¹ for an agro-ecological pattern which answers the current environmental and food stakes. This imbalance between the law text and the scientific literature enables to remind -according to Pierre Eric Lauri²- « the contrast between on the one hand official positivist declarations which focus on a new agriculture based on ecological intensification; and on the other hand the reality of its application by the agricultural world actors. At the epistemological level, agro-ecology does refer to a “break” which changes research practises as well as agricultural practices. If, in general, organic farming in France presents good figures, there is still room for improvement.

This dynamic of conversion, as seen on the graph above, is an indicator of vitality and attractiveness for this production mode. Nevertheless, if the organic products market went from 1.5 to 5 billion euros from 2005 to 2014, it only represents 2.4% of the French food market.

Generally in France, the lights are green from production to consummation. The Barnier plan, « organic farming 2012 horizon» did not reach its objectives to triple organic areas going from 2% to 6% of the total cultivated area in 5 years. The « Ambition bio » plan, presented in 2013 seems achievable for the sector actors, the objective being 8% at the end of 2017. But the weight of conventional sectors can be an obstacle to the generalisation of the organic.

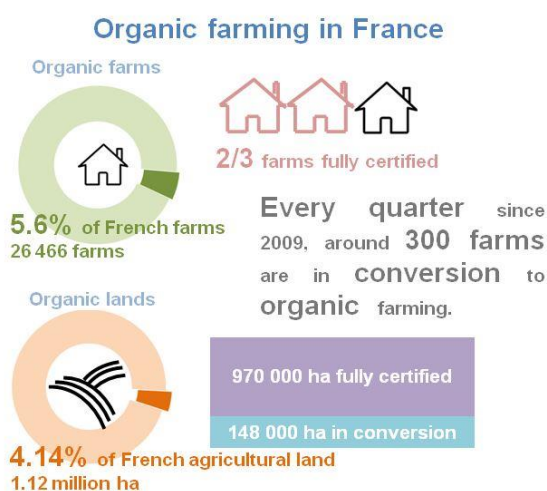


Fig 10: Organic farming in France, Data source in 2014 Agence Bio.

At the regional level, the numbers show a great inequality. Five regions are ahead with almost half of the total cultivated area committed in organic farming.

Other studies showed the strong link between agroforestry and organic farming. Almost half of the plots in agroforestry are worked by “organic” farmers. The two approaches notably have in common the reintroduction of medium-long term in the agricultural landscape.

With the Rural Development Plan 2 (PDR2), the EU introduces a specific help for the planting of inter-plot tree lines³. These aids were taken back in the new program. The trees and the hedges are now protected for the condition of the help and are a component of Ecological Interest Areas (EIA). Then, the reintroduction of trees in the agricultural systems would be an important gauge (indicators) of an agriculture which uses ecosystem-friendlier practices, by deeply reducing the risks of erosion, by improving the crop resilience to climate change, and favour biodiversity by the biotopes preservation, good for the crop auxiliaries.

It's also interesting to analyse the other definitions of AE most widespread in France.

¹ Stéphane Bellon, *Organic Farming, prototype for sustainable agricultures*. Servane Penvern Editors, 2014.

² Pierre Eric Lauri, *Conception de systèmes horticoles innovants, bases biologiques, écologiques et socio-économiques*, July 2014, INRA.

³ Philippe Balny, Denis Domallain, Michel de Galbert, *Promotion des systèmes agroforestiers, proposition pour un plan d'actions en faveur de l'arbre et de la haie associés aux productions agricoles*. February 2015. CGAAER. Report n° 14094. <http://www.ladocumentationfrancaise.fr/rapports-publics/154000303/>

For the l'INRA¹ (Institut National de la Recherche Agronomique), agro-ecology is defined as a discipline at the crossroads of agronomy and ecology: « *agro-ecology consists in a whole range of practices and an emerging. It leads to tomorrow's agriculture. As much production will be involved, but more ecologically while remaining profitable* »². The works led in 2009-2011 enabled to draw an inventory of existing technical solutions, designed or studied in order to improve the farm environmental performances. To do so, three leads were followed:

- Use biodiversity at different scales in agricultural systems³,
- Deal with landscapes and territories and go from a plot management to a landscape management.
- Close off the great cycles (carbon, nitrogen, phosphorus, ...).

The idea is to develop solutions adapted to each mode of production (breeding, arable crops, permanent crops and horticulture) in organic farming, conventional or very intensive on agro-ecological basis. The landscape and territory management, through space organisation of plots and agro-ecological infrastructures (AEI), grass strips, wet lands; acts on the water availability and quality, on the pesticides transfers, and on the bio-agents or pollinators regulation. No system is left aside; all can benefit from research contributions for resilient systems based on the living but also on techniques and innovations.

For the CIRAD⁴ (Centre de coopération internationale en recherche agronomique pour le développement/ Center of international cooperation in agronomic research), specialist of tropical and Mediterranean agricultures, “*agro-ecology mobilises ecological utilities of agro-systems to ensure agricultural production in a more sustainable way...* ». It is important to understand:

- the devices to amplify the biological and ecological regulations and to improve the use efficiency of resources in agro-systems,
- the natural processes by studying the functioning and the biological, ecological and biophysical devices, which regulate the agro-ecological systems and their ability to propose realistic alternatives to the conventional production patterns.

That is with scientific works, mainly led in Mediterranean and tropical countries with local actors that the CIRAD develops its research projects on agro-ecology. This contact with the field reinforces the communication and the collaborations between actors in order to conceive, adopt, and spread agro-ecological systems, adapted to the diversity of encountered places.

For the CNRS⁵ (Centre National de la Recherche Scientifique), agro-ecology refers to an eco-friendlier agriculture, limiting among other things, the use of fertilizers by enabling biodiversity in cultivated plots. For the CNRS, the social sciences contributions are crucial in the understanding of Man-Nature interactions. The aim of the researches on agro-ecology is to analyse and compare, on a long-life time, the evolution of agro-ecosystems and their agro-biodiversity (including transitional heterogeneity, intra and interspecific diversity of grown species, the knowledge and know-how associated to their handling). These patterns make us think on different forms of joints between social practices, biological processes and effects on agro-biodiversity, in the long run. This leads to deal with agro-ecosystems resilience in the context of current environmental issues.

For the ITAB (Institut Technique de l'Agriculture Biologique technic institute of organic farming), « organic farming (OF) is currently the only form of agro-ecological agriculture agreed worldwide⁶. The works produced by the ITAB in favour of organic farming take part in the national program “Agro-ecology and producing differently” (see part II). They are centered on 4 lines:

¹ Cf. INRA, science et impact, *Colloque agro-écologie et recherche, synthèse des ateliers*, 17 oct. 2013,

² *Ibidem*.

³ Plot, farm, exploitation, drainage basin, territory

⁴ CIRAD : centre de recherche agronomique pour le développement : <http://www.cirad.fr/nos-recherches/themes-de-recherche/agro-ecologie/que-fait-le-cirad>

⁵ CNRS : Centre national de recherche scientifique : <http://www.cnrs.fr/inee/communication/breves/b119.html>
<http://www.cefe.cnrs.fr/fr/recherche/ines/ibc/grd-3353-mosaïque-2>

⁶ Cf. ITAB, *du côté de l'ITAB et son réseau*, mai 2013, <http://www.itab.asso.fr/downloads/du-cote/itab-mai2013.pdf>

- the importance of formation (theoretical and practical),
- the need of tools and of public policies in favor of farmers' setting,
- the OF research works sharing at a European level,
- the lifting of regulatory constrictions linked to genetic material, animal and plants and inputs..., which limit the OF developing.

For the association Terre et Humanisme, Pierre RABHI defines agro-ecology as: « *aiming at the harmonious relation between Human and Nature, agro-ecology is both an ethical way of life and a farming practice... Agro-ecology is for us much more than a simple agronomic option. It is linked to a deep dimension of life respect and it puts the human-being back in his responsibility towards the Living.* » So, Terre et Humanisme, with its wealth practical experience in Africa and elsewhere, proposes 10 keys to consider agro-ecology:

- a tillage which does not change the soil's structure,
- an organic fertilisation,
- phytosanitary treatments as natural as possible,
- a sensible choice of best adapted varieties,
- water: saving and optimum use,
- using the most balanced energy, from hydraulics or animal origin
- anti-erosive works for cultivated areas,
- the setting of planted trees and hedgerows,
- the reforestation of available and bare areas,
- the rehabilitation of traditional know-hows.

In Parole d'Agronome¹, Jean Pierre SARTHOU defines agro-ecology as the: “*genius od agro-ecosystems, gathering all the know-hows aiming at putting in an agro-ecosystem in order to make it sustainably productive: the management of “abandoned ones”; hedges, copse, grass strips, pools... becomes a structuring element of agricultural practices. This is about optimising the management of auxiliary fauna and flora and to really introduce them in a global approach of the agricultural production.*”

For the **Bergerie Nationale**, the agro-ecology definition, which suits better is the one highlighted by the institutional framework and the Law on the future of agriculture to insure its missions of following and educational support for agricultural education schools, towards the agro-ecological transition.

ITALY

definition and evolution of agro-ecology

In **Italy**, In Italy two of the precursors of agro-ecology were the agronomists Pietro Cuppari (1816-1870), professor at Pisa University (famous for his studies on the farm as agroecosystem²) and Girolamo Azzi (1885-1969), professor at Perugia University, the founder of the agrarian ecology³. The pioneering work of Cuppari was later re-assessed and expanded by Alfonso Draghetti with a seminal book entitled Principles of physiology of a farm (1948)⁴. More recently, since the '80s, stands out the scientific activity of Fabio Caporali, professor at the Tuscia University of Viterbo; in 2015 he published the “History and development of agroecology and theory of agroecosystems”⁵.

According to the most recent Italian studies, the **Agro-ecology is the application of the ecological science and**

¹ cf. In paroles d'agronomes/2010, Villarceaux: <http://www.agronomie.asso.fr/en/meeting-professional-diversity/down-to-earth/lagroecologie-lavenir-de-lagriculture/>

² Fabio Caporali (2015), Pietro Cuppari precursore dell'agroecologia e del governo sostenibile del territorio, ETS editore

³ Girolamo Azzi (1928), Ecologia agraria, Unione tipografico-editrice torinese

⁴ Alfonso Draghetti (1948), Principi di fisiologia dell'azienda agraria, Bologna, Istituto editoriale agricolo

⁵ Fabio Caporali (2015), History and development of agroecology and theory of agroecosystems. In “Law and Agroecology” (Monteduro M., Buongiorno P., Di Benedetto S., Isori A. Eds.), 3-29, Springer

principles to agricultural systems. It involves various approaches and dimensions, such as environmental, economic, ethical and social aspects.

Agro-ecology is considered today a transdisciplinary field of enquiry that is capable of changing our common vision of both agriculture and society¹.

“Ecology studies the relationship between living organisms and the environment in which they develop. This necessarily entails reflection and debate about the conditions required for the life and survival of society, and honesty needed to question certain models of development, production and consumption”⁴.

“It cannot be emphasized enough how everything is interconnected. Time and space are not independent of one another, and not even atoms or subatomic particles can be considered in isolation. Just as the different aspects of the planet – physical, chemical and biological – are interrelated, so too living species are part of a network which we will never fully explore and understand. A good part of our genetic code is shared by many living beings. It follows that the fragmentation of knowledge and the isolation of bits of information can actually become a form of ignorance, unless they are integrated into a broader vision of reality”⁴.

“When we speak of the environment, what we really mean is a relationship existing between nature and the society which lives in it. Nature cannot be regarded as something separate from ourselves or as a mere setting in which we live. We are part of nature, included in it and thus in constant interaction with it”⁴.

It is now necessary to move towards an **“Integral Ecology: environmental, economic and social”**².

Agroecology in Italy is inherently connected to the development of organic farming, therefore this report provides an overview of this sector, with a special focus on the new territorial approach (Bio-districts/Eco-Regions).

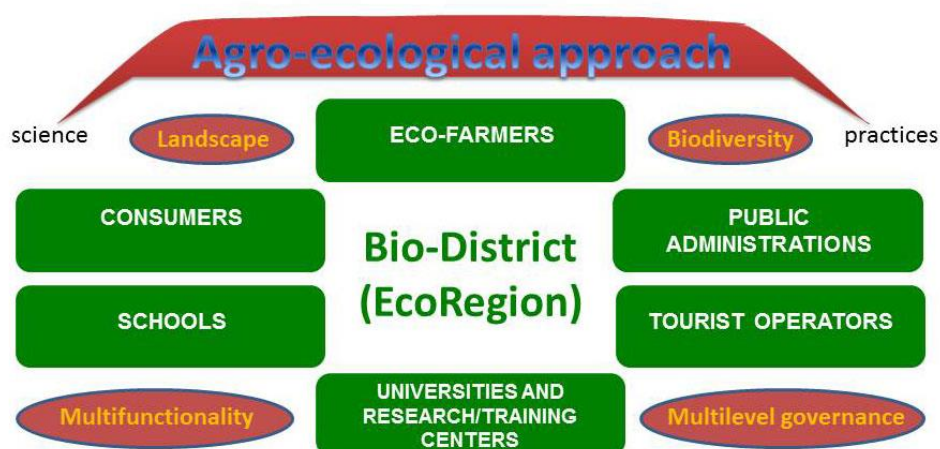


Figure 11. Agro-ecological approach of Bio-districts/Eco-Regions. Source: IN.N.E.R. 2015. www.ecoregion.info.

In a Bio-district the promotion of organic productions is inextricably linked with the promotion of the land and its special characteristics. So, it can be fully realized its economic, social and cultural potential.

The Bio-districts experience, originated in the year 2004 by AIAB Campania in Cilento area (Province of Salerno, Italy), is today spreading across the country. At present 15 Bio-districts are operating in 10 regions (Campania, Calabria,

¹ Fabio Caporali (2010), Agroecology as a transdisciplinary science for a sustainable agriculture. In "Biodiversity, Biofuels, Agroforestry and Conservation Agriculture" (Lichtfouse, E, Ed.), 1-71. Springer.

² Holy Father Francis (2015), Laudato si', Encyclical Letter on care for our common home (<http://w2.vatican.va>)

Latium, Marche, Tuscany, Liguria, Piedmont, Trentino Alto Adige, Lombardy, Sicily). In 2014 was established the International Network of Eco-Regions (Bio-districts), based in Rome.

The Bio-districts are in line with the Organic 3.0 model, more holistic and dynamic.

Bio-district is a territory of a sub-regional level with a no profit association amongst agriculture enterprises and agro-food farmers, citizens/consumers, even associated together as with the fair trade groups, local public administrations, national and regional parks, protected natural areas, commercial, touristic and cultural enterprises, social cultural and environmental associations. They act according the principles and methods of the organic production and consumption and agro-ecology.

Each Bio-district is marked by lifestyle, nutrition, human relations, nature. It results that agricultural productions are more valuable and typically characterized, hence more appreciated by the market.

The productions resulting from the link between territorial vocations and production techniques are often enhanced by setting in production areas the stages of processing the agricultural product.

Hence the food product in these areas also becomes cultural heritage and a local identity mark: local economic and social actors become more responsible in the management of natural and environmental resources, which are common to several sectors (agriculture, tourism, commerce, etc.). This awareness has made the mobilisation and the protection of local resources more easy, most of all those related to agricultural systems and to agro-food industry.

An integrated approach of sustainable development is adopted by a Bio-district. The different actors are involved for shared purposes: the improvement of the life quality, the employment of local population and the reduction of population's decrease in rural areas, the employment increase of young people and women, and of the quality of agro-food productions and of local livestock premises.

Also to ensure the consumers safety, a traceable and healthy food, the increasing and seasonal regulation of tourist flows, through a multiple eco-tourism and local culture supply, biodiversity protection, enhance landscape and natural resources.



Figure 12: Bio-districts in Italy (Source IN.N.E.R.) 2015

ITALIAN BIO-DISTRICTS DATA

BIO-DISTRICT	MUNICIPALITIES INVOLVED (N°)	SURFACES (Kmq)	POPULATION (N°)	ORGANIC OPERATORS (N°)	ORGANIC USED AGRIC. AREA (HA)
Cilento	32	3.196,00	269.846	400	2.000,00
Grecanico	12	600,00	48.000	250	1.300,00
Via Amerina e Forre	10	428,00	70.000	197	4.266,00
Greve in Chianti	1	169,38	14.351	40	300,00
Chianti storico	1	129,00	2.698	40	390,00
San Gimignano	1	138,60	7.770	42	192,50
Val di Gresta	3	30,25	13.102	55	423,00
Val di Vara	7	345,00	6.368	94	2.386,00
Valli Valdesi	28	1.350,00	55.000	60	640,00
Il Piceno	18	400,27	54.427	60	600,00
Valle Camonica	10	1.335,00	118.000	20	455,00
TOTAL	123	8.121,50	659.562	1.258	12.952,50

Figure 13: Italian Bio-districts data (IN.N.E.R. 2015).

Data not available for the recent bio-districts of “Valle dei Laghi”, “Montalbano”, “Eolie”, “Simeto”, “Baticòs”.

The Bio-districts are therefore a real answer to the present trend of economic development causing massive phenomenon of abandonment of rural areas and the increasing urbanization of people in search of better condition of life and a higher income. The process affects both the most industrialized countries and developing countries, causing the degradation and the progressive impoverishment of territory resources, the loss of biodiversity and of the cultures and traditional knowledge.

The practices of Bio-districts are characterized by the agricultural and agro-food enterprise multifunction: a set of activities increasing its entrepreneurial added value as the renewable energy production (solar and bio-mass), the teaching-farms, the agro-schools for children, leisure activities as gardening care, kitchen courses in countryside, social agriculture for disabled people, imprisoned and drug addicts, direct and farmer markets, the maintenance of parks, gardens and the landscape preservation.

The multifunctional agriculture demonstrates that agro-farmers, in addition to ensure food production, increasingly important in the future, patrol and protect the territory, the biodiversity, the hydro geological balance, the landscape, natural resources, first of all water and land, local culture and traditions. It is an overall approach to the farm management: the agro-food production, that combines best environmental practices, a high level of biodiversity, preservation of natural resources and the application of high level animal welfare standards, as well as production methods following the responsive preferences of a growing part of consumers for products obtained from natural substances and processes.

The development processes in the Bio-districts' territories focus therefore on these specific features, latent factors of

development and topics of great significance, also linked to the considerable potential of the hidden resources existing in these areas.

In this way it is possible to make enjoyable and attractive the territories, acting on a whole of factors and trying to improve local agro-food productions and other economic sectors, to improve the transports, the use of renewable energies, enhancing cultures and local know-how, to invest in education at all levels, offering health services of good quality for all, circulating information, giving everybody access to the new Information and Communication Technologies and, most of all, promoting a long lasting and pro-active dialogue between institutions, associations and private sector.

This last issue is perhaps the most significant: agriculture and food production made through the social dialogue, direct commercialisation, by giving concrete answers to responsive consumers, can create growth and new employment, at the same time enriching the community. This practice of economy of development joints together sustainability, ethic labour and social cohesion.

The constitution of the IN.N.E.R. association intents answer to a double need of the Bio-districts: from one side strengthening the practices in place through a *coordination* strategy for development and continuous innovation, with a common line of action and exchange of information and experiences; on the other side sustaining the practices through a supporting *political* capacity at local, national and international level.

Operationally these goals also meet the challenges of the Bio-districts for the years to come:

- **To increase the quality of organic production** through further use of *research and innovation*, by the building of networks with IFOAM (International Federation of Organic Agriculture Movement) and the development of products, processes, practices and innovative technologies together with the protection of ecosystems and landscape: innovative methods for the management of pests, diseases and weeds; ecological plant protection; reduction of energy consumption of the greenhouses; improvement of soil fertility; more efficient use of energy; coexistence of organic farming and non-biological ingredients; and techniques for the processing of organic food by creating a virtuous circle of dissemination and exchange of information, knowledge and experiences.
- **To improve and strengthen the multilevel governance policies**, open and actively participated by the citizens; facilitate social dialog on reproduction and rationalization of the natural resources used (water footprint and biodiversity), pollution reduction (carbon footprint) and animal welfare.
- **To involve all territorial actors** and adopt the *measurements* of the undertaken processes which enable, in fact, a greater food security, increase the consumer's confidence, allow an easier access for the small workers to the organic system, in an ambitious and rigorous context of rules for the certification of products. Furthermore it is worth to adopt the electronic certification to improve the territorial traceability of products.
- Finally, to **promote and implement actions of international cooperation** for the spread of the Bio-districts network, to help solving the serious imbalances of the current development that, together with some advantages, also produce poverty, exclusion, conflicts, violence and a serious decay of the environment that threaten the future of all. This line of activities is complementary to and integrate multilateral agreements amongst countries to enhance food security and the high quality of organic products.

The IN.N.E.R. network works through 4 interlinked *thematic groups* with the participation of the representatives of each adherent Bio-district:

Eco-tourism, to enhance and improve the quality of the Bio-district touristic offer with an innovative integration among natural and cultural resources, the artistic and architectural heritage and wide choice of hospitality, the improvement of environment and landscape, the promotion of culture, traditions and local knowledge, and of national and international markets.

Agro-food systems, to improve the connection of the typical productions of excellence from the Bio-districts with the extra-local and foreign markets and with consumers in national and foreign urban areas, through new channels and commercial services, making the public administrations sensitive to their green procurements; to increase the responsibility of the local economic and social actors in exploiting and preserving natural and environmental

resources, reinforcing the integration between primary production, transformation and marketing methods, in order to improve the distribution of its added value in support of the agro-farms.

Energy to support the creation and to secure local chains of renewable sources by the monitoring of technological trends of energy systems and by facilitating connections with the institutions and national expertise centres. Energy saving and the production of renewable sources are encouraged, as well as the sustainable exploitation of biomass, favouring investments dedicated to energy conversion; the closure of the production and consumption cycles, and the creation of business systems for the treatment and energy production, derived from the use of solid and liquid animal waste, are also fostered.

Social inclusion, in order to deal with the issue of agriculture and social inclusion of disabled people, imprisoned, drug addicts, immigrants and at the same time the residents' quality of life, in order to facilitate integration into the local community of disadvantaged groups and experiment new forms of welfare.

According to the latest SINAB Report "Bio in cifre 2015"¹ (Organic numbers), in Italy there were **1,387,913 hectares** of organic agricultural land (share of **11.2% of the Italian UAA** – Utilized Agricultural Area) at the end of 2014, and **55,433 organic agricultural holdings** (+ 5.8% compared to 2013).



Figure 14: The development of operators and area under Organic cultivation in Italy between 1990 – 2014 (SINAB "Bio in cifre 2015")

The Italian Regions with the largest number of organic operators were, at the end of 2014, Sicily (9,660), Calabria (8,787) and Apulia (6,599). These regions accounted for more than 45% of the total Italian organic operators.

The largest extension of organic surfaces was also located in these three regions, respectively with 303,066 hectares in Sicily, 176,998 hectares in Apulia and 160,164 hectares in Calabria. The organic surface of these three regions accounted for 46% of the national organic surface.

¹ Bio in cifre 2015, published in February 2016, SINAB – Italian Information System for Organic Farming (<http://www.sinab.it>)

The regions with a higher percentage of organic farmland on total cultivated surfaces were: Calabria, where the organic surfaces accounted for about 30% of the total areas; followed by Sicily, with 22%, and Lazio, with 19%.

	Producers exexclusive	Producers / Processors	Processors exclusive	Importers	Total 31/12/2013	Total operators 31/12/2014	Var. % '14 - '13
TOTAL	42.546	6.104	6.524	259	52.383	55.433	5,8
SICILIA	8.492	531	625	12	9.88	9.660	-2,3
CALABRIA	7.860	680	243	4	7.16	8.787	22,6
PUGLIA	4.803	1.223	563	10	6.25	6.599	5,5
TOSCANA	2.621	1.063	472	-	3.70	4.156	12,3
EMILIA ROMAGNA	2.678	327	816	55	3.71	3.876	4,2
LAZIO	2.607	269	363	8	3.22	3.247	0,8
SARDEGNA	2.233	100	74	-	2.22	2.407	8,0
MARCHE	1.707	263	211	6	2.16	2.187	1,2
PIEMONTE	1.361	294	424	41	1.99	2.120	6,1
CAMPANIA	1.474	190	343	9	1.92	2.016	4,8
VENETO	942	276	619	43	1.80	1.880	4,2
LOMBARDIA	725	243	697	35	1.72	1.700	-1,4
ABRUZZO	1.074	179	204	4	1.44	1.461	0,9
BASILICATA	1.047	96	81	1	1.16	1.225	5,1
UMBRIA	891	183	137	6	1.20	1.217	1,2
PA BOLZANO	830	8	247	7	1.644	1.092	6,1
PA TRENTO	534	-	116	2		652	
FRIULI VENEZIA GIULIA	220	87	128	6	417	441	5,8
LIGURIA	207	59	113	10	385	389	1,0
MOLISE	165	24	41	-	238	230	-3,4
VALLE D'AOSTA	75	9	7	-	93	91	-2,2

Figure 15: The development of organic operators in the Italian Regions (SINAB “Bio in cifre 2015”)

In 2014, the main organic productions in Italy were fodder, pastures and cereals, followed by surfaces under olive growing. Even for livestock production, distinguished on the basis of the main farmed species, the data show a substantial increase on 2013, in particular for pigs (+ 15.2%) and poultry (+ 13.9%); slight drop only for cattle and horses. The performance of holdings engaged in organic aquaculture sector also was quite good: in 2014 they grew up to 41. The regional breakdown of organic aquaculture holdings saw a greater concentration in Veneto and Emilia Romagna. According to the Italian Institute of Services for the Agricultural and Food Market (ISMEA) estimates, the **domestic market (off-trade) of organic products in Italy** showed a value of more than **2.1 billion euros**. The estimate does not

include the turnover linked to the on-trade channel, related to sales undertaken by catering, bars and food services. Modern Distribution (hypermarkets, supermarkets, discount stores) and specialized stores, including small, medium and large surfaces, moved a total of more than 75% of the turnover of this segment. Always according to Ismea estimates, Modern Trade, in particular, presented a retail sales value of over 855 million euro, with about 40% share. Specialized store sales reached a volume of about 761 million euro, equivalent to 35.5% of the entire value of the organic retail market. The remaining channels are accredited by ISMEA estimates of an overall incidence of almost 25%, represented for 10% by small farmer markets, direct sales, purchasing groups and e-commerce, for 8.9% by traditional shops and for 5.1% from pharmacies. An almost negligible 0.6% was the overall share of health food stores and drugstores.

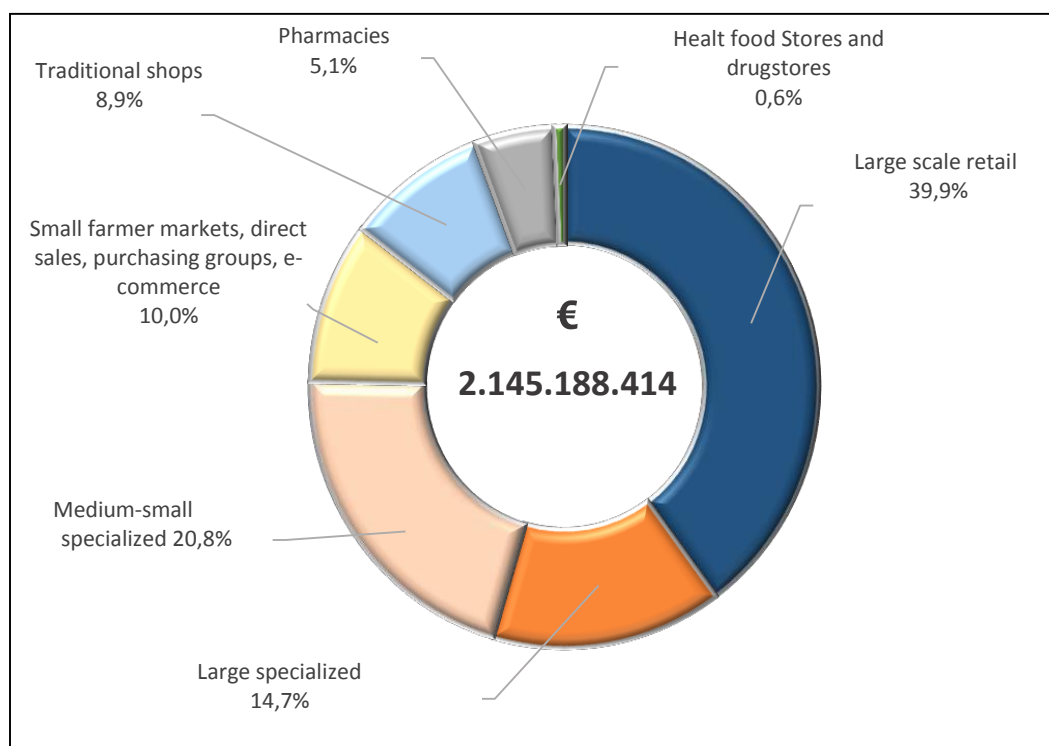


Figure 16: the domestic market (off-trade) of organic products in Italy (ISMEA 2015”).

LITHUANIA

definition and evolution of agro-ecology

In **Lithuania** agro-ecology is not widely spread branch of ecology and is not actively discussed or analysed or applied into practice. The definition of agro-ecology is not approved in legislation of the Republic of Lithuania, as there is no any particular law established on agro-ecology, so far. Nevertheless, there are some researches held, where the definition is stated. Below are the three definitions available in Lithuanian dictionaries and researches. In general, they do not differ a lot:

- Agroecology - (agri- eco + Gr. Logos - science; ch. Agro / ecology) – The branch of ecology investigating interrelations of cereals, vegetables and fruits biocenosis and external conditions on those relations and linkages (Internet Lithuanian dictionary, www.lietuviuzodynas.lt)
- Agroecology (syn. Ecologic Agriculture) - branch of ecology science which studies relations of crops biocenosis and external conditions on those linkages. It examines the concepts, principles, development and management of agricultural systems. Agroecology is an evolving science, covering agronomy, economy and sociology (V. Pilipavičius, 2007).
- Agroecology investigates interrelations of cultivated plant biocenosis and impact of external conditions on the formation of relations. (International word dictionary. Chief encyclopaedia, 1985).

The term “ecology” is well known among population and have been developing for more than 25 years in Lithuania. It would be hardly to find a person who would not heard anything about ecology. To the word 'ecology' people give different meanings: one - as "green" movement, for others - a complex science, for third - confusing system of certification, for others - a desirable, but hardly possible way of life, a task only for the elite.

In general, the ecology (Greek *oikos* – “house”, “homeland” + *logos* – “science”) defined as science dealing with the relations and interactions between organisms of animate and inanimate nature and biological systems of the higher than the body levels (Lithuanian Dictionary in Internet, <http://www.lietuviuzodynas.lt/terminai/Ekologija>).

Definition of The organic farming is the most clearly regulated sector of ecology in the legislation of Lithuania. Organic Agriculture is the system of agriculture in compliance with the requirements of the Ministry of Agriculture for production of organic agriculture and food products (The law of agriculture and rural development of the Republic of Lithuania, 2002).

As there is no data on agro-ecology farms in Lithuania, the dynamics of area and number of organic farms could show the tendency of transferring agriculture towards sustainable use of natural resources.

Organic farming in Lithuania

Overview

- Organic agricultural area: 167809 hectares (68 % consists of arable land, 27 % is grassland, and 3.4)
- Organic operators: 2457 farms

History of organic farming

- 1987: The beginning of the organic movement in Lithuania
- 1990: The Lithuanian Association of Organic Agriculture “GAJA” is established
- 1991: The country’s first programme for the transformation to organic farming is approved by the government and implemented by the “Tatula” fund in the north of Lithuania
- 1995: First trade fairs for organic food are organised by the Tatulos programme
- 1997: The certification body “Ekoagros” is established
- 2004: Area-based EU support encourages farmers to convert to organic farming and causes the rapid growth of organic farms, and the expansion of the certified organic area

Organic farms.

Lithuanian organic agriculture area development was extremely rapid from the start of organic agriculture as a farming form in 1990. From 2004 till 2012 area of organic agriculture in Lithuania increased 3.8 times till 162655 hectares in 2012. Therefore, the average size of certified organic farm in Lithuania constantly increased and in 2012

already covered 64 ha. The most organic farms (47%) operated area is up to 30 ha. Organic farms with 31-50 ha, 51-100 ha and 101-300 ha covered 16.5%, 17.0% and 16.5% respectively. The biggest organic farms with the area above 300 hectares make 2.5% of the general number of organic farms in Lithuania.

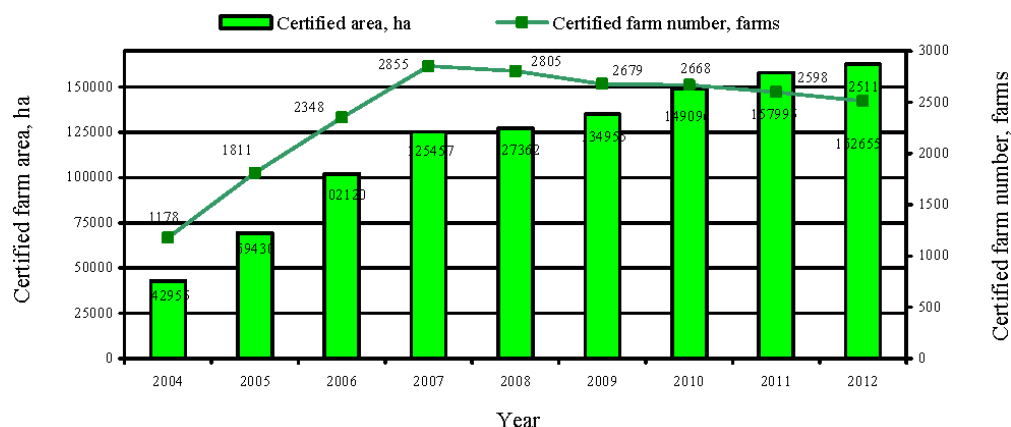


Figure 17: Dynamics of certified organic agriculture farms number and area (fully converted and under conversion) during 2004-2012 in Lithuania including area of fishery farms. Source: Ekoagros.

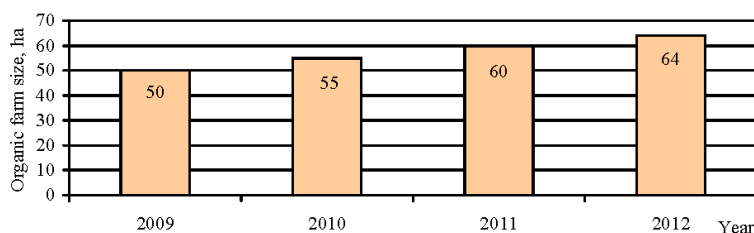


Figure 18: Average size of certified organic farms in Lithuania, including area of fishery farms. Source: Ekoagros.

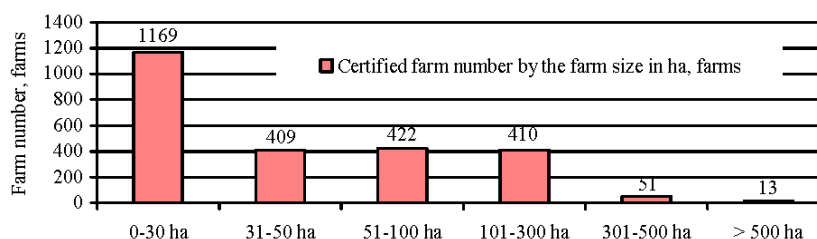


Figure 19: Differentiation of certified organic farms in Lithuania according to the farm size in hectares 2012. Source: Ekoagros.

Certification of organic farming

The main standard document of organic agriculture in Lithuania is "Regulations of Organic Agriculture: production, processing, realization and marking" issued by the Ministry of Agriculture. The "EkoAgros", as certification body controls keeping of organic agriculture regulations. Certification body inspects declarant, seeking for organic certificate, performs expertise of inspection results and initiates decision for issue of organic certificate. Certificate is a document issued according to the regulations of organic agriculture and evidenced that product or processing process is in accordance with the requirements of organic agriculture regulations. Certificate gives right to mark products declared in certificate as organic.

SLOVENIA

definition and evolution of agro-ecology

In **Slovenia** agro-ecology is a less known concept in official institutions, but in the mode of thinking and operating of many non-governmental and non-state institutions, the principles of AE are already used.

AE as a sustainable agriculture concept is not official applied in the strategic policy, but some sustainable principles linked with AE are already carried out especially at local and regional level, mostly due the preserved traditional agricultural management and knowledge of small family farms. The AE principles are also recognized in the field of education and tourism infrastructure (learning paths, observation points).

The content of AE is in compulsory education only as an elective subject, but many people know the principles linked with AE through good practice and informal educational programmes. Although, we don't have a single and simple definition of AE in Slovenia, the concept lives in traditional skills and innovations that take into account the principles on which the AE is based. Most of descriptions of AE are based on the environmental aspects of sustainability and underlines its importance. Even the official institutions recognize that the contents of AE are present with us, but they are under-recognized under this common name.

Although the term AE is not often used in recent years its use has strengthened. This can be seen by the inclusion of Slovenia in international projects with this content, which can be seen in the following part. In comparison with former republics of Yugoslavia, where the concept of AE is very often used, the term in Slovenia can be found only on some web pages.

The following part presents the project SAGITER, which deals with AE (online source 1 and source 2, in the bibliography of the present Report).

Project SAGITER.

Data for the project SAGITER, which is the acronym for the project "**Agro-ecological knowledge and ingenuity of rural areas**", we gathered from the website of the Chamber of agriculture and forestry of Slovenia.

In the framework of the Leonardo da Vinci programme as a partner organization in the project SAGITER the Slovenian representative is the Chamber of agriculture and forestry (KGZS). The project takes into account the legality of farming, according to traditional systems, adjusted to the specificities of their environment. The Project SAGITER¹ connects ten partner institutions from seven European countries. Partners are three universities (Marburg in Germany, Cluj in Romania and the Hungarian University in Gödölö); two Chamber of agriculture (KGZS) from Slovenia and VAL from Flanders and training centres from the Spanish province of Galicia and France: Geyzer, Fummeterre, and Nobody from the CFPPA SupAgro from Floraca, which is the lead partner. The project is carried out in the framework of the Leonardo da Vinci, Lifelong Learning Programme, and aims to develop modules for the training of AE in the area of agriculture. In the description of the project, it is stated that the purpose of the three-year project is to cooperate in a dynamic process of evaluation of the informal traditional knowledge, which have developed over time in the rural areas, and their conscience in parallel with an academic approach. This means that AE is understood with the transmission of traditional knowledge in the current practice, which is one of the directions of AE, which does not have a precise definition in Slovenia (for us this definition seems very suitable, since it is based on the capacity of the environment and is associated with the historical value of space, culture, habits and above all it is consistent with nature).

An indication that the purpose of the project is to participate in a dynamic process of evaluation of the informal traditional knowledge, which have developed over time in rural areas and their consideration in parallel with the

¹ <http://sagiter.eu/wakka.php?wiki=Pourquoi>

academic approach with the effective use of natural resources and the creation of social cohesion in rural areas means that it comes to the implementation of the sustainable development or sustainable principles into practice, which is in the field of agriculture, a novelty in Slovenia, since up until now complex approaches have not appeared. Up to now, the emphasis was on the methods that work soothingly on the environment from intensive farming, but to connect all spheres of society, including tradition, is a novelty in the project SAGITER. In the presentation of the project it is also written that for this purpose, the partners will develop a method for training of mentors, engineers and technicians for a better recognition and integration of knowledge, which are formed by experience over time in rural areas. This result will be directly useful for our project since we will be able to use these experiences and practices to connect them more broadly, not just in the field of agricultural knowledge.

The starting point of the project is to analyse the features of a traditional rural skills, options of its action and to prevent the loss of these skills. In centuries of farmer's coexistence with nature, farmers have accumulated knowledge and skills that they have been using for management. The skills and knowledge have been adjusted so that in the given conditions they are to produce as much as possible and take into account local characteristics of soil, climate, water, and coexistence with neighbours and nature. Over the centuries people have learned to observe nature and to adapt to it so that with her help they got a sufficient amount of high-quality food, feed and other products. Intensive farming pushed this knowledge to the periphery. Instead of sustainable farming profit prevailed in many parts. Nevertheless, throughout the World, there are knowledge and traditional farming approaches that give farming the characteristic of sustainable farming. This used to be a necessity, if farmers wanted to survive. Moreover, just by collecting and presenting these skills in some places, especially in South America, they enabled local communities to have once again begun to farm according to traditional systems, adapted to the specificities of their environment. The knowledge and proper valuation of traditional knowledge does not only allow their sterile maintenance, but also allows the inclusion of agro-ecological knowledge in the everyday life of rural areas and ensures sustainable farming. In doing so, institutions have an important role since they are increasingly assuming the role of mediator of skills to compensate intermittent traditional ways.

The approach is called AE and in the management of the agricultural space introduces an old traditional knowledge, which have been previously evaluated and updated by experts and are recommended to use. High-quality performance provides a multidisciplinary approach, enriched with a variety of partner links, such as agricultural advisors, teachers, mentors and researchers in the fields of agronomy, education, economics, anthropology and the environment.

The long-term results of the project will have a direct impact on farmers due to improving of their knowledge through training in the framework of the partnership project.

In addition, we expect that the project will contribute to the creation of a European network associated with AE skills. The network will be very important at European level because the promotion and validation of skills, which can be considered as AE, are among the priorities.

This project is based on the assumption that the progress in the direction of sustainable agriculture can be achieved by combining scientific and specialized skills. Therefore, we would avoid the asymmetrical vision of the World in which science is regarded as rational and therefore "real" and the people's knowledge as an irrational therefore "false". Therefore, it is necessary to take into account the traditional knowledge, which is sometimes referred to as AE knowledge. However, the question that arises is how to perform the transmission of such knowledge into the system of scientific knowledge. Which methods it is necessary to choose in order to make and appropriate transition considering the type of knowledge and the target group for which the methods are for.

The question is how those who use AE knowledge and skills to acquire this knowledge and how it shapes the way of their intervention. What is the possibility of transferring these skills in the process of training? With this project, we want to cooperate in promoting and upgrading of the AE knowledge and ingenuity, that has developed over time on individual areas. The training will focus on the development of display, search and reintroduction of techniques, networking and strengthening social links in rural areas.

Management systems, adapted to the sustainable use of cultural landscape, will be established. This is an advantage for small farms and users and at the same time the cultural landscape in its diversity is preserved. AE approach gives an opportunity for the collection of traditional knowledge and its transmission through formal or informal channels. Since the transfer of knowledge from generation to generation through personal contact is often disrupted an important role play educational and advisory institutions. For example, one of them is the Chamber of agriculture and forestry of Slovenia. Institutions like that the enriched agricultural will be transferred to young landowners. The rural area will give them an opportunity to survive and to be independent from major corporations.

A broader understanding of the concept of agro-ecology in Slovenia.

On national level the uniform and the final common definition of AE does not exist yet. Most of descriptions of AE recognized on national level are based on the environmental aspects of sustainability and underline its importance. Hereafter report summarized some key international and national definitions, adapted to national agriculture situation.

AE is a term that can be used in several ways, as a science, as a movement and as a practice in the field of agriculture in the World. AE treats agriculture in an interdisciplinary way. Agriculture is considered as part of the ecology, therefore, AE is focused on OF principles (online source 3 in bibliography).

AE in advance does not exclude any approach. It is a set of different skills, adapted for use in local environments for the most sustainable oriented farming. Approaches do not exclude a sustainable-oriented innovation or the transfer of knowledge from another environment where it appeared useful. The holders and users of this knowledge are mainly small farmers who have less and less space in the "farming for profit".

In some places in Europe, particularly in France, they have been collecting local knowledge and trying to transmit it to the young generations with the help of schools, for a long time. We are fortunate that many skills are still maintained and in some cases they still apply. AE approaches can help to evaluate this knowledge and maintain it.

AE is not associated with a particular method of production, whether it be organic, conventional, intensive or extensive. In addition, it does not define any way of management, such as the use of natural enemies instead of insecticides, or polyculture instead of a monoculture. Additionally, agro-ecologists do not unanimously oppose technology or inputs in agriculture, but want to assess how, when and if the technology can be used in conjunction with the natural, social and human resources. AE proposes a context or "site-specific" method of studying in agro-ecosystems studies and, as such, recognizes that there is no universal formula or recipe for success and the greatest prosperity of the agricultural ecosystem. Instead, agro-ecologists may study questions related to the four system properties of agro-ecosystems: productivity, stability, sustainability and justice. Unlike disciplines dealing only with one of certain properties, agro-ecologists see all four properties, which are connected to each other. Agro-ecologists study these four properties through an interdisciplinary approach. Using natural science agro-ecologist tries to understand the items in the ecosystems such as soil properties and plant, and that by using the methods of the social sciences they understand the effects of farming in rural areas, economic constraints to developing new methods or cultural factors determining farming practices.

The approach of Eugen Odum¹ is based on the assumptions that natural systems with their stability and immunity are the best model for imitation. Usually the ecosystems of AE are not actively involved in social sciences, but this school is based primarily on the belief that the intensive agriculture is unappropriated.

The second approach involves the traditional agricultural production. This approach is also not actively involved in the social sciences of the AE analysis, however, it does use the social understanding of the processes by which an intensive agriculture became unsustainable. The third approach focuses on the multifunctionality of landscapes, instead of focusing exclusively on the promotion of agriculture. Agriculture and nutrition counts as an institutional complex that relates and connects with other social institutions.

¹ https://en.wikipedia.org/wiki/Eugene_Odum

In accordance with the above definitions, report summarizes them into a **common working definition** adapted to the national agriculture situation: **AE means the use of sustainable practices based on traditional and local farmer's knowledge, consistent with the characteristics of the local environment and conservation of the biodiversity and cultural landscape.**

The management systems focuses on the whole food system, including environmental, economic, social and ethical dimension and the support of small scale farmers. AE is considered being a part of the ecology and developed ecological structure that doesn't need external inputs and allows the interactions among species for the system to work.

AE as sustainable agriculture model is not applied in the national public agriculture policy and is less known concept in official institutions. At the same time, it was discovered in education (the university degree of Faculty of agriculture and life sciences and the Faculty of ecology in Koper) and also in the field of agriculture (Chamber of agriculture and forestry of Slovenia).

The State introduced the nature-friendly farming methods as a new "eco-social" farming policy in 1993 with adaptation of Strategy for Agriculture Development of Slovenia mostly due the specific country characteristics such as: different climatic, geological, morphological soil conditions, high percent of forest, mountains area, permanent grassland share, a low share of arable farmland and perennial crops, unfavourable farm size structure, dominance of mix farms holdings which are too small to make the income from agricultural activity alone etc.

Alternative sustainable agriculture practices such as biodynamic and permaculture have gained a big support mostly among the general public and local farmers.

Since the late 1990s, several non-profit and non-governmental Biodynamics and OF Associations of food producers and interested public were established (Demeter Certification etc.) which can be characterized as a national OF movement.

In recent years also some civil initiatives (NGOs) and Community gardens committed to sustainable agriculture development with a focus on country food self-sufficiency supply and protection of agriculture land were established. Due to the gardening widespread in Slovenia, which also has a strong and long tradition the Community gardens could be a good base for the development of AE social dimension.

At the national level OF was recognised as an opportunity to Slovenian farmers and consumers for providing safe and quality food. The trend has been directed by the national policies regarding farming conditions and the EU's environmental goals.

OF represents a form and method of farming that is gaining increasing importance in the Slovenian agricultural area.

Country	Area (ha)	Share of all agr. Land %	Producer (No)	Retail sales (Mio €)
Slovenia	41.237	8,9%	3.293	49 (2013)

Figure 20: Organic Agricultural land, producers, domestic sales in Slovenia. Source: FIBL 2016

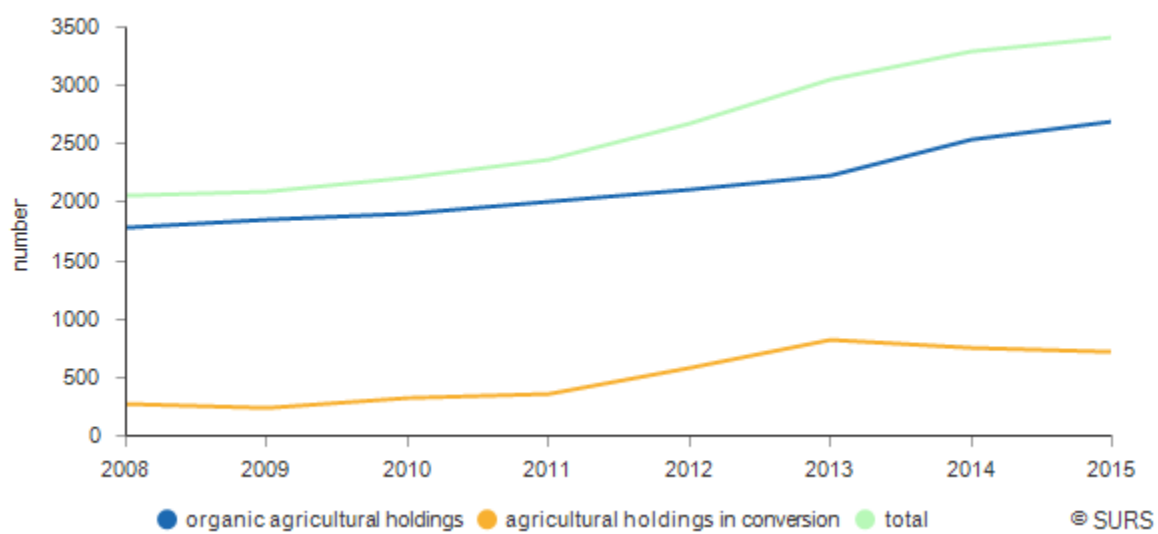


Figure 21: Organic Agricultural holdings in Slovenia. Source: Ministry of Agriculture, Forestry and Food of Slovenia.

PUBLIC POLICIES

This chapter is designed to display the implemented policies in favour of Agro-ecology and organic farming within Europe and in particular in the five countries participating in the Euro-EducATES Project (Austria, France, Italy, Lithuania, Slovenia), on different levels and through changes during their recent histories.

On the European level two main regulatory frameworks influence the current status of OF and AE: the CAP and the regulations for Organic production and labelling.

The **CAP** is the European Union's comprehensive policy on agriculture and it structures various kinds of agricultural subsidies, rural development schemes and other programmes. It was first introduced in 1962 and was most recently restructured in 2013¹. It utilizes around 38% of European Union's total budget². For the period 2014-2020 there is a "greening" component entailed, which aims to implement environmental friendly farming methods as a prerequisite for receiving full CAP funding. In order to obtain this full funding, three obligatory agricultural practices must be followed: i.) maintenance of permanent grassland; ii.) inclusion of ecologically focused areas and iii.) crop diversification³.

Effects of CAP's greening are still being debated and are known to be controversial. Because of this the greening components are to be reformulated in 2017, once again directing EU's agriculture towards more agroecological production methods in the individual countries⁴.

About the **Organic Farming**, beside the regulatory frameworks of national/regional or local organic associations the binding legal basis for producing and labelling Organic produce in EU-member countries there are additional Regulations, i.e:

- No. 834/2007 of 28 June 2007 - concerning organic production and labelling of organic products and the common rules and objectives of OF
- The repealed regulation (EEC) No 2092/91
(<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2007:189:0001:0023:EN:PDF>)
- The Commission Regulation (EC) No 889/2008 of 5 September 2008 which laid down detailed rules for the implementation of
- The Council Regulation (EC) No 834/2007 on organic production and labelling of organic products with regard to organic production, labelling and control
(<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CONSLEG:2008R0889:20100701:ENG:PDF>).

¹ Regulation (EU) No 1310/2013 of the European Parliament and of the Council of 17 December 2013. Official Journal of the European Union, L347/865, 20.12.2013. <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32013R1310&from=EN>

² European Commission. EU agriculture spending, focused on results. September 2015. http://ec.europa.eu/agriculture/cap-funding/pdf/cap-spending-09-2015_en.pdf

³ European Commission. Overview of CAP Reform 2014-2020. http://ec.europa.eu/agriculture/policy-perspectives/policy-briefs/05_en.pdf

⁴ EU agricultural reform fails on biodiversity. Article in Science, 6 Jun 2014, vol. 344. Issue 6188, pp. 1090-1092. <http://science.sciencemag.org/content/344/6188/1090.short>

CAP direct payments post 2020: German positions. ARC 2020, 20 December 2015. <http://www.arc2020.eu/2015/12/cap-direct-payments-post-2020-german-positions/>

New research shows greening will fail to make positive impact on Europe's farms. European Environmental Bureau.

<http://www.eeb.org/index.cfm/news-events/news/new-research-shows-cap-greening-will-fail-to-make-positive-impact-on-europe-s-farms/>

The hidden truth, Environmental impact of new EU Development Programmes in Austria.

<http://www.eeb.org/index.cfm?LinkServID=C24B5B96-5056-B741-DBE77E39D37372E4>

Specific adaptations/modifications to these regulations are available on the IFOAM web site¹

AUSTRIA

public policies

In Austria the congruencies of organic farming and agroecology are strongly visible in implemented Austrian policies, particularly during the last few decades. Austrian policies are essentially embedded in European Common Agricultural Policies, resulting in rules and regulations surrounding organic farming inherently influencing AE standings in both science and practices.

Generally, the Organic regulations of the European Union and the *Codex Alimentarius Austriacus* (Chapter A8) apply for Austrian Organic farms. Beside these organic regulations organic associations such as BIO-Austria may define additional and more strict regulations for their members².

Since year 2001 the **Bio-Aktionsprogramm**, which is a combined support scheme for Organic farms, has been issued by the BMLFUW and pursued in 2003, 2005 and 2008 resulting in increasing numbers of organic farms and organically cultivated land in Austria. A central element of the Bio-Aktionsprogramm 2015-2020 is the support scheme for *Rural Development*, which entails:

- i.) The **Austrian Agri-environmental Programme (ÖPUL)** (a more detailed description below) encourages farmers to participate in supported measures such as extensive agriculture, protection of the environment and the maintenance of the landscape. Organic farms are funded with around 150 Mio. € (1/3 of the total budet of ÖPUL).
- ii.) The **allowances for less-favoured areas** dedicated to organic organic farms is high, especially in the Austrian alpine regions. These farms receive approx. ¼ of the compensation allowances for less-favoured or marginal agricultural areas.
- iii.) The **Biobonus** (higher grants, better evaluation in selection procedures for organic farms) aids towards acquiring subsidies, managing investments, processing, marketing, qualification, information and sales.

BMLFUW initiatives to reach the objectives for the Bio-Aktionsprogramm:

- iv.) “More Organic Farms”: Offer of detailed and specialised information (about regulations) for farmers to attract them to convert to organic or to re-convert to organic
- v.) “More Organic Projects”: Offer more rural development measures for organic farms in the form of higher grant rates as a result of combined grants such as grants for young farmers and grants for farms in mountain areas or subsidies for projects supporting qualification, marketing and innovation in organic farming.
- vi.) “More Organic with ÖPUL”: Higher subsidies for organic farms in ÖPUL support scheme organic farming if they create plots of biodiversity.
- vii.) Extension of the ÖPUL due date to engage in this support scheme
- viii.) “More Organic Products”: Governmental support of exports through the public legal entities AgrarMarktAustria (AMA) and the Wirtschaftskammer (WKO - Austrian Federal Economic Chamber)
- ix.) “More Organic Consciousness”: Strong organizations and certifiers such as BIOAustria; positive representation of the entire organic sector without any negative differentiation; intensified cooperation within the organic sector.

Bioregions – example Bioregion Mühlviertel’.

Regional governments support the establishment of Bioregions that enhance rural economies by promoting regional and traditional practices (often sought out by tourists). One successful example is the “Bioregion Mühlviertel”.

¹ <http://www.ifoam.bio/en/organic-regulations/list-eu-organic-regulations>.

² Bio Austria: <http://www.biola.at/de/bio-austria-richtlinien-biola-wissensdatenbank-fuer-den-biologischen-landbau.html>

“The ‘Bioregion Mühlviertel’ represents a territorial approach towards regional development based on a strong organic agriculture sector. The Mühlviertel region is located in the province of Upper Austria (yellow) and comprises the four districts (...) of Freistadt, Perg, Rohrbach and Urfahr-Umgebung (covering 122 municipalities). On 3090km² the area inhabits 270.000 people with a density of 92 people/km². The agriculturally used area is 2580km² of which again around one quarter gets cultivated organically. Also the proportion of organic farms (≈26%) is higher than the national average of around 17% (BMLFUW, 2014). The development process of setting up the Bioregion began in 2010. All in all around 1200 people were contributing to the process of establishing the Bioregion. During numerous workshops and events a long-term development concept was elaborated together with stakeholders. Currently 7 Austrian Leader-regions and the Euregio "Bayrischer-Wald/Böhmerwald" are involved.” (Furtschegger & Schermer, 2015, p.1)

Rural development programs.

Since 1995 the most important farming program including environmental and rural development aims for the Austrian countryside is called: The Program for Rural Development.

The core of this program is an agricultural-environmental program called ÖPUL, which is co-funded by the federal government and the European Union. Austrian owners of farms can voluntarily participate at various levels in this program while receiving financial incentives for completing certain environmental tasks on and around the farm. The outputs of this program include support of organic agriculture, integrative pest management, water conservation measures, reduced erosion measures, and increasing biodiversity through the use of traditional and rare plants and animals¹.

An additional aspect of the program for rural development is the LEADER program. LEADER is also significant because it deals with investment funding for building new stalls, renovating existing infrastructure, creating space for direct marketing, community purchases for machines, etc. This allows for further development in rural communities².

Below are described **selected civil society initiatives**, influencing national and transnational debate on policy implementation relevant in regard to agroecology.

BIOAUSTRIA³ is the largest organic farming network in the EU representing over 12,000 Austrian members and 340 partners. The network focuses not only organic farmers (extension service) but also consumers (education and awareness) and has a significant policy division. BIOAustria policy focuses on keeping the organic agenda and related issues (AE) present and active in the national agricultural, environmental and rural development agendas.

ARCHE NOAH⁴ is an organization in Austria that was originally organized to focus on the loss of biodiversity through traditional seed cultivation, preservation and the establishment of a seed bank. In the meantime the organization has 13,000 members that support Arche Noah goals. Arche Noah has since branched towards policy directly related to biodiversity and seed traditional protection. It is known within Austria as well as the EU as being a leader in seed policy through the promotion of biodiversity, healthy food and small farmer rights.

LA VIA CAMPESINA⁵ is an international movement and stronghold for small-scale and peasant farmers. They look towards justice and fairness issues dealing with feminism and indigenous and labor rights, specifically within an agricultural lens.

¹ https://www.bmlfuw.gv.at/land/laendl_entwicklung/le-07-13/agrar-programm.html
https://www.bmlfuw.gv.at/dam/jcr:05f9058d-f5db-4f61-8469-7d47d971ee8d/Merkblatt_OPUL-2015_Internet_25-03-2015.pdf
http://www.bio-austria.at/app/uploads/OEPUL_Fachinfo_Maerz-2015-3.pdf

² https://www.bmlfuw.gv.at/land/laendl_entwicklung/leprogramm.html

³ <http://www.bio-austria.at>

⁴ <https://www.arche-noah.at/english/about-arche-noah>

⁵ <http://www.viacampesina.at/cm3/ueber-uns/geschichte-der-oebv.html>

For the MAAF¹ (Ministère de l'agriculture, de l'agro-alimentaire et de la forêt/ Ministry of Agriculture, food and forests), **agro-ecology is at the heart of its political project « producing differently »** launched in 2012. This project is inspired by innovations produced by farmers (men and women) who set up innovative production systems, or too little known systems to produce sustainably and efficiently. From this public-spirited and individual drive, the political project changes it in a national movement, where should be listed innovative practices and completed the knowledge. To do so, 5 levers were settled:

- the 10 keys of agro-ecology divided into in national programs and action plans;
- A contributory web platform « Produisons autrement »² (producing differently) on which all the actors of the agricultural world are invited to share and speak about their experience;
- A redirection of research, making agro-ecology a priority. For the INRA and the technical institutes, it will be at the heart of new government goal contracts, with the spreading of research results to practicing farmers³;
- The introduction of agro-ecology in the course of studies and educational repositories in public and private schools, in higher education, first degree courses and in-house training, setting the example and transferring knowledge to the public agricultural education farms⁴, towards the learners and the professional world;
- Grants and subsidies to go with the agro-ecological transition through the financing found with the second pillar of the common agricultural policy (CAP) or precise financings leading farmers to adopt agro-ecological practices, in particular through the Groupements d'Intérêt Economique et Environnemental GIEE (environmental economic interest grouping EEIG), gathering farmers' co-operatives, working together to improve their practices.

Off these 5 levers, some public policies are made up and settled at all administrative and political levels both at a regional and national level. From the different national programs, 10 agro-ecological keys have been defined to go with the transition:

- train today and tomorrow's farmers (teaching how to produce differently);
- favor the emerging of collectivities (GIEE);
- reduce the use of pesticides (Ecophyto);
- favor a natural method to protect the plants (Biocontrol);
- reduce the use of veterinary antibiotics (Ecoantibio);
- start a sustainable development of beekeeping (Biodiversity);
- recover the breeding waste (Bioenergy);
- promote organic farming (Ambition Bio);
- choose and select adapted seeds;
- use trees to improve the production (Agroforestry).

At a regional level, most regions endowed themselves with a strategy and an agricultural policy taking into account the agro-environmental stakes and the 10 keys of agro-ecology and adapting them to local contexts. A rising number of intercommunity grouping institutions develop their own agricultural policies, making an interpretation of the

¹ MAAF ministère de l'agriculture de l'alimentation et de la forêt. Since 1992, program have been set up to go with the setting of sustainable development principles in different action plans dedicated to agriculture such as the PDD (1994), CTE (contrat territorial d'exploitation/ territorial farm contract), CAD (contrat agriculture durable/ sustainable agriculture contract)

² Cf. <http://agriculture.gouv.fr/agriculture-et-foret/projet-agro-ecologique>

³ Cf. chapter « research» p 17

⁴ Cf. chapter « Training-pedagogy» p 24

national stakes, and setting up administrative and financial terms of implementation to go with the change of practices towards resilient agro-ecological systems for sustainable territories.

10 keys of the national action plan for the agro-ecological project for France.

1 Training today and tomorrow's farmers¹.

The future challenge for farmers will be to succeed in reaching an economically and ecologically successful agricultural production. Taking the path of agro-ecology means important changes in the farm running practices, but also thinking the work differently with the living. The agricultural education has an essential role in the big scale success of this transition as a formation system for tomorrow's farmers and advisers.

For a period of 4 years, this plan has four lines which will mobilize all living forces of agricultural education.

- Line 1. Revisit the degrees' repositories and the educational practices;
- Line 2. Mobilise the agricultural education farms to set up experiments, shows, agro-ecological innovations on territories;
- Line 3. Develop a regional project to "teach to produce differently"
- Line 4. Train the personnel of agricultural educational and professional schools.

2 The economic and environment interest groups.

Groupements d'intérêt économique et environnemental/ Groupings of Economic and Environmental Interest (GIEE).

They enable an official state recognition of the common involvement of farmers in the change or implanting of their practices aiming at an economic, environmental and social performance. They represent one of the building tools of the agro-ecological project in France. The GIEE aim at driving the ecological transition of agricultural modes of production, by leaning on collective approaches implying- in a more effective way- all the actors of sectors, territories and agricultural development.

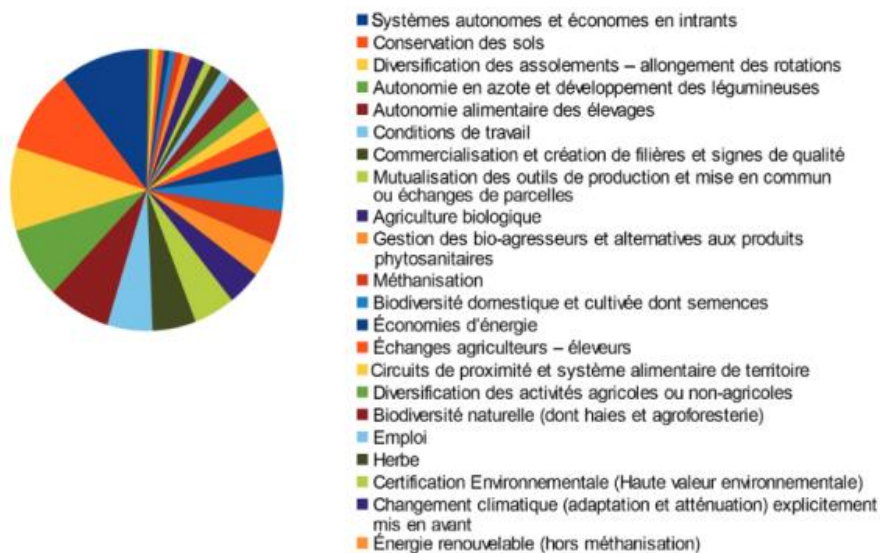
The farmers' project approach includes several farms in a coherent territory, which favour synergies. As such, the intended evolution of production systems contributes in improving the competitiveness of farms by decreasing, for example, the cost of inputs and energy, while using and preserving the ecosystems on which the agricultural activity leans. A social aspect is integrated in the project with the objective of improving the working conditions of the group members and their employees, of supporting employment or struggling against rural isolation.

Today, more than 2300 farmers (+ than 1500 farms) are implied². The size of co-operatives varies between a dozen and more than 100 farmers, the average being around 20 farmers in a GIEE. In many cases, we found non-farmers' partners in the co-operative. All the productions are represented (including apiculture or specialised plants productions such as fruit farming or aromatic plants, perfumed and medicinal plants); most of the time, diverse types of production systems are gathered within the same GIEE. More than 60% of projects concern breeding (and almost 40% more particularly mix-farming). Numerous projects combine breeding farms and crop farms. (Fig.22)

¹ Cf. chapter training-pedagogy. p 24

² <http://agriculture.gouv.fr/deja-pres-de-130-groupements-dinteret-economique-et-environnemental-giee-reconnus>

THÉMATIQUES ABORDÉES PAR LES GIEE



Themes introduced by the GIEE :

- input economical and independent systems.
- land conservation
- Crop rotation system diversification- rotation lengthening
- nitrogen independency and leguminous plants development
- breedings food autonomy
- working conditions
- selling and industry creation and quality mark
- production tools share and pooling or plot exchanges
- Organic farming
- crop protection management and alternative to phytosanitary products
- methanisation
- domestic and cultivated biodiversity including seeds
- energy saving
- farmer- breeder exchanges
- local trade and territory food system
- diversification of agricultural and non-agricultural activities
- natural biodiversity (including hedges and agroforestry)
- employment
- grass
- environmental certification (high environmental value)
- climate change (adaptation and decrease) explicitly highlighted
- renewable energy (except methanisation)

Fig 22. Themes introduced by the GIEE.

On the 1st Octobre 2015, one lists 128 known GIEE: Alsace (3), Aquitaine (20), Auvergne (3), Basse-Normandie (12), Bourgogne (5), Bretagne (7 et bientôt 22), Champagne-Ardenne (2), Corse (4), Franche-Comté (4), Haute-Normandie (2), Languedoc-Roussillon (9), Limousin (10), Lorraine (10), Midi-Pyrénées (7), Nord-Pas-de-Calais (3), Pays de la Loire (9), Picardie (5), Poitou-Charentes (3), Provence-Alpes-Côte d'Azur (4) et Rhône-Alpes (6).

There will soon be around 30 additional recognitions.

Source : Alim'agri..

<http://agriculture.gouv.fr/deja-pres-de-130-groupements-dinteret-economique-et-environnemental-giee-reconnus>

Mastering the realisation of the project objectives, the farmers can lean on partnerships with the Research for the following of experiments and innovations, the sector actors (cooperatives, processing industries, dealers...) and territories (Regional Natural Parks, local authorities...) in order to guarantee the sustainability, the recognition and the promotion of farms running. The GIEE results are shared with all the regional actors, in order to favor the development of these collective approaches.

3 The national Ecophyto plan.

A national plan launched in 2009, in the context of France's Grenelle Environment Conference, a national plan, which provides for a reduction by half in the use of plant protection products over the next ten years. Mobilized stakeholders: farmers, researchers, experts have initiated actions to reach the target.

The 2018 Ecophyto plan is composed of 8 lines:

- Line 1. Assess the progress concerning the decrease of pesticide use.
- Line 2. List and generalise the agricultural systems and the known means allowing to reduce the use of pesticides by rallying all the research partners
- Line 3. Innovating in the conception and the adjustment of technical ways and pesticide-efficient systems.
- Line 4. Training to the diminution and securing use of pesticides.
- Line 5. Reinforcing the watching webs on bio-agents and on non-deliberate effects of the pesticides use.
- Line 6. Take into account the specificities of the French overseas departments.
- Line 7. Reduce and make the use of plant protection safe in non-agricultural areas.
- Line 8. Organise the national following of the plan and its territorial version, and communicate on the reduce of phytosanitary products.

2018 Ecophyto takes part in a deep thought, which builds up the most ambitious laboratory in the service of environmental quality in agriculture. It sets up tools leading to the reduction of phytosanitary products dependency, while maintaining a, economical efficiency. The ONEMA (Office National de l'Eau et des Milieux Aquatiques) contributes to funding the national Ecophyto plan. Pilot farms, discussion groups and mentor farmer networks are set up to share best practices, to accompany and advise farms managers.

Tools are provided to go with the setting of this program. We can quote:

- Certiphyto to form professionals: reduce the use of pesticides and secure their use for a real formation, accountability and a certification of all the sector actors: retailers, advisers, appliers. These professionals are trained during two to three days for a better use of pesticides in order to obtain the Certiphyto, which recognizes their knowledge.
- Medical bulletins for plants to watch and treat wisely: 4 000 watchers, gathered inside the regional epidemio-surveillance web, follow the cultures to realise medical bulletins for plants. These bulletins, freely accessible on Internet sites of « directions régionales de l'alimentation, de l'agriculture et de la forêt » (DRAAF), enable the farmers to measure out more precisely and at the right time the pesticides regarding the cultures health. They cover agricultural and non-agricultural areas (parks and public gardens...).
- Some master farms to experience and spread good practices: the « Fermes DEPHY » are a master web of farmers who put their farms in a process of reduction of pesticide use. They experience pesticide-efficient systems, share their good practices and support each other's.

On agricultural education a specific action, the "Action 16", is dedicated to agricultural education. The sponsor is the DGER (Direction Générale de l'Enseignement et de la Recherche) and the CEZ-Bergerie Nationale is the project manager. Since 2009, around 30 pilot schools are engaged to suggest, test and confirm agronomical hypothesis which target a reduction in the use of pesticide and to create and share teaching situations in order to transfer these production methods.

The purpose is:

- To create a network to discuss and share practices

- To accompany farms managers and teachers of the school: financial support, technical and educational training, link to experts and professionals.

The encouraging results offer good prospects for pesticides reduce.

4 National plan for an efficient biodiversity¹.

Since 2011, within the course of the BiodivEA program² launched by the MAAF and the MEDDE (Ministère de l'Ecologie et du Développement Durable et de l'Energie/ ministry of ecology and sustainable development and energy), some farmers and agricultural high schools have set up a demonstration and experiment program on relations between agriculture and biodiversity. The proposed tools enable, through the setting of a certain number of protocols leaning on landscape ecology, to study the link between agricultural practice, biodiversity and landscape. The projects are based on a statement part, with a participation to the agriculture observatory of biodiversity (Observatoire Agricole de la Biodiversité/OAB)³, a MAAF device, in a scientific partnership with the National Museum of Natural History (Muséum National d'Histoire Naturelle/ MNHN). The proposed protocols are simple and easy to understand for non-specialists. They are completed by other diagnostic tools (IBIS⁴, IBEA⁵, EPEA⁶, ...)⁷, enabling to involve future professionals whose stakes are linked to the knowledge of the agro-ecosystems functioning. An action plan based on agronomic and innovative land planning practices is set up in relation with the territory partners. The focus is on the management of agro-ecological infrastructures (Infrastructures Agro-Ecologiques - IAE), in order to make biodiversity possible and for farm runners to handle it in a better way. To implement this action plan, subsidies of the MEDDE made the territory actors involvement easier and the MAAF grants permitted to go with the projects process, the actions share and the increase of farmers involved in actions related to biodiversity. The main themes in favor of biodiversity are:

- Optimum agronomic and pastoral management of meadows and biodiversity;
- Trying flowered strips, hedges and other agro-ecological infrastructures;
- Evaluation of the interest of these IAE to attract auxiliaries;
- Separated handling of green spaces;
- Interest of agroforestry in wine growing;
- Impacts of changings on production systems on biodiversity;
- Boscase management plan: procedure, terms, protocols, diagnosis;
- Global diagnosis: use of different tools (IBIS, IBEA, DAE);
- Apiformes.

¹ INRA. *Agriculture et biodiversité, valoriser les synergies, synthèse du rapport*. INRA, 2008, 113 p. available on :

<http://inra.dam.front.pad.brainsonic.com/ressources/afile/234057-4fc50-resource-expertise-agriculture-et-biodiversite-synthese.html>

² BERGERIE NATIONALE. *Biodiversité et paysage* : available on : <http://www.bergerie-nationale.educagri.fr/r-d/agricultures-et-alimentation/biodiversite-et-paysage/biodiversite/ressources/>

³ Observatoire agricole de la biodiversité, available on: <http://observatoire-agricole-biodiversite.fr/>

⁴ CERVEK. Céline. *Intégrer la biodiversité dans les systèmes d'exploitation agricole : le projet IBIS*. *Innovations agronomiques*, 2015, n°25, p. 143-154. available on : :

https://www.google.fr/url?sa=t&rct=j&q=&esrc=s&source=web&cd=3&ved=0ahUKEwiMoJr7vLXKAhXMcBoKHRitBTkQFggyMAI&url=https%3A%2F%2Fwww6.inra.fr%2Fciag%2Fcontent%2Fdownload%2F3822%2F36230%2Ffile%2FVol25-10-Cervek.pdf&usq=AFQjCNH9qen-bvmHxNHAhZOUo_97KT3QAw&sig2=zPPcc73NbhVkJULl5l1Q3Q&cad=rja

⁵ IBEA: « *Impact sur la Biodiversité des Exploitations Agricoles* », software which evaluates the impact of agricultural practices on biodiversity, on the scale of a farm. Educational tool first of all, for agricultural high school pupils and farmers.

⁶ BERGERIE Nationale, EPEA : Evaluation Paysagère de l'Exploitation Agricole. This auto-evaluation tool aims at enabling the farmer to make a landscape assessment without an expert help and to define an improvement strategy for each space entity which is part of their farm.

⁷ For further details on diagnosis tools related to biodiversity : available on :

http://www.bergerie-nationale.educagri.fr/fileadmin/webmestre-fichiers/Recherche_developpement/agricultures_alimentation/biodiversite_et_paysage/EPEA_VF-2013.pdf

5 Agroforestry.

Regarding the second pillar of the CAP, the European Commission established a European measure of agroforestry support for the period 2007-2013, which was carried over the period 2014-2020. It was in this context that the MAAF launched in December 2015, a national action plan for the development of agroforestry. This plan reinforces the actions, which took place in the last few years, in particular those undertaken by the French association for agroforestry: l'Association Française pour l'Agroforesterie (AFAF)¹. As an example, from the first estimates, the milestone of 10000 hectares of agroforestry was reached in 2013. In the agricultural high schools' farms, 63 agroforestry projects were born because they are used as training medium, as agroforestry is considered as one of the key elements of agro-ecology and takes part in the climate change adaptation.

The national agroforestry plan turns on 5 lines:

- Know better the biodiversity of agroforestry systems and their functioning;
- Improve the regulatory and legal framework and reinforce the financial supports;
- Develop consulting, training and promotion of agroforestry;
- Improve the economic valuation of agroforestry production in a sustainable way;
- Promote and spread agroforestry internationally.

According to the AFAF, agroforestry refers to practices, new or old, linking trees, crops and/or animals on a same agricultural plot, on the edge or inside fields. These practices include agroforestry systems, but also agro-pastoral, eco-orchards (animals grazing under fruit orchards), hedges... this corresponds, on the one hand to the management of trees integrated in agricultural plots, and on the other hand to cultures run on behalf of forestry². The agroforestry projects show a great diversity in the landscaping, going from intra-fragmented linings, to hedges, cut trees, isolated trees, edge of waterways (riparian) ... by encouraging the diversity and complementarity of on-territory species, agro-ecology leads to reflexions on the relationship between trees and cultures. Therefore, for years, the INRA has proceeded to experimentations on the settling of agroforestry plots, which has enabled to show the benefits of the association tree/cultures on the agricultural production. This systems and associated practices provide beneficial services, necessary to the agriculture. This presents advantages for the plot but also for a larger territory scale: landscape, biodiversity, climate change adaptation. Some systems thus belong to an old rural tradition, others are new and need to adapt to the current agricultural context. The innovations are related to the essences and kinds choice, to the new planting, maintaining and trees farming practices.

Different associations (AGROOF, Arbre et paysage 32...) enable to communicate, go with and advise farmers who would like to embark on an agroforestry project. They interact with national webs and provide formations for the professionals. This also goes through the development of new valuations of wooded resources (Bois Raméal Fragmenté- fragmented wood, pallets). The range of products enable to develop new sectors and to help the development of social and economic organisations, locally or regionally.

According to the Centre d'Etudes et de Prospective (Center for Long Term Strategic Studies)³, an ambitious plan of 600 000 agroforestry ha in France would represent 3 à 4 % of the targeted objectives from now on 2020. Procedures have been settled to study the labelling of agroforestry on the voluntary compensation markets in the context of struggle against climate change.

6 National Eco-Antibio Plan 2017.

The anti-bioresistance is one of the main issues of the human health. In France, this issue largely concerns agriculture. Currently, according to the French agriculture ministry, reducing antibiotics in livestock system is a main objective. A plan was launched in November 2011 to last five years. The plan has two main objectives:

- A quantitative one by reducing antibiotics use in veterinary medicine by 25 % in 5 years

¹Association française d'agroforesterie : available on : <http://www.agroforesterie.fr/index.php>

²Agroforesterie la revue française des arbres ruraux. AFAF, 2008, n°1, 36 p. Available on : http://www.agroforesterie.fr/documents/revue_00_agroforesteries.pdf

³LIARGE. Fabien, SANTI. Frédérique, VERT. Julien. «L'agroforesterie en France : intérêts et enjeux », Analyse, centre d'études et de prospective. Montreuil-sous-Bois, Ministère de l'Agriculture et de la Pêche Secrétariat Général, n°37, 2012, 4 p.

- A qualitative one focused on the use of critically important antibiotics in veterinary. These ones are fluoroquinolones, third and fourth-generation cephalosporin.

There are five priorities. The first one is to promote best practices and raise awareness among the stakeholders involved. The second one is to develop alternatives to antibiotic use as phytotherapy. The third one is to reinforce the regulation of commercial practices and prescribing rules, the fourth one is to improve the system for monitoring antibiotic resistance and the last one is to promote the same approach on a European and international scale.

The five priorities give 40 measures that should be applied by all the stakeholders: farmers, veterinarians, scientists and risk assessors, pharmaceutical industries, public authorities ... So far, a decrease of 13 % has been observed, with results which have to be moderated in between the different livestock systems and antibiotic families. Improving livestock farming practices is one of the keys of reducing antibiotics. That is why several scientists and researcher groups are working on that subject and conduct projects with farmers:

- CASDAR¹ RedAB: the goal is to precisely identify the keys to success for change and to develop tools which would enable to involve, train and encourage each of the dairy cow actors to more intelligent practices in terms of antibiotics.
- CASDAR ECOANTIB15: the aim is to draw a picture of antibiotic use practices in agricultural high schools' breedings.

7 Develop the breeding waste.

This national plan named EMAA (Energie Méthanisation, Autonomie Azote), aims at a better treatment and a better management of nitrogen and to speed up the development of farm methanisation. It offers great opportunities: renewable energy production, diminution of the input cost, territory dynamics, as many opportunities to meet current economic, environmental and energetic stakes

EMAA is made of two complementary lines "Nitrogen" and "Methanisation" aiming at:

- Managing nitrogen on territories in a global aspect. (exploitation of organic nitrogen, in particular the one coming from breeding waste, and the decrease of French agriculture dependency to mineral nitrogen which has an impact on water and air quality, and which is indirect energy-consuming and greenhouse gases maker during its fabrication;
- Develop the collective methanisation of a medium size in the agricultural farms.

The plan also meets strategic objectives of the new renewable energies policy in France, set up during the Environmental Conference:

- Making legal regulation easier ;
- The grants stability, tax and buying price systems;
- A strong public support for innovation.

The concerned farmers are first breeders and breeder groups having « methanisable » breeding waste. At the end of 2014², there were about 185 units of methanisation settled in the farm. A constant increase as there have been about 70 new settlement projects a year since 2011. The objective of this plan is to count 1000 methanizers in France in 2020, requiring the development of about 130 new projects a year from now to 2020.

Beyond the EMAA plan, others policies and support energy saving and renewable energy support plans take part in farms, in particular in the new LTECV (Loi de transition énergétique pour la croissance verte- Law for the energetic transition towards the green growth), but also in the regions (often by implementing European co-financing).

¹Casdar : COMPTE D'AFFECTATION SPÉCIALE « DÉVELOPPEMENT AGRICOLE ET RURAL », this is a traditional budget tool of the agricultural and rural policy. Created by the finance law 2016. The CASDAR favors the settlement of the *Programme national de développement agricole et rural* (PNDAR), which essentially aims at preparing the future of French agriculture. Cf. <http://www.senat.fr/rap/a12-149-1/a12-149-17.html>

The casdar mainly cover the applied research programs for agriculture and the spread of knowledge taken from these research by information, formation and advice given to farmers. Agricultural education can be associated to these projects. Cf. <http://www.angers-nantes.inra.fr/Toutes-les-actualites/RedAb>

²http://www.developpement-durable.gouv.fr/IMG/pdf/2_-_Comite_National_Biogaz_-_Etat_des_lieux_de_la_filiere_methanisation.pdf

8 Biocontrol' : favor natural methods to protect plants.

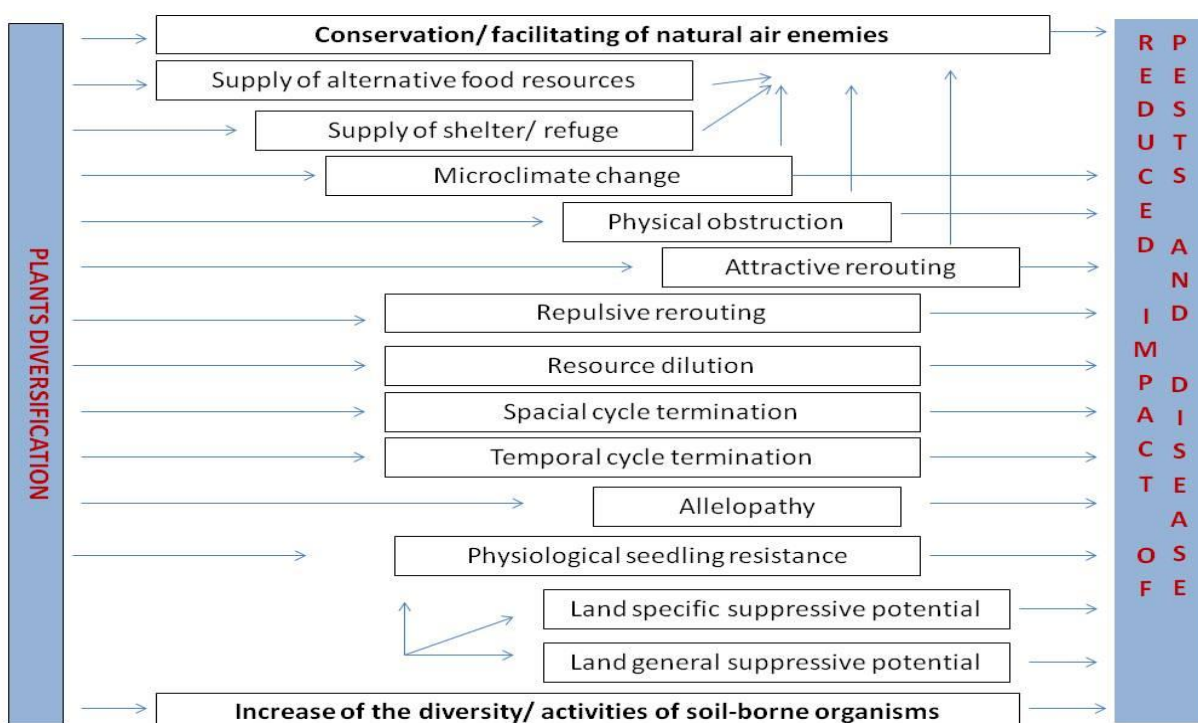
The Biocontrol action plan take part in the 2009/128/CE European directive, which encourages non-chemical methods: “Establish a common action framework to reach a use of pesticides compatible with sustainable development”. The goal set out is to reduce the risks related to the use of pesticides and develop “ the resort to integrated struggle against the enemies of cultures and substitution methods and techniques, such as non-chemical alternative means to pesticides». It clearly leads the efforts towards biocontrol methods and asks to each state member to come along with an action plan which can define objectives in this field.

France has already set up its national plan through the 2018 Écophyto plan². The biocontrol techniques enable to protect the cultures by reducing the use of phytosanitary products. These options help then reducing the risks for human health and environment (Fig. 23). The biocontrol products can be listed in 4 groups:

- The auxiliary macro-organisms.
- The micro-organisms.
- The chemical mediators which contain insect pheromones and kairomones.
- The natural substances used as biocontrol products.

Currently, these techniques are particularly efficient and used in vegetables fields, in fruit farming and wine growing. Today, in France, 75% of undercover tomato and cucumber crops are protected by auxiliary insects and 50% of apple and pear orchard fields are protected thanks to the use of pheromones and sexual confusion techniques. Biocontrol implies acquiring new techniques and requires, for the farmer, to be accompanied by an adviser, a research institution, an experimentation web or an agriculture chamber. Biocontrol is also used in non-agricultural areas, in particular for gardens. This process goes through the development of a real French biocontrol sector, thanks to the research results and to a few active companies, innovating in this field.

Fig. 23: From INRA/Ecoles-chercheurs/ Conception de systèmes horticoles innovants, bases biologiques, écologiques et socio-économiques. Sous dir Pierre Eric lauri. P172



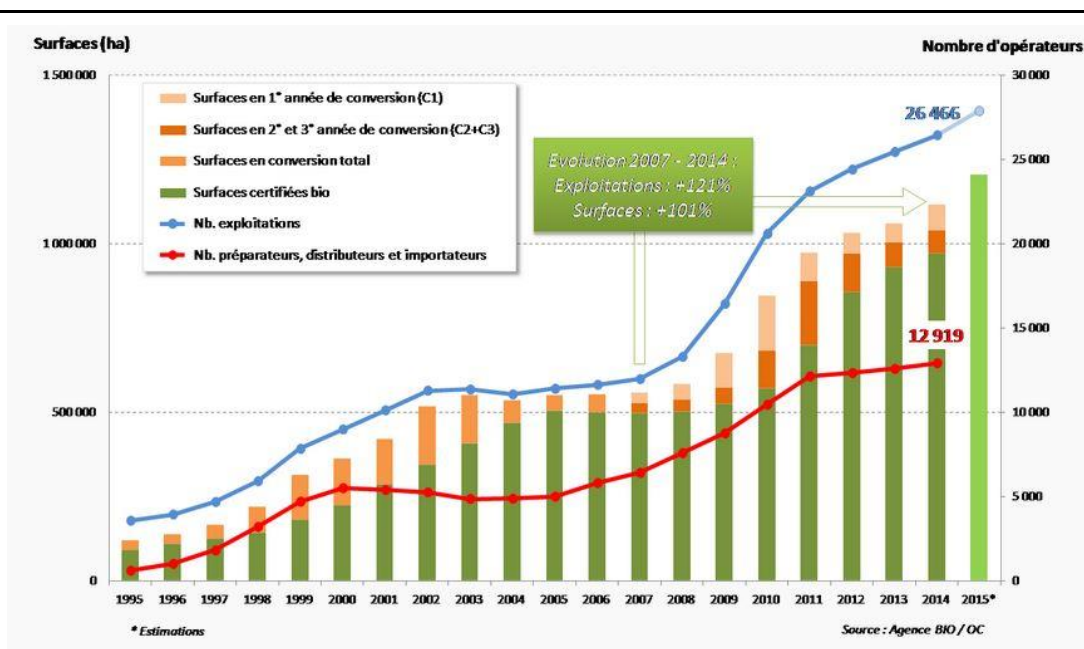
Key processes to reduce the impact of pests through the introduction of specific plant diversity in agro-ecosystems. According RATNADASS et al. 2012.

9 National program organic farming « Ambition Bio 2017 ».

In order to reach the general objective of doubling the number of organic fields before the end of 2017, the state worked out an action plan in close collaboration with all the concerned actors. This plan exists in a specific form for each region. Besides the financial support to producers and the regulation adaptation, it plans to raise awareness among consumers.

According to Agence Bio¹, France is the 3rd EU country when it comes to OF areas, which means 1,12 million organic hectares at the end of 2014, with an increase of 5.4% compared to 2013 (FIG. 24). For the whole productions, the organic share keeps on increasing, aiming at reaching 4.14% of national total cultivated area (SAU-surface agricole utile) worked as organic. For the record, the share of organic areas in the whole agricultural lands of the European Union in 2013 was 5.7%. with more than 37000 operators, more than 1 million of organic hectares in the national territory and a 4.5 billion euros' market in 2013, French organic farming represents a dynamic and expanding sector, more and more approved by the consumers. Beyond the preservation of the land quality, of biodiversity, of water and air, the society can benefit a lot from organic farming: creation of activities and employment, promotion of innovation in agriculture, rural territories landscaping, and reinforcement of the links between farmers and consumers.

FIG. 24
evolution of
organic areas
between
2007-2014



The national program « Ambition bio 2017 » consists in:

- Developing production, in particular with incentive measures dedicated to the turning and maintaining of areas into organic ones (160 million euros a year, in average on the period 2014/2020).
- Structuring the sectors and incite to the maintaining and development of field crops and oil and protein seed crops (rape, soybeans, sunflower...), to insure the protein independence for the animal and human food, from now on 2017.

¹Agence Française pour le développement et la promotion de l'agriculture biologique [on line]. Agence Française pour le développement et la promotion de l'agriculture biologique [seen on 20/01/2016]. Available on : <http://www.agencebio.org/la-bio-en-france>

- Developing consumption and conquer markets: reach 20 % of organic products in state catering and raise the awareness of citizens (national communication campaigns, French exportation strategy), focusing on the youth (actions with the Department of Education: visit OF farms, cooking classes, gardening...).
- Reinforcing Research and Development: by according the R&D projects dedicated to organic farming for the period 2014- 2020.
- Training the agricultural and food-processing actors: by reinforcing the link between agricultural education and professional webs (training periods, professional's talks in classes, visits on the field...) and by developing in-house training for farmers in OF or not.
- Adapting regulations: for an improvement of specific OF regulation and a better taking into account of organic farming specificities in a general regulation.

Choose and select adapted seeds.

France has 72 selection companies, 240 companies producing seeds and some 17 800 seed distributor farmers. At a European level, it is the 1st market and seed producer. At a global level, it is the 3rd after the United-States and China. It is the 1st world seed exporter (number 1 in field crops and number 3 in vegetable crops). This rank, guarantee of food safety and supplying safety of national agricultural farms, brings access to seeds and plants adapted to agronomic, teaching, and climate conditions of territories and to consumers' demands.

A 7 lines action plan tends to reinforce the public policies in terms of seeds selection. It highlights several features:

- Conservation and broadcasting of genetic resources,
- Information in terms of intellectual property, attached to varieties,
- Evolution of access conditions regarding the Official Catalogue, in particular for varieties adapted to organic farming,
- The establishment of environmental criteria for the varieties evaluation,
- Contribution of the production control and seeds and plants labelling to the Ecophyto plan objectives,
- Expansion of the governance in the system of seed-policy,
- Promotion of national efforts in the revaluation of the community framework.

Diverse actions have already been conducted and finalised, such as the transcription in the Law of the international agreements measures in terms of intellectual property attached to varieties, or the Expansion of the governance. Other actions keep on as the reinforcement of the environmental dimension of assessment rules for the varieties needed in the Ecophyto plan, or even the adaptation of measures for varieties dedicated to specific markets or niche (organic farming, old varieties...).

This agro-ecological transition accompanying action plan, is one of the most important as it enables the seed sector to reinforce the sustainability of production modes, the environment protection, the adaptation to climate change, and the development of cultivated biodiversity. Nevertheless, the debate remains open, and the regulation related to seeds remains complex and *“hardly accessible to interested people. Indeed, the heart of the regulation is settled by statutory order and there is no law related to seeds. Moreover, the texts interact, there are numerous cross-references and confusions, to which are added lots of modifications”*¹. Besides, there is not ONE seeds law but several laws dealing with seeds trade, intellectual property law on varieties, farmers' rights law... and this, at a national, community (European Union) and international levels.

In France since 2002, the Confédération Paysanne, Nature&Progrès, the Fédération Nationale d'Agriculture Biologique des Régions de France, the Mouvement de Culture Bio-Dynamique, Bio d'Aquitaine, the GDAB Midi-Pyrénées, the Syndicat des Semences et Plants bios du Languedoc-Roussillon and other structures act for the fundamental right of the farmer to sow the collected seeds a second time, for the right to choose the kind of agriculture they want to practice, for the right for food self-sufficiency of people, of scientific debates on the living, of law and ethical debates on intellectual property... These structures have warned for years about the danger of limiting seeds biodiversity, by

¹ Cf. http://www.semencespaysannes.org/lune_reglementation_complexe_10.php

allowing, for example in organic farming, only labelled commercial seeds or seeds found in the common directory of varieties. The seed industry cannot guarantee the offer for permanent diversity that the majority of farmers need when they use agricultural seeds from local or old varieties...this practice is necessary for them to make use of the biodiversity necessary to their agriculture, “at zero synthesis chemical input”. The agro-ecological plan tends to make the access conditions evolve in the Official Directory, in particular for the adapted varieties in organic farming, but the tensions around the living patents and intellectual property are still a controversial subject.

ITALY

public policies

In Italy there isn't a national programme of Agro-ecology, but the organic sector shows concrete agro-ecological solutions for agriculture and food systems. The current discussion is on the CAP & organic legal framework aimed at improving knowledge of rural actors about support offered under the new RDPs (Rural Development Programmes 2014-2020) for the development of organic farming as well as the agro-ecological approach.

In Italy there are 21 RDPs approved by EU, for a total amount of 1.689 millions of euro of public support for the organic farming sector, in **transition from Organic 2.0 to Organic 3.0**.

After the Universal Exhibition "EXPO 2015 Milan", dedicated to the theme "Feeding the Planet," Italy developed interesting legislative initiatives and experiments about a cultural advancement in the field of agro-ecology, also called for by civil society and by peasant movements that gave rise to the parallel forum called "**Expo of Peoples**"², attended by 180 delegates from 54 countries representing 14 international networks.

The Forum ended with the "**Food Sovereignty and Agro-ecology document**"³ aimed at healing the sick food systems and presenting to the world the 10 big change strategies adopted and applied by the global networks. These include measures to promote agro-ecology and refuse its co-option by the industrial food system. Understood as a way of life. *“Agroecology is not a mere set of technologies or production practices, but rather an inclusive, holistic system of food production and processing through direct, fair and short distribution chains and self-governance. Its practices are based on ecological principles, and drastically reduce dependence on external inputs. Our strategies to promote agroecology include the promotion of appropriate health and sanitation regulations, horizontal and inter-generational exchanges of knowledge, and ensuring recognition of agroecology as a primary solution to climate change. We will fight corporate and institutional attempts to grab agroecology as a means of promoting GMOs and other fake solutions to climate change”*.

In continuation of this action, it was formed in Italy the Expo Committee of Peoples pledged to disclose the contents of the document on the Italian territory (Grand Tour of Expo of Peoples) and to use the document as an evaluation tool of the Italian and European policies that deal with the right to food and the transition to more just and sustainable food and agricultural systems post 2015.

Among these activities, the Campaign for the Peasant Agriculture, with the dual purpose of:

- (1) inform the public and compare experts about what are the laws and practices that prevent or promote peasant farming in Italy;
- (2) make proposals about new practices, new laws and possible convergences that give them the space and dignity they deserve.

Among the recent Italian measures that go into agro-ecological direction, we report below the most significant.

Law no. 221 of 28 December 2015 laying down provisions relating to the environment, promoting green economy measures and the containment of excessive use of natural resources .

The law contains measures for the protection of nature and sustainable development, environmental assessments, energy, green procurement, waste management and reclamation, soil conservation and water resources. Article 67

¹ <http://www.expo2015.org/archive/en/index.html>

² <http://expodeipopoli.it/the-international-forum?lang=en>

³ http://expodeipopoli.it/wp-content/uploads/2015/06/EN_Output-media-Documents_final.pdf

sets up the *Committee for Natural Capital*, at the Ministry of Environment and Protection of Land and Sea, and regulates its functions and composition, in order to ensure the achievement of social, economic and environmental objectives consistent with the annual financial programming and the state budget. Article 70 delegates the Government the introduction of remuneration schemes of ecosystem and environmental services (PSEA), establishing the principles and criteria. With Article 72 comes the "National Strategy of Green Community", rural and mountain communities that consecrate to sustainability.

Among the pillars of the actions that these communities could undertake: integrated and certified management of agro-forestry, biodiversity management and certification of the wood industry; certified integrated management of water resources; production of energy from local renewable sources; development of sustainable tourism, capable of enhancing local production; construction and sustainable management; Energy efficiency and intelligent integration of the systems and networks; Sustainable development of productive activities; integration of mobility services.

It is also set up a new voluntary mark "Green Made in Italy" to indicate and communicate the environmental footprint of products. Those who buy will give priority to the "kilometer zero" certificate and to sustainable agricultural and industrial productions. Regulatory changes reinforced by another important measure called "Connected Agricultural" that opens up new scenarios of innovation and growth in the agricultural sector with particular regard to future generations and to the entry of young people in agriculture. It also established the Information System for the Organic (SIB).

Law no. 194 of 1st December 2015 containing **provisions for the protection and enhancement of biodiversity** in the interest of food and agriculture.

Also remember that in 2010 Italy adopted a "**National Biodiversity Strategy**", through which it aims to integrate the needs of biodiversity with the development and implementation of national sectoral policies and to define the vision for its preservation until 2020.

We also want to signal an interesting law proposal presented on **March 5, 2015 on "Rules for the protection of the Earth, the recovery and development of abandoned farmlands and the support of farmers' agricultural activities"**.

This is expressly referred to the great challenge of EXPO 2015 Milan as an opportunity to share with the people of the whole world experiences, projects and strategies for healthy food, safe, sustainable and sufficient for everyone. In addition, it is an opportunity not to be missed to build legislative routes that can sustain and improve our relationship with the earth and then with agriculture, spreading new awareness and sensitivity around heritage and values. For this reason the bill is divided into two parts. The first chapter brings together some of the rules designed to improve the management of land, considered common good, through the development of forms, including organizational, such as social promotion associations and interest groups, to improve and to socialize the access to the products of land and food security.

Chapter II, within the broader framework of the protection of the Earth, provides for the recognition and special support to the peasant farming. The peasant agriculture, which is one of the most significant expressions of family farming, when the latter is related to small size companies, is an ancient form of cultivation of fields and animal husbandry, which threatened to disappear due to industrial and intensive agricultural competition. But today peasant agriculture is gaining new attention on those who would return to the land and on those more attentive consumers of quality food. Moreover, either when you set it up as a main activity or when you set it up as supplementary activity, it represents an important resource in terms of self-employment and self-sustenance. The peasant agriculture was saved where it was able to maintain production and niche transformations, linked to local traditions, or, in the case of conversion of companies, in case of organic and biodynamic production. There is still an agriculture sized on rural work and family economy, oriented towards self and direct sales; an agriculture of low or no environmental impact, based on a lifestyle choice linked to welfare values, ecology and solidarity. This agriculture, which is likely to be invisible to the big numbers of the economy, is essential to keep the land fertile and cared for, especially in the hilly areas, in the mountainous and economically disadvantaged and marginal areas. It is an agriculture that in many cases keeps

populated rural areas that would otherwise be abandoned, preserves the natural richness of landscapes, biodiversity of plants and animals and keeps alive ancient knowledge, techniques and local productions.

The peasant agriculture, as a phenomenon that constantly evolving, has accompanied human existence since ancient times, can not only be considered an economic activity, but a real complex and integrated life dimension. It interacts with ecosystems, the management of the territories, the expression of socio-cultural realities, whose values and side effects are from an economic point of view, social and cultural development at least as significant as its strictly productive aspect.

The possibility of having an income or to supplement your own small income in this era of economic and employment crisis can be an important contribution to the budget of families, women, youth, the unemployed, pensioners, either in non-monetary terms with direct production of useful goods, or in monetary terms with the direct sale of products.

The peasant agriculture can well integrate with other non-agricultural sources of income helping to bring value and make more desirable the part time jobs available and multiplying, thus, the total number of available jobs.

The peasant agriculture, moreover, with its active and widespread presence is a decisive element of defence and protection of the territories, with virtuous and irreplaceable effects on the quality of the landscape, which in turn has repercussions on tourism, maintenance the hydrogeological balance, biodiversity, fertile layer of soil conservation, contrasting runoff and erosion; it also has effects on the preservation and evolution of Italian food and typical food, as a cultural and educational element useful also to environmental education and food of young people, and as the ideal environment for the social development of agriculture. The multifaceted character, manifold, multifunctional and complex peasant agriculture is not adequately recognized by the regulations that capture, in the best cases, only certain partial aspects isolating them from the richness and complexity that characterizes it.

In short, an innovative and inclusive vision of the Agro-ecology which integrates with the landscape and the identity of the territories. Such a vision, for example, is expressed in its state of excellence, in the territory of Cilento and it's recognized by UNESCO as a model and lifestyle (Mediterranean Diet) Intangible Cultural Heritage of Humanity.

The general legislative framework is then completed at a regional level, as in the case of the Campania Region, with the Law approving the **Regional Territorial Plan** (PTR) with attached "**Guidelines for the Landscape**," which give concreteness to a new model of agro-ecological approach in a vision of "perceived landscape, lived and therefore also analysed and understood in many respects". In other words the PTR shows the landscape in a number of "dimensions", each of which can have greater or lesser importance depending on the characters, problems and trends of specific local situations. Historically, this essential polysemy and multidimensionality of the landscape explains the variety of looks, approaches and theoretical interpretations - geographical, historical, ecological, aesthetic, anthropological, etc. - developed in various scientific fields. But, in spite of the recurrent attempts by the different schools of thought, to "steal" the notion of landscape proposing "exclusive" interpretations, it is only by the interaction of several readings, from the intersection of knowledge and visions that the complex meaning and holistic understanding of the landscape is born. It is therefore considered appropriate that the entire path for the construction of the landscape plan should reflect the same multi-dimensionality of agro-ecology.

In general, the dimensions to be taken into account for the Campania Region should be at least four:

- the natural agro-ecological dimension (including the aspects agricultural, ecological, geomorphological, climatic, etc.);
- the economic-functional dimension (including the agricultural and forestry aspects, the economy of rural areas, economic use of natural resources, mobility and transport, etc.);
- the historical and cultural background (including the historical and archaeological aspects of the cultural heritage also intangible aspects, aspects of planning, settlement and infrastructure, etc.);
- the semiotic-anthropological dimension (including the aspects anthropological, sociological, semiological, aesthetic, perceptive, etc ..).

"A clearly open vision, to be defined on the basis of local specificities. It is only meant to remind the inevitably relational and complex nature of the landscape and the need to promote a cross- knowledge, able to support a basically "integrated management", which crosses the different incidents adopted on the territory.

The different aspects or different dimensions referred to above, in fact, have different weight and importance at different scales. This transcalarity obviously does not only concern the processes of knowledge but also the adjustment of the transformation processes, which are expressed by different evolutionary dynamics, while requiring a total of coherent and integrated policies.

The process of landscape planning cannot ignore the complexity of relationships - which will enrich and articulate the inter-institutional cooperation in the vertical direction - while respecting the ownership attributed to the Region by the Code of cultural heritage and landscape".

The Italian Ministry of Agriculture introduced the agro-ecological approach in the National Action Plan for organic farming, approved the 24th of March 2016.

The Plan includes a set of 10 actions, oriented in the direction of the transition from Organic 2.0 to Organic 3.0.

ACTION 1 - ORGANIC IN RURAL DEVELOPMENT PLANS – Development of a coordination among the different Italian Regions to bring into alignment the application rules of the Rural Development support measures for organic farming. **A particular attention is given to promoting a specific agro-ecological approach.**

ACTION 2 - SUPPLY CHAIN POLICY - Encouraging the aggregation of producers and stable relations with the other players of the sector, including processors, distributors and traders, through the implementation of specific association forms.

ACTION 3 - ORGANIC “MADE IN ITALY” AND INSTITUTIONAL COMMUNICATION - Introduction of a logo for the Italian organic products and promotion of international information campaigns also through the web.

ACTION 4 - ORGANIC AND GREEN PUBLIC PROCUREMENT - Encouraging the use of organic products in hospital catering and in school canteens, applying organic agriculture methods also in the management of public green areas.

ACTION 5 - SIMPLIFICATION OF THE ORGANIC LEGISLATION - A simplification of the rules governing the sector, involving regional administrations, also following the EU legislation updating.

ACTION 6 - EDUCATION, INFORMATION AND TRANSPARENCY - Organization of organic farming training courses at university level and of training courses for high school teachers. Strengthening of SINAB (the National Information System on Organic Farming) services to improve the availability of information on the sector.

ACTION 7 – “PAPER LESS” ORGANIC - COMPUTERISATION – Development of SIB - the Italian Organic Computerised System to facilitate the connection with other databases useful for the sector, with the aim of simplifying the operators’ procedures.

ACTION 8 - REVIEW OF CONTROL RULES – The aim is to Improve the effectiveness of the Italian control and certification system, as a guarantee for organic operators and consumers.

ACTION 9 - CONTROL ON IMPORTS – Improvement of control activities on products imported from third countries also through a deeper involvement of Customs and with the use of advanced IT tools so to facilitate the rapid exchange of information at all levels.

ACTION 10 - PLAN FOR RESEARCH AND INNOVATION IN ORGANIC FARMING – Drawing up of a national plan for research and innovation in organic farming, establishing a permanent coordination committee for research in organic and biodynamic farming, involving the institutions supervised by Mipaaf, the Regions and representatives of the organic sector.

After regaining the independence on March 11, 1990 the Ministry of Agriculture was re-established on March 22, 1990. Since then in addition to agriculture, its sphere of regulation included food industry and fisheries.

Since the very first days of the restored Lithuanian Republic, it has started its independent agrarian policies starting with land reform. Since 1997 the state has started to formulate and shape its agricultural policies on the basis of private agricultural production and market economy. Since 2004 the Ministry has been formulating and implementing it on-going agricultural and rural policies.

The development of Lithuanian agricultural policies has gone through three distinct stages since the restoration of independence:

- 1990-1996 – cardinal reforms, liberating from the consequences of Soviet occupation
- 1997-2003 – adaptation of agriculture, industry and business to the environment of market economy
- from 2004 – development of agro-food and rural sectors after the Lithuanian accession to the EU.

Since its EU accession in 2004, Lithuania has joined the common European market, and also joined measures of the EU structural policy which aim at reducing by financial means existing social and economical inequalities among the EU regions and improve competition of less developed regions. Lithuanian rural people together with agricultural and food business have opportunity to become beneficiaries of the EU support measures.

The support to Agriculture through the European Agriculture Fund for Rural Development (EAFRD)

Single Programming Document 2004-2006.

The European financial support is really impressive. During the period of Single Programme Document 2004-2006, 1.91 billions of EUR of support (direct payments, investments and compensations) were injected into Lithuanian agricultural sector, whereas 0.52 billions of EUR were allotted to agriculture from the national budget. Such lavish financial help had profound effect on agricultural sector, it allowed open and develop new markets, promote export, raise income of farmers and guarantee its stability, enhance investment potential and competitiveness in domestic and foreign markets, and accelerate modernization and cooperation processes. Agricultural sector has developed potential of competing in international markets, while rural areas turned more attractive for residents and businesspeople, and their infrastructure has been significantly improved. It is calculated that the EU support makes 25% of the total income of agricultural and contributes significantly to its financial vitality.

Rural Development Programme 2007-2013.

The National Rural Development Strategy for 2007–2013 as well as the Lithuanian Rural Development Programme (RDP) for 2007–2013 (hereinafter – the “Programme”) drafted for the implementation of the Strategy have been drawn up following the provisions of Council Regulation (EC) No 1698/2005. The Programme was approved on by decision No C(2007)5076 of the European Commission of 19 October 2007. Its overall objective is to ensure economic growth by improving competitiveness of agricultural, food and forestry sectors, creating opportunities for diversification of economic activities and improving the quality of life in rural areas. To achieve this objective, the RDP distinguishes four priority investment axes and 27 measures aimed at increasing competitiveness of agricultural, food and forestry sectors (Axis 1), improving the environment and the countryside (Axis 2), enhancing quality of life and diversifying economic activities in rural areas (Axis 3) and implementing the LEADER approach (Axis 4). In addition, some of the funds have been used for fulfilling continuing obligations under the RDP 2004–2006. (DG AGRI, 2016).

<i>Programme axis</i>	<i>Assistance allocated in 2007–2013, thou. EUR</i>	<i>No of applications received in 2007–2009</i>	<i>No of agreements signed (authorised applications) in 2007–2009</i>	<i>Assistance disbursed in 2007–2009, thou. EUR</i>	<i>Share of the assistance allocated in 2007–2013, %</i>
Axis 1	950,138.22	10,247	8,235	268,431.24	28.25%
Axis 2	824,590.41	321,082	287,156	191,642.67	23.24%
Axis 3	280,599.55	434	97	759.12	0.27%
Axis 4	136,993.80	82	52	2,380.12	1.74%
Technical assistance	92,979.20	5	5	37,382.42	40.21%
Total:	2,285,301.18	331,850	295,545	500,595.57	21.91%

Figure 25: Absorption of the Programme funds by axes

Rural Development Programme 2014–2020.

To improve the competitiveness of the agricultural, food and forestry sector, the RDP will focus on the modernisation of small and medium-sized farms, particularly those producing livestock, fruit and vegetables. The programme will give priority to projects featuring innovation and environmental benefits. Agricultural and forestry infrastructure (in particular, outdated drainage systems) will be improved. To facilitate generational renewal of the farming community, support is foreseen for setting up more than 1 100 young farmers. Special attention will be paid to promoting cooperation and agricultural risk management.

The second important challenge to be addressed is the improvement of biodiversity, the condition of water and soils and adaptation and mitigation to climate change. Projects in these domains will build on the success of previous schemes. To this end, the RDP includes measures such as maintaining farming in areas with natural and other specific constraints (almost 43% of total agricultural land) to avoid land abandonment, and environmentally and climate-friendly farming practices on agricultural land, including organic farming. As regards climate change, support is foreseen for afforestation and for the greater use of renewable energy resources (in particular for production of biogas from agricultural waste).

To foster local development of rural areas and the creation of businesses and jobs, the RDP will focus on support for LEADER, business start-ups and non-agricultural business development. It is intended to create 1,940 jobs, 960 of which will be created under LEADER. There will also be investment in small scale rural infrastructure.

The RDP 2014–2020 is centred around 6 Rural Development Priorities, with the main priority being Priority 2 „Competitiveness of the agricultural sector and sustainable forestry“. Under this priority, the RDP will support investments in the modernisation of more than 5 000 farms (2.5% of the total number of farms), the development of more than 2 700 small farms and the setting up of more than 1 100 young farmers. An important element is innovation which will be facilitated by encouraging co-operation and by the European Innovation Partnership. The programme will promote advisory services, information and knowledge transfer between the agri-food sector, researchers and other stakeholders. 7 EIP Operational Groups will be established. In order to improve the competitiveness of farming and forestry, more than 60 000 people will be trained. Support is also foreseen for forestry development (afforestation, investments in forest technologies and improvement of forest infrastructure).

The Priority 3 „Food chain organisation, including processing and marketing of agricultural products, animal welfare and risk management in agriculture“ aims to better integrate more than 600 farms into the food chain and into the overall market. It will do this by encouraging farmers to participate in EU and national food quality schemes, by setting-up 4 producer groups and through 100 cooperation projects to develop short supply chains. Almost 1 500 farmers will take part in a risk management scheme so that they can improve the insurance cover. Training and advisory services will play an important role.

The Priority 4 „Restoring, preserving and enhancing ecosystems related to agriculture and forestry“ focuses on maintaining farming in those areas with natural and other specific constraints (almost 43% of total agricultural land) to avoid land abandonment (nearly 1 million ha is targeted). The programme will also encourage the conversion to, and

maintenance of, organic farming (135 000 ha will be supported). Nearly 150 000 ha of agricultural land will be under voluntary agri-environmental and climate-related commitments by farmers. They will be trained and advised on how to better deliver environmental and climate-related benefits.

The Priority 5 „Resource efficiency and climate“ puts particular emphasis on a greater use of renewable energy. There will be 29 projects for the production of biogas from agricultural waste. More than 6% of agricultural land will be under agri-environmental and climate-related commitments by farmers so that GHG and NH₃ emissions are reduced. Support for afforestation to promote carbon sequestration will also play a key role.

The Priority 6 „Social inclusion and local development in rural areas“ aims at non-agricultural business development (nearly 1 000 projects will be supported) and job creation in rural areas (almost 2 000 jobs will be created, of which half will be created under LEADER). 50 LEADER Local Action Groups will implement local development strategies.

Almost 7 000 projects will be supported to improve small-scale rural infrastructure. They will include the replacement of asbestos roofs (more than 6 000 projects), the refurbishment of public spaces and buildings and the improvement of drinking water facilities and rural roads (100 km). Broadband infrastructure will be extended to rural areas (400 different points) for the benefit of an additional 2% of population (DG AGRI, 2016).

The 5 biggest RDP measures in budgetary terms (total public funding) are:

- € 620 million allocated for Measure 4: Productive and non-productive investments
- € 287 million allocated for Measure 13: Farming in areas with natural constraints
- € 223 million allocated for Measure 6: Farm and business development
- € 150 million allocated for Measure 11: Organic farming
- € 142 million allocated for Measure 10: Agri-Environment and Climate

The Programme of the Government of the Republic of Lithuania for 2012-2016

The XVIth Government of the Republic of Lithuania does not define agroecology as a priority or a goal but big attention is paid to the sustainable development and ecology. There are some key points of the programme related to the subject of research:

- development of incoming tourism including ecotourism;
- development of ecologically clean and green technologies for future economy;
- promotion of development of sustainable energy, which encompass economic, environmental and social priorities;
- continue following the principle of sustainable development in using of natural resources, protecting the environment from unacceptable pollution and guaranteeing a healthy way of life for current and future generations;
- consistent pursuing of a sustainable forestry policy;
- development of education as an essential tool to strengthen environmental policy. To reach out that the environmental, social and economic development of sustainability issues be reflected in all the training and education programmes.
- creation of a rational waste management system;
- introduction of measures for promoting of modern farming, in order to reduce drinking water pollution;
- raising the responsibility of producers for the pollution of the environment and the quality of the environment, according to the EU requirements;
- supporting the creation and development of competitive farms, which would be capable of producing high-quality healthy and safe production, as well as promoting production of organic natural, exceptional quality and traditional livestock products;
- supporting establishment of medium-sized commodity and family farms through development of a modern and competitive agricultural, food and forestry sector, while using rationally land resources and supporting sustainable agriculture and forestry farm development;

- supporting development of the short food chains and promoting direct marketing of livestock and crop production directly to consumers.

The key laws related to Agroecology and Organic Farming

None of the laws of the Republic of Lithuania provides any particular regulations on Agroecology but there some of them which has some relations to the subject, especially to the ecology and organic farming:

- the Programme of the Government of the Republic of Lithuania for 2012-2016
- the Law on Agriculture, Food and Rural Development. 2002;
- the Law on Environment Protection of the Republic of Lithuania. 1992;
- the regulations of the Organic Farming. Ministry of Agriculture of the Republic of Lithuania, 2000;
- the Rules of the Measure “Organic Farming” under the Lithuanian Rural Development Programme for 2014-2020. Ministry of Agriculture. 2015.

Public Bodies related to Agroecology

Ministry of Agriculture (MoA)

The MoA is the managing authority of the Government of the Republic of Lithuania which forms the operational objectives of the national strategy in agriculture and food, fisheries (excluding conservation of fishery resources and control of inland waters), rural development, land reform, land management, surveying, mapping, real estate cadastre, land use state control over agriculture and rural area infrastructure engineering development and technical progress, the development of renewable energies, education, training, development of innovative technologies in agriculture, food industry and fisheries, land reclamation and the reclamation of investment, plant, animal, plant protection, seed production, breeding, fish-farming, phytosanitary and veterinary, national heritage areas and organizes, coordinates and monitors the implementation of the state. More information in www.zum.lt

Under the MoA there are established the following bodies having direct or indirect relation with agroecology and organic farming:

Public body	Functions	Relation with the subject
National Land Service www.nzt.lt	A state institution which participates in the formation and implementation of public policies for land management and administration, land reform, land use planning, real estate cadastre, accounting, geodesy, cartography, state georeferential spatial data sets and preparation of Lithuanian spatial information infrastructure.	Non direct
Fishery Service www.zuv.lt	A state institution in charge of implementation Lithuanian fisheries policy, based on the European Union's Common Fisheries Policy, arrangement and execution of conservation and restoration of fish stocks, control of its usage in marine waters, and applied research in the field of fisheries, including organic fishery.	Non direct
Lithuanian Institute of Agrarian Economy www.laei.lt	Key functions - analysis and prognosis of micro and macro processes in the field of scientific research and information management. The Institute is also working on important issues of agricultural and rural development.	Non direct
State Plant Service www.vatzum.lt	A public body established by the MoA to ensure: <ul style="list-style-type: none"> - phytosanitary control of plants, plant products and other regulated objects nationally, and also which 	Non direct

	<p>are imported, exported and passing by transit;</p> <ul style="list-style-type: none"> - Perform control of genetically modified propagating material and genetically modified plants and plant products that are not intended for human food and animal feed monitoring and control in the internal market and at the border, as well as control of genetically modified risk crops; - Ensure the quality control of grains, propagating material and control of fertilizers; - Ensure plant varieties registration and their legal protection; - Ensure quantity and quality control of food grain at state reserve; - Within its competence to participate by ensuring the safe and healthy food production chain. 	
Centre for Programme LEADER and Agricultural training Methodology www.zmmc.lt	A public body established by the MoA for development of continues vocational education and training programmes on organic farming, agroecology, LEADER programme, etc. Accreditation of consulting institutions and consultants on farm management, agro environment and organic farming, forestry, accounting and LEADER issues. Provision of trainings.	Direct
EkoAgros www.ekoagros.lt	A public body established by the MoA and Ministry of Health for certification and control of organic production and the exceptional quality of agricultural and food products.	Direct

The Ministry of Environment (MoE)

The MoE is the main managing authority of the Government of the Republic of Lithuania which forms the country's state policy of environmental protection, forestry, utilization of natural resources, geology and hydrometeorology, territorial planning, construction, provision of residents with housing, utilities and housing, as well as coordinates its implementation.

Having assessed the data of environmental observations, taken into consideration the conclusions of scientific institutions and the public opinion and following the existing strategic documents and preparing the legal bases, the goals of the Ministry of Environment and its subordinate institutions are as follows:

- To implement the principle of sustainable development;
- To set preconditions for rational utilization, protection and restoration of natural resources;
- To ensure provision of information about the state of environment and its forecasts to the public;
- To create conditions for the development of construction business and the provision of residents with housing;
- To ensure a proper environmental quality, taking into account the norms and standards of the European Union.

Under the MoE there are established following bodies related:

- Environmental Protection Agency, www.gamta.lt
- Environmental Projects Management Agency, www.apva.lt
- Lithuanian Environmental Investment Fund, www.laif.lt
- Environmental Protection Departments (in 8 regions), www.am.lt
- General Forest Enterprise, www.gmu.lt
- Lithuanian Geological Survey, www.lgt.lt
- State Forest Survey Service, www.amvmt.lt
- Lithuanian Hydro meteorological Service, www.meteo.lt
- State Protected Areas Service, www.vstt.lt
- National Parks Directorates (4 parks)
- State Strict Nature Reserves (4 reserves)

NGO sector related to agroecology

Title of the NGO	Functions	Relation with the subject
Chamber of Agriculture of Lithuania www.zur.lt	In charge for: <ul style="list-style-type: none"> - encouragement of self-government of NGOs of Agriculture and Rural Community sectors; - development of cooperation in agriculture sector; - encourages organic farming and development of business and agro-tourism sector; - provides information, consultation and trainings; - etc. 	Direct
Lithuanian Association of Organic Agriculture "GAJA"	The NGO is founded in 1990, when a group of activists of scientists and farmers joined in to non-profit organisation 'GAJA'. In 1991 it became a member of the International Federation for Organic Agricultural Movements (IFOAM).	Direct
Lithuanian Association of Organic Farms (LOFA) http://www.ecofarms.lt/	The NGO is founded in 2010. Nevertheless, this association is the youngest but at the same time the biggest non-profit organic organisation in Lithuania; it joins around 160 Lithuanian farmers. LOFA is strong lobbying group for organic farmers and is influential in developing organic policy in Lithuania.	Direct
Tatula programme www.organic.lt/lt	The NGO is founded in 1993 as foundation „Tatula“. Its aims at saving a sensitive relief of North Lithuania region which is known as karst region. The main purpose is to join organic farmers of North Lithuania region understanding the importance of saving environment of this region.	Direct

SLOVENIA

public policies

During the period of Slovenia entering into the EU, Slovenia began to encourage conversion to sustainable forms of farming, for which there were EU and national financial incentives, which helped farms to replace the lost income due to the transition. Slovenia promotes the introduction of agricultural practices, which in the long term contribute to the preservation and protection of the environment, sustainable management of non-renewable natural resources, soil fertility, preserving biodiversity and traditional rural cultural landscapes, protection of drinking water resources, adaptation to climate change and at the same time ensuring the production of high-quality and safe food (online source 6, in the bibliography).

In Slovenia, sustainable forms of farming have a long-term strategic focus and are included in all of the most important strategic documents of Slovenian agriculture. For example, the Slovenian development strategy of agriculture from 1993; The program of the reform of agriculture from 1998; Slovenian agri-environmental programme from 2001; Rural development programme (RDP 2004-2006); Action plan for the development of organic agriculture in Slovenia by 2015; Resolution on the strategic development of the Slovenian agriculture and agri-food sectors by the year 2020 " provide.si food for tomorrow, " taken in 2011.

Slovenia is in accordance with the objectives of the EU'S Common Agricultural Policy, the national legislation and the national strategic documents supported financially and as a form of environmentally friendly agricultural practices encourages in particular, integrated production and OF. All forms of sustainable farming represent the long-term strategic course of agriculture, understood as interdependent and balanced development in the economic, social,

environmental and ethical aspect. The national agricultural policy emphasises issues such as: (de)population of the countryside, preservation of cultural landscapes, ecological acceptability of human activities, ecological and social factors in addition to market-oriented ones.

In this chapter we presented some other sustainable approaches, which are based on more traditional forms of farming as they are also understood in AE and take into account the circulation of substances on the farm, the crop rotation without the use of mineral fertilizers and pesticides. They are derived from the knowledge of the nature of the crops and animals. Approaches such as biodynamic farming, permaculture and ecoremediation in agriculture represent a new alternative forms of farming.

However, at the national level they have not yet received financial incentives and are not legally defined as this applies to the already well-established OF. In particular, permaculture and biodynamic farming are increasingly expanding among Slovenian organic farms. Some researches indicates that farmers have a lack of knowledge about these approaches and want to learn about permaculture and other sustainable principles and their application in practice. Farmers miss more useful knowledge in the field of sustainable farming by educational institutions and associations.

In the following part we present examples of sustainable forms of farming with the regulations.

Organic farming.

OF represents a form and method of farming that is gaining increasing importance in the Slovenian agricultural area, however, its origins date back to the early 90's.

In 1998, there were only 41 growers or agricultural holdings involved in the control. In 2014, 3049 farms had already successfully completed a conversion period and acquired the certificate.

Up until now, the entrance of organic farms into the control system and the increase of organic surfaces constitute a continuous growth but it is not satisfactory due the general agricultural land abandonment and natural forest expansion. However, there is still an urgent need for large quantities of crops and organized appearance on the market, with the raising of awareness of consumers and producers. The current production is dominated by grassland or livestock production, consumer demand is the largest for fresh vegetables and fruits, as well as by non-meat processed, this is a grain and dairy products.

Since 2001, OF is regulated with the rules for organic production and processing, which is coordinated with the European regulation on OF mode. With the passage of more agro-environmental programmes such as Slovenian agri-environmental program- SKOP, 2001-2003 and Rural development programme 2004-2006 organic farmers were eligible for direct payments for the enforcement of the measures of this programme. Financial incentives are designed primarily to reduce the intensity of the action and the use of naturally more friendly technological processes, preservation of the population, the sustainable use of natural resources and the production of safe and quality food, preservation of natural resources, biodiversity and traditional cultural landscapes, as well as measures in the area of special environmental constraints that apply to protected areas. This program became part of the Rural development programme of the Republic of Slovenia when the state entered the EU (RDP 2004-2006, RDP 2007-2013, RDP 2014-2020) (online source 10, in the bibliography).

In 2005, the Government of the Republic of Slovenia on the basis of a European action plan for organic food and agriculture adopted its own national action plan of the development of organic agriculture in Slovenia until 2015. The document supports all 21 acts of the European action plan and provides the analysis, identify the needs, objectives, and measures to promote the long-term development of an accelerated organic agriculture in Slovenia. The main aims of the plan were: the inclusion of the action plan into nation RDP 2007-2013, increase the share of organic farms to 15% by 2015, increase the share of utilised agricultural area in organic farming to 20% and 10% of Slovenian origin of organic food of the total quantities marketed food, triple the number of ecological tourist farms, etc. Many of these ambitious goals were not realised due to the several reasons such as: not organized marketing chain for OF products, some organic products are still sold as conventional (especially milk and meat), advisory system is not well implemented into the practice for supporting conversion and for knowledge transfer, weak collaboration among organic farmers (the voice is not heard in the policy). (online source 5, in the bibliography).

OF will continue to be encouraged in the context of new perspectives 2014-2020, which, in accordance with the aims of the EU defines measures for rural development programmes and for the first time establishes a completely self-contained measure for OF which aims to promote agricultural holdings for the voluntary guidelines or implementing of OF. The payments cover commitments that are beyond the mandatory standards of the NS, the minimum requirements for the use of fertilisers and phytopharmaceutical products and other relevant mandatory requirements set out in national law (online source 6, in the bibliography).

In the context of the RDP 2014-2020 a holistic approach is set for OF through the merging of payments linked to the surface, or animals, and grant support for the implementation of investment and other activities, such as integration in short supply chain, the logistics platform and promotions. More focus will also be on activities like the transfer of knowledge and innovation, since OF produces many of eco-innovation and the transfer of them into practice wants to be promoted.

Rural development programme (RDP).

RDP¹ is joint programming document of Slovenia and the European Commission and is the basis for the disbursement of funds from the European agricultural fund for rural development. The authority responsible for the preparation of RDP and for monitoring, control and evaluation is the Ministry of agriculture, forestry and food (Online source 11, in the bibliography).

During the programming period 2014-2020 the basis for receiving funding is the RDP RS 2014-2020, which was approved by the EC in early 2015. The priorities that Slovenia identified on the basis of an analysis of the features and status of agriculture, agri-food sectors and forestry and its integration of these economic sectors in the rural areas and the whole space are: the acceleration of the processes of structural adjustment in the agricultural sector, more effective marketing organization of agriculture, strengthen the agri-food chain, to improve the visibility and quality of locally sourced products, the preservation of natural resources and response to climate change, sustainable exploitation of forests and increase the added value of the wood. A part of the program are as well green jobs and the harmonious development of rural areas. The transfer of knowledge and innovation, care for the environment and climate change are horizontal aims that are pursued by all the priority areas of action. In the framework the programme will carry out 14 actions that are also divided on sub-measures (online source 12, in the bibliography).

In March 2016 European Commission approved the first changes to the RDP 2014-2020² mostly in the agri-environment-climate payments scheme, OF and animal welfare that will benefit to Slovenian agriculture.

Sustainable – green agriculture.

The new reform for the period from 2014-2020, is responding to the environmental, economic and territorial challenges with greater emphasis on sustainable development, the strengthening of the competitiveness of agriculture and rural development. The essential new feature is the Green component which devotes 30% of direct payments to agricultural practices, which are beneficial for the climate and the environment within which the measures will be implemented: diversification of crops, maintenance of permanent grassland and areas of ecological significance. Specific support will be passed on to young farmers who will start with agricultural activity for the first time. The support is intended to facilitate the start-up activities and the structural adjustment of their holdings. With this a generational rejuvenation in the agricultural sector will also be stimulated. A new element is the scheme for small farmers means a simplification of the procedures for entry into the scheme. Better targeting of direct payments is also reflected in the new terms and conditions for receiving direct payments to so-called active farmer, the minimum size of the agricultural holding (online source 13, in the bibliography).

Because Slovenia also follows the policies of the European aims the Government of the Republic of Slovenia in 2014 adopted a strategy for the implementation of resolutions on the strategic development of the Slovenian agriculture

¹ http://ec.europa.eu/agriculture/rural-development-2014-2020/country-files/si/factsheet_en.pdf

² http://www.mkgp.gov.si/en/media_room/news/archive/2016/3/select/sporocilo_zajavnost/article/12447/8686/

and agri-food sectors by 2020. The resolution defines the vision and goals of the development of agriculture in Slovenia in the next medium-term by 2020, and represents a response to the challenges facing agriculture in the 21st century. At the forefront of the resolutions is the pursuance of the multifunctional role of agriculture and agricultural development through the goals of sustainable development. This is based on the account of the economic, environmental and social role of agriculture. The objectives are defined through the presentation of the situation in agriculture, the global and the European framework and development advantages and options. Agriculture is understood in its broad sense, together with the associated economic sectors and their impact on the environment, space and rural resources. Strategic goals and programs will be realized in the context of strategy with the help of the various measures under the Rural development programme 2014-2020, of the regulation on direct payments in agriculture, market price measures, national sectoral strategies or plans (online source 14, in the bibliography).

Permacultural farming.

Permaculture is an approach to achieve sustainability and the whole world knows it. It is the answer to the findings of scientists, that there can be no unlimited use of natural resources and that we're getting close to the limits of growth. Despite some doubts about the unsustainable use of raw materials on our planet, as well as the exploitation of people make is certain that in the future we will have to work and live differently, as we have been until now. Therefore, with an imitation of nature (ecoremediation) and smart planning, we are already decreasing the costs of erosion, flooding, the disappearance of rare plant and animal species. However, there are still insufficient number of these kinds of approaches in education and because experiential learning is a necessity, in this paper we present methods of permaculture arrangements on school gardens. International Centre for ecoremediation is a professional institution that deals with these approaches on learning polygon for self-supply and permaculture in the Poljčane municipality.

Sustainable, permanent societies may be based only on what it can maintain and be restored on its own. Our current unbalanced policy, unsustainable use of the Earth and the lack of caring for people and the environment are already causing the need to change. The change must lead us back to the balanced society. The people who live according to the principles of permaculture, by observing the natural cycles have developed strategies which allow them to create their own system of sustainable life (Bell, 2010). All it takes is the awareness that we cannot exploit nature endlessly and that we need to adapt to the natural rhythm (season, available resources, and the idea that we can do it). Permacultural systems are sustainable, give profitable crops, require minimum effort for maximum result, they are ethical and caring for the Earth and people and generate surpluses, which we share with others. This part of Permaculture and the real results that are already visible on the Learning Centre for self-sufficiency in Dole, are the starting point of realising that even educational institutions can be directed to the use of permaculture in school gardens. We always need practical experience before going into something new. Therefore, in this paper, we have gathered ways of organizing garden with the use of permaculture. These methods are simple, and convince us that in the nature the matter and energy circulate, and that the easiest thing to take into account is the nature's own guidelines. By creating our own permaculture gardens we can develop creativity, connect health, movement and food production and make a special contact with the soil, plants and animals, thus creating added value. The world's biggest problem nowadays is the lack of fertile soil.

In recent years, several initiatives have arisen to connect to the network of ecovillages in Slovenia. Members seek to maximise the self-sufficiency with food, sustainable housing, connection with nature, caring for healthy development of humans and a solid social ties within the community, which is based on the development of the basic principles of permaculture. This represents the starting point of the ecological planning and engineering, which develops a sustainable human settlements and self-sufficient and self-endurable agricultural modular systems that are modelled on the examples of natural ecosystems. This is an integration of traditional knowledge and modern innovative approaches in the field of agriculture, building and environmental planning. This means a coexistence of human and nature, where there is an intertwining of ecology, landscape, sustainable agriculture, architecture and agro-forestry. Within existing initiatives already comes to the first organized direct exchanges of organic crops – the so-called partnership farming (online source: 15 and 16, in the bibliography).

In the new programming period from 2015 to 2020, with the introduction of agri-environmental and agri-climate payments promotes a high agricultural practices, which represent higher requirements than normal agricultural practices. The support is primarily intended for the management of agricultural land, which contribute to the conservation of biodiversity and the landscape, the protection of water resources and by adapting farming contributes to mitigating and adapting to climate change. In the context of the measure it supports and promotes methods successfully used primarily in permacultural farming, for example. the application of coverage, coverage of the soil with a groomed fallow ground, leaving unmown bands on meadows, etc.

Biodynamic farming.

"Biodynamic farming ranks among ecological ways, but its standards are more stringent. It's a self-sustaining process of food production, which is based on the completion of a circle within the farm, includes mandatory animal husbandry, use their manure in the form of compost, and local production and distribution systems using domestic breeds and varieties, which should contribute to the preservation of the environment, biodiversity, and improving the lives of farmers. " (online source 18, in the bibliography)

The beginnings of the biodynamics in Slovenia date back to 1991, with the creation of the first biodynamic association called Ajda Vrzdaneč. The association is a fully-fledged member of Demeter international, a member of the Research team DEMETER with the headquartered in Darmstadt and counts more than 450 members.

Organic farmers who are eager to obtain the right to use the trademarks of Demeter must be in an organic control for at least two years. Products with this brand has been around since 1928, controlled by the International Association of Demeter International, which manages and awards quality certification Demeter.

In Slovenia, the administrator for the brand Demeter is the Institute Demeter, who leads all activities in order to obtain the rights to use it. Each biodynamic farmer must be a member of the institute and attend at least five annual meetings organized by it and further education in collaboration with the Faculty of agriculture in Maribor. He must also be a member of one of the local society Ajda that offer basic knowledge of biodynamics. For biodynamic farming is a subject to all statutory provisions that also apply to organic farming, taking into account the Demeter's international guideline (online source 20, in the bibliography).

Ecoremediation in agriculture.

Agri-environmental programs of the common agricultural policy are increasingly supporting the sustainable approaches for the reduction of the negative impacts of agricultural activities. Ecoremediation (hereinafter referred to as ERM) in Europe is increasingly being recognized as a sustainable approach to environmental protection and possible addition to the measures of the environmental program in agriculture. The Slovenian environmental programme largely stresses the preservation of specific values of Slovenian rural areas, such as the traditional forms of farming, conservation of cultural heritage and the typical Slovene landscapes and conserving the diversity of animal and plant species. Thanks to the friendly nature of traditional farming practices in Slovenia in the past, the agricultural space preserved many biotopes of animal and plant species and the variety of finely structured cultural landscape (online source: 21 and 22, in the bibliography).

The design and implementation of environmental programmes is based on the principles of sustainability, in a cost-effective way and policies of environmental protection and aim to achieve the objectives, such as improving the standard of living in rural areas, the conservation of the population on farms in an environmentally friendly way, the protection of the traditional rural landscape, preservation of soil fertility with environmentally friendly production and processing, environmental protection, improving the quality of drinking water sources and the preservation of biodiversity. For an efficient and effective realization of those objectives a complement of the measures ecoremediations should be introduced as an innovative approach to protect and restoration of degraded environments. They are a natural systems and processes whose primary purpose is the sustainable management, which enables integrated territorial development in a given area and contributes to the harmony of human and nature and mitigates natural disasters.

Ecoremediations are an innovative, environmentally and health friendly technology, which includes the collection, containment, cleaning and reusing water. In so doing, ecoremediations take advantage of and promote the self-cleaning ability of natural ecosystems, and complements with constructed wetlands, vegetational belts and other sustainable methods that imitate nature and processes in natural ecosystems. These are the reasons why ecoremediations are extremely useful in agricultural areas, because they are using the appropriate methods of reducing or even prevent the runoff of nutrients and protective agents in the waters and groundwater, but also provides water for watering.

The possibilities of using ERM to reduce the negative influence in agriculture and as an alternative to complement measures of agri-environmental programmes are (online source 22, in the bibliography):

- the reduction of contamination of groundwater with nitrates, phosphates and pesticides, and organic matter and ammonia compounds from livestock farms and in areas with agricultural and horticultural production;
- the reduction of air pollution;
- reduce the effects of wind erosion and mudslides;
- reducing the accumulation of pesticides in the soil;
- reduction of salinated soils;
- the increase of landscape diversity and biodiversity;
- holding water and enriching the groundwater;
- act as a supplement to the existing system for the prevention of pollution;
- to prevents drying out, etc.

With the ERM we can successfully complete the measures of agricultural environmental programme and with that we can improve ecosystem services the agricultural landscape on a sustainable and long lasting way, we can contribute to increased and better products and its protection and at the same time, we guarantee the protection of the surrounding ecosystems from the negative impacts of agriculture.

ERM are fully in line with the latest programming documents and strategies such as the water act, the law on nature protection, the law on the environment and also with the EU water framework directive (WFD), which was adopted at the end of 2000 and is included in the Slovene legislation.

The legalization and the most important milestones in the field of sustainable forms of agriculture in Slovenia (adapted from the online source 6, in the bibliography).

1985

- The first lectures and the publication of the first articles in the field of biodynamic farming.

1988

- The creation of the "Gardening University"- Microcosms society;
- The first class of foreign experts in the field of biodynamic farming.

1991

- The establishment of the biodynamic association Ajda (21 members);
- The first attempts of organic production, with individual lectures by visiting professors from abroad;
- Published "Recommendations for organic farming in Slovenia" (Ministry of agriculture, forestry and food);
- The establishment of the Association of organic farmers of Slovenia (ZEKS);
- The introduction of integrated production
- Development strategy of Slovene agriculture – the first strategic programming document, which becomes a main direction of the development of Slovenian agriculture.

1994

- Operational work programme and activities for the realization of the development strategy of Slovene agriculture during the period 1994-1996 was adopted;
- The beginning of permaculture in Slovenia – creation of the Association for permaculture in Slovenia and the translation of Mollis's version of the book Introduction to permaculture.

1995

- A private non-profit Institute for sustainable development, which works in the field of sustainable development in agriculture and in rural areas was established.

1996

- The first organized lectures and courses for agricultural consultants in the context of the agricultural advisory service (expert group on sustainable farming).

1997

- A new agricultural reform programme 1999-2000 was made.

1998

- Association of organic farmers in Slovenia with the help of Austrian experts set up a system of internal control and certification. Conducted training for Slovenian controllers of organic production;
- The first 13 organic farms from the association of organic farming from North-Eastern Slovenia is involved in the control of controllers from ABG (Austria Bio Garantie);
- 18 biodynamic farms received Demeter certification from the German bio-dynamic controllers;
- The agricultural Institute of Maribor with a control organization Austria Bio Garantie concluded a contract on the acceptance of control services and certification for Slovenia;
- The Government of the Republic of Slovenia adopted the agricultural policy reform programme 1999-2002-the 2. Pillar of direct payments supports organic agriculture (the so-called ECO-3).

1999

- The establishment of the Federation of associations of organic farmers (ZZEKS);
- The inauguration of the organic farmers' market in Ljubljana;
- Within the framework of the program of the development of organic farming, the first organic farmers obtain financial support from the state;
- The Agency of the Republic of Slovenia for agricultural markets and rural development was established, which is the paying authority for the granting, payment, reporting, and control of a wide range of payments and other measures for the implementation of the CAP, the EU and the implementation of the Slovenian national measures in the areas of agriculture, forestry, food and fisheries;
- The first list of plant protection agents for organic farm was published;
- The setup of a collective trademark BIODAR.

2000

- The inauguration of the organic farmers' market in Maribor;
- Bio symposium Alps – Adriatic in Maribor;
- Agriculture Act (Official Journal of the Republic of Slovenia, no. 54/2000) and statutory regulations governing agriculture;
- The establishment of the first contacts with producers of organically grown fruits and vegetables in Mercator stores;
- The first controlled farms to obtain certificates of organic farming (34 farms) and the right to brand BIODAR;
- The control involved 263 new farms;
- 30 of biodynamic farms acquired sign DEMETER.
- The beginning of the work products in chain manufacturing plants (e.g. Pohorje beef);
- The national programme for development of agriculture, food industry, forestry and fisheries for the period 2000-2002 was approved;
- The EC approved the Rural development plan 2000-2006, for gaining of pre-accession assistance, for the implementation of the SAPARD programme measures, investments in agricultural holdings, investment in the food processing industry, economic diversification in rural areas and the development and improvement of rural infrastructure;

- The catalogue of permissible feed materials for organic farming was published.

2001

- The rules of organic production and processing of agricultural products or food (Official Journal of the Republic of Slovenia, no. 31/2001). In Slovenia there are two private eco-organic food brands: Biodar and Demeter and national character "organic food";
- Regulatory on technical and organisational conditions which must be met by an organization for the control of organic agricultural products or foodstuffs (Official Journal of the Republic of Slovenia, no. 56/2001);
- The designation of an organization for control (Official Journal of the Republic of Slovenia, no. 82/2001);
- The Slovenian agricultural environmental program to encourage conversion to sustainable forms of agriculture-organic farming a stand-alone measure was adopted;
- Catalogue of authorized funds for organic farming;
- Reorganization of the working community Ajda in the independent society for biodynamic farming in the area of the entire country.

2002

- The law on livestock farming (Official Journal of the Republic of Slovenia, 28.2.2002) –the article 28th states that the natural form of farming is an environmentally friendly form of agricultural activities that can be carried out on agricultural holdings with the same form of sustainable crop production.

2003

- Policy on the establishment of the zones in the Republic of Slovenia, which are suitable for organic husbandry management practices with the bad card sites for eco-designed husbandry management practices in the Republic of Slovenia (Official Journal of the Republic of Slovenia, no. 52/2003);
- The Charter of the cooperation within the framework of the initiative of the Ecoregion of the Alps- Adriatic region was signed. This region, in addition to Slovenia includes still Austria (Carinthia, Styria) and Italy (Friuli-Venezia Giulia); the document committees these countries to promote and integrate organic farming at the interregional level. In accordance with the guidelines of organic farming the inactive also stands up for the establishment of the in between state region free of genetically modified organisms;
- Law on agricultural land-ZKZ-UPB1 (Official Journal of the Republic of Slovenia, no. 55/2003);
- Institute for sustainable development for the period 2003-2005 carried out extensive research on the state of the eco-agriculture sector in Slovenia, in the context of the European research project to Further Development of Organic Farming Policy in Europe, with Particular Emphasis on EU Enlargement, QLK5-2002-00091.

2004

- The decision of the Government of the Republic of Slovenia about problems of coexistence of GMOs (11.3.04);
- Adoption of the European action plan for organic farming and food (10.6.04);
- By entering in the EU all amendments apply directly to the EU Regulation 2092/91 on organic farming and the labelling of an appropriate mode of agricultural products or foodstuffs (Council Regulation (EEC) no. 2092/91 of 24 June 1991 on organic production of agricultural products and indications referring thereto on agricultural products and foodstuffs-with all the changes and additions (hereafter: Regulation 2092/91);
- Eco symposium Alps – Adriatic in Ljubljana; "Organic farming and genetically modified organisms";
- The organic market in Ljubljana, Maribor, Celje, Kranj, Slovenia, Novo Mesto;
- The appointment of the two organizations for the control (Official Journal of the Republic of Slovenia, no. 138/2004)-KON-CERT for organic farming (farmers are entitled to subsidies), which is also joint with the biodynamic farms as a result of direct payments and the grant of the control of Demeter for the certificate for the biodynamic farming, which is above average and self-founding;
- The implementation of the Rural development programme for the Republic of Slovenia, 2004-2006. The priorities are: Sustainable/natural agricultural and rural development and economic and social restructuring of agriculture (Official Journal of the Republic of Slovenia, no. 116/2004, 45/2006, 70/2007, 124/2007);

- Rules for the implementation of good agricultural practices in the fertilisation area (Official Journal of the Republic of Slovenia, no. 130/2004);
- Policy on the conservation of biodiversity in livestock production (Official Journal of the Republic of Slovenia, 13.8.2004) – regulates the greater sustainability and conservation of autochthonous breeds of domestic animals.

2005

- Participation in the Common committee on organic farming of European Commission-changes in EU rules;
- Council Regulation (EC) number 1290/2005 on the financing of the common agricultural policy;
- The home base of the association Ajda withdrew from the association and became a member of the fully-fledged natural Demeter International.

2006

- The rules of organic production and processing of agricultural products or food were adopted (Official Journal of the Republic of Slovenia, no. 128/2006);
- The appointment of the three organizations for control;
- Active participation in the Working Group for organic agriculture in the preparation of the new regulation on organic farming, which will be replaced in 2009 with the current Regulation 2092/91;
- The control includes over 1800 organic farms;
- In the context of the RDP the measure of sustainable eco-breeding animals was enforced;
- The Institute Demeter was founded.

2007

- In December, three organisations for the control and certification of organic produce and groceries gain accreditation document by the Slovenian Accreditation which acknowledges the fulfilment of the requirements of standard SIST 45011;
- The Council Regulation (EC) no. 834/2007 of 28 June 2007 on organic production and labelling of organic products and repealing of the Regulation (EEC) no. 2092/91;
- The implementation of the Rural development programme 2007-2013 (RDP). The main aims of it: improving the competitiveness of agriculture and forestry by supporting restructuring, development of innovation; improving the environment and countryside through support for land management; improving the quality of life in rural areas and promoting diversification of economic activities;
- In the context of the RDP 2007-2013 comes to the establishment of agri-environmental measure of payments for the financing of environmentally friendly farming;
- The regulations about the protective sign for the labelling of agricultural products or foodstuffs (Official Gazette RS, no. 3/11).

2008

- The adoption of Commission Regulation (ES) no. 889/2008 of 5 September 2008 laying down detailed rules for the implementation of Council Regulation (ES) no. 834/2007 on organic production and labelling of organic products with regard to organic production, labelling and control;
- The adoption of Commission Regulation (ES) no. 1235/2008 of 8 December 2008 laying down detailed rules for the implementation of Council Regulation (ES) no. 834/2007 as regards to the arrangements for imports of organic products from third countries;
- Inter-service group was established to reduce the impacts of climate change with the objective of making the Strategy for adjustments of Slovene agriculture and forestry to climate change, adopted by the Government of the Republic of Slovenia on 174. regular session that took place on the 18th of June in 2008.

2009

- The beginning of the EU promotion.

2010

- The rules on integrated production of crops (Official Journal of the Republic of Slovenia, no. 110/2010);

- The rules on integrated production of fruit (Official Journal of the Republic of Slovenia, no. 110/2010);
- The rules on integrated production of grapes and wine (Official Journal of the Republic of Slovenia, no. 110/2010);
- The rules on integrated production of vegetables (Official Journal of the Republic of Slovenia, no. 110/2010);
- The rules on the classification of agricultural holdings in less-favoured areas for agricultural activities (Official Journal of the Republic of Slovenia, no. 25/10);
- The action plan of the strategy of Slovene agriculture and forestry for adaptation to climate change for the years 2010 and 2011.

2011

- Strategic document adopted a resolution on the strategic development of the Slovenian agriculture and agri-food sectors by the year 2020 "Zagotovimo.si food for tomorrow";
- The law on the promotion of agricultural and food products (Official Journal of the Republic of Slovenia, no. 26/11 from 8th of April 2011);
- The regulations about the promotion of the protective sign for the labelling of agricultural products or food (Official Journal of Republic of Slovenia, no. 3/11).

2012

- Regulation (EU) no. 1151/2012 of the European Parliament and of the Council from 21st of November 2012 on the schemes of quality of agricultural products and foodstuffs;
- The Ministry of agriculture and the environment and the Association for the development of the Slovene countryside coorganized the second Slovenian rural parliament on the topic of discussion on common agricultural policy in the period 2014-2020;
- Agricultural land act (Official Journal of the Republic of Slovenia, no. 72/11-UPB2, 58/12).

2013

- European Parliament Regulation (EU) no. 1308/2013 and of the Council of 17 December 2013 on the establishment of a common organisation of agricultural products and repealing of Council regulations (EGS) no. 922/72, (EGS) no. 234/79, Regulation (ES) no. 1037/2001 and (ES) no. 1234/2007 (single SUT Regulation): 1308/2013;
- Strategic plan for the promotion of agricultural and food products, 2013-2018;
- The selection of the official sign for "verified quality" of agricultural and food products;
- The Ministry of agriculture and the environment and agricultural Institute of Slovenia issued a publication the Fundamental principles of good agricultural practice, protection of plants and the safe use of plant protection products.

2014

- The Government of the Republic of Slovenia adopted a strategy for the implementation of the resolution on the strategic development of the Slovenian agriculture and agri-food sectors by 2020.

2015

- The EK confirmed rural development programme (RDP) 2014-2020;
- In the context of the RDP 2014-2020 implementation of measurements for organic agriculture and agri-environmental and climate protection (AECP) for promotion of environmentally friendly farming;
- A contractor has been selected for training of farmers within the framework of organic farming from the RDP 2014-2020;
- The policy on the quality of agricultural products and foods (Official Journal of the Republic of Slovenia, no. 23/15).

RESEARCH

Agroecology, as a scientific discipline and as an approach to sustainable farming practice, has objectives similar to those of organic agriculture. This section of the report presents the various approaches toward AE and OF.

AUSTRIA

research

In this section we focus on organic farming related research in which we have explained the direct connections to AE above (see section *Definition of Agroecology*).

In Austria there is a number of diverse organic research institutions, as well as further university facilities—e.g., The Veterinary Medicine University, University of Innsbruck focusing on mountain agriculture. Some of these research institutes are privately organized, but governmentally owned—see Johanneum Research. Although we will only focus on the most relevant examples, such research facilities as well as agricultural schools, breeding facilities and organic farmers themselves, provide important knowledge toward the enhancement of agricultural practices, ecological, economic and sociological aspects of organic.

UNIVERSITÄT FÜR BODENKULTUR, WIEN – UNIVERSITY OF NATURAL RESOURCES AND LIFE SCIENCES, VIENNA¹.

Officially opened in 1872 in Vienna, the University of Natural resources and Life Sciences or abbreviated BOKU—derived from its German name *Universität für Bodenkultur*: the University of the Culture of Soil—focuses on education and research in renewable resources. The University houses over 12,000 students and has 15 departments ranging from economics and social sciences and crop sciences to nano-biotechnology and landscape, spatial and infrastructure sciences. There are however two departments specifically related to AE: first the Department of Integrative Biology and Biodiversity Research, in which the zoology department is particularly active, partners with the other active department: Department of Sustainable Agricultural Systems in which the Division of Organic Farming (IFÖL) is active. These two departments have worked closely together in the past few years to create and offer a national (offered in English as an international master curriculum) titled: Organic Agricultural Systems and Agroecology (See: www.eur-organic.eu).

The Division of Organic Farming has three working groups that are actively involved with AE, the working group of Soil Fertility and Cropping Systems (often in a scientific and technical capacity see the homepage of project Biodiversity Indicators for European Farming Systems <http://www.biobio-indicator.org/>); the working group of Transdisciplinary Systems Research (attempting to bridge the scientific, technical and movement dimensions of AE focused more on a macro-level project <http://www.nas.boku.ac.at/ifoel/arbeitsgruppen/ag-transdisziplinaere-systemforschung/umis-projekt-im-unesco-report-2013/> below) and the working group of Knowledge Systems and Innovation (focusing on the communication and transfer of knowledge through attitudes and beliefs within innovation processes in OF and AE, see <http://www.combioserve.org/>).

FORSCHUNGSINSTITUT FÜR BIOLOGISCHEN LANDBAU (FiBL) – RESEARCH INSTITUTE OF ORGANIC AGRICULTURE².

Implemented in Austria in 2004, FiBL is an independent, non-profit, research institute aiming to advance science in the field of organic agriculture. With locations in Germany, Switzerland as well as Austria, it is connected to organic and sustainable agriculture schools, research and practice within the German speaking regions of the EU. However there is also involvement in projects in developing countries. Issues of health and socio-economic impacts are included in their research as they work with farmers to boost agricultural productivity. FiBL also has a focus of transfer of knowledge to educational institutions at varying levels around the country (e.g. Bioschule Schlägl—see below). They have

¹ <http://www.nas.boku.ac.at/> and <http://www.nas.boku.ac.at/ifoel/>

² <http://www.fibl.org/de/oesterreich/standort-at.html>

partnerships and host lectures at many universities and rural training institutes, they are seen as a training and advisory service for many and partake in projects not only with other research institutions, but at the governmental and retail levels as well.

FiBL's most logical connection to AE is its very practice oriented work directly with farmers. For example, as explained on their website, as part of the project "BIONet" (www.bio-net.at), FiBL Austria provides training and information to sensitise organic farmers on the importance of promoting the development of pollinating insects. However, again FiBL's connection with organic farming and the farming movement highlights also socio-economic situations also connected to AE as a movement.

BIOFORSCHUNG AUSTRIA¹

Organic Research Austria (BioForschung Austria) covers the basics in organic and sustainable agriculture research. The institute is a non-profit non-university affiliated research and learning organization. It was the first organic research centre opened in 1980. The organization focuses on four major goals:

- The improvement of organic farming with the help of inter- and transdisciplinary research
- The implementation of research results in practice, specifically together with farmers and farm actors
- Clear communication of the benefits of organic products to consumers
- The support of sustainable development within Viennese city boundaries

These goals, especially with their connection to transdisciplinary organic farming practices alludes to connections related to agroecological practice and the movement itself with its social aspirations.

BUNDESANSTALT FÜR BERGBAUERNFRAGEN².

The Federal Agency for mountain farmer questions (Die Bundesanstalt für Bergbauernfrage) is a social and natural science research institute that is part of the (BMLFUW). The goal of this research institution is the scientific support of Austrian agricultural and regional politics.

The main topics this institute focuses on are heavily connected to AE scientific and movement related goals: biodiversity, organic farming, regional development, mountain farming, gender and social relations. They share results and have cooperations not only with other Austrian partners but hold also international relations.

BIO-INSTITUT AT THE LEHR-UND VERSUCHSZENTRUM RAUMBERG-GUMPENSTEIN³.

The Institute for Organic Farming and Biodiversity in Animals for Production (Institut für Biologische Landwirtschaft und Biodiversität der Nutztiere) was established in 2005 and is one of four research institutes of the teaching and research center for agriculture in Raumberg-Gumpenstein. Research on organic production and regulation (organic grassland management and animal husbandry, arable farming, ruminant health, pig keeping and regulation/certification) is conducted in three different locations (Trautenfels, Wels-Thalheim und Lambach Stadl-Paura) within Austria.

FRANCE

research

The diversity of research topics about agro-ecology and the disciplinary fields it calls, offer a great range of possibilities and we cannot pretend to completeness in this report. However, we can give a simplified and synthetic overview of the different research works dedicated to agro-ecology according to the mentioned research organisms. To give a brief overview, the French research laboratories whose works are based on agro-ecology, spread over several public research centres specialised in science and technology. We can quote as example the CNRS, the CIRAD,

¹ <http://www.bioforschung.at/>

² <http://www.berggebiete.eu/cm3/de/themen.html>

³ <http://www.raumberg-gumpenstein.at/cm4/de/forschung/forschungsbereiche/bio-landwirtschaft-und-biodiversitaetder-nutztiere.html>

the IRD (Institut de Recherche pour le Développement- Research institute for the development), the Ifremer, France Agrimer, the INRA, and many other public or private research institutes as the IFV (Institut Français de la Vigne et du vin - French institute for grapes and wine), the IDELE (Institut de l'Élevage - breeding institute), the ITAB, the FRB (Fondation pour la Recherche sur la Biodiversité - foundation for the biodiversity research), the ACTA (agricultural technical institutes web),... each of these organisms take part in international research projects¹ as part of ANR/PCRD².

According to Olivier Le Gall³, the agricultural ecosystem is a specific ecosystem which requires to redefine a conceptual framework, even if it leans on the ecology one: *“Building this framework is necessary to surpass the specific situations and to make the generic principles emerge. This requires integrating different disciplines, different analysis scales in time and space, which represents an intellectual challenge. One must also integrate innovations coming from different partners. Contrary to conventional wisdom, agro-ecology is a high-tech approach”*. And indeed, this is confirmed by the scientific corpus dedicated to research. The bibliometric collection identified by the INRA from the term “agroecology” includes approximately 2500 publications between 1975 et 2012. A more generic questioning, enabling to define the intersection between agronomic sciences and ecological sciences and biodiversity, indicates a corpus of more than 33000 international publications between 2002 et 2011 (FIG. 26), where France appears 7th and the INRA 3rd institution, equal with the WUR⁴, behind the USDA⁵ and the Chinese academy CAS⁶.

Among the research subjects of these institutions, some specific programs aim at agro-ecology in its diverse dimensions: ecological, agronomic, social and economic. Some call for projects plans of “finalised research”, innovation and partnership” which can take shape of GIS⁷, de RMT⁸, de Casdar⁹, ... are implemented to do applied research on precise agronomic questions, facilitate exchanges between different research actors of research, development, of the work and formation and to provide the transfer of results by taking a more direct way of communication.

¹ Examples of European projects to which technical institutes attended: <http://www.acta.asso.fr/fr/recherche-developpement/partenariats-europeens/autres-projets-europeens-des-ita-2007-2013.html>

² ANR: National Agency for the Research which proposes PCRD (framework program of research and development). The PCRD is the main community tool for financing research and innovation, mainly working thanks to a call for proposals system. It finances, under the form of grants, R&D projects led by European consortiums.
<http://www.enseignementsup-recherche.gouv.fr/pid25261/l-espace-europeen-de-la-recherche.html>

³ Chief executive in charge of scientific affairs of the structure ‘Direction Collégiale de l’INRA’

⁴ WUR: Wageningen University and Research Centre is a Dutch public university in Wageningen, Netherlands. It consists of Wageningen University and the former agricultural research institutes of the Dutch Ministry of Agriculture

⁵ US department of agriculture.

⁶ Chinese academy of sciences

⁷ GIS: Groupement d’Intérêt Scientifique (interest scientific group) which is a contractual measure of scientific collaboration where an agreement signed by actors willing to work together, enables the sharing of skills and of means in order to lead community programs around a given questioning. In the sectors of food-processing and of agriculture, some national “thematic” and “field” GIS have been settled:

- the thematic GIS concern a determined theme (soils, plant or animal genomics);
- the field GIS concern the development of production systems highly performant economically, socially, environmentally, in response to the expectations of the different production industries (fruits, vegetables, field crops, breeding, etc.).

The actions taken by the GIS can be multiple:

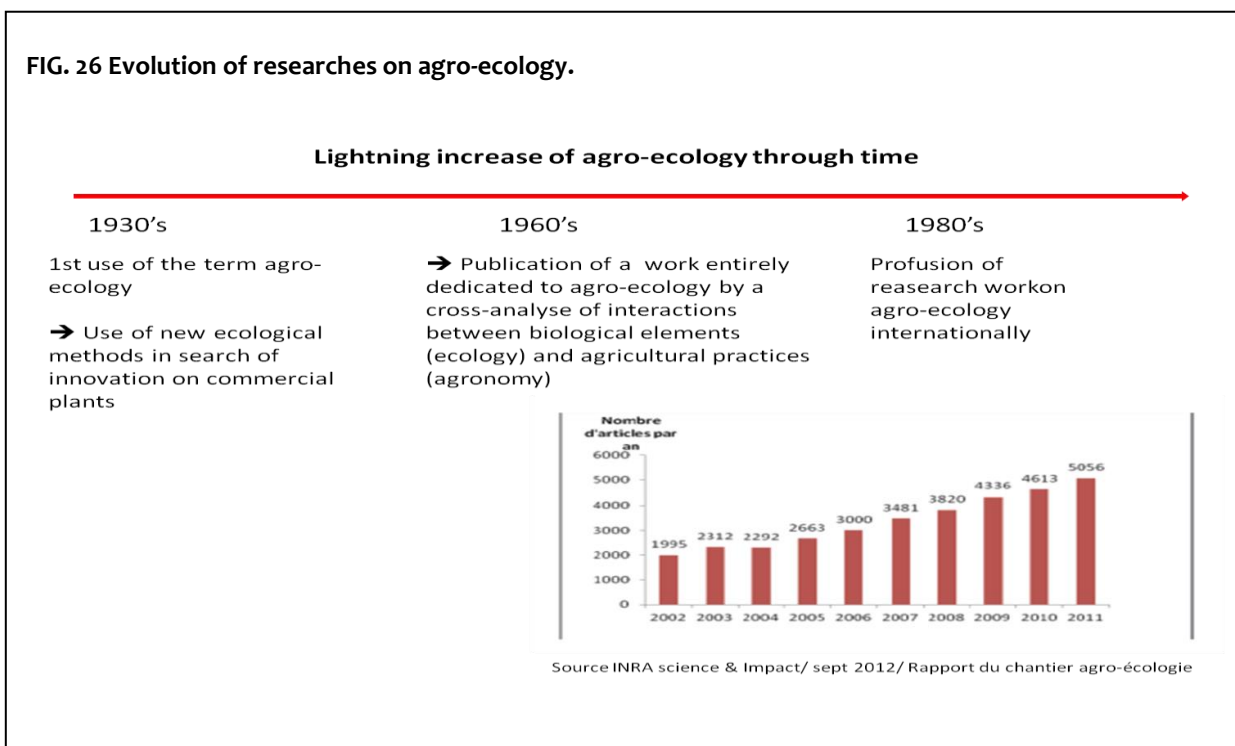
- prospective actions, identification of emerging themes;
- help to the building and running of research and R&D programs;
- production of knowledge, tools, methods, etc. and emphasis on these by transfer and communication actions.

<http://www.acta.asso.fr/fr/recherche-developpement/partenariats-nationaux/groupements-dinteret-scientifique.html>

⁸ RMT: les réseaux mixtes technologiques (mixed technological webs) and the unités mixtes technologiques (UMT- mixed technological unities) were created to facilitate the interaction between the actors of research, formation and development. Their selection was realised during specific calls for projects. Examples of RMT: <http://www.acta.asso.fr/recherche-developpement/partenariats-nationaux/reseaux-mixtes-technologiques/detail-rmt/fi/fiche/detail/sdci.html>

⁹ Examples of Casdar projects: <http://agriculture.gouv.fr/developpement-agricole-et-rural-appels-projets>

FIG. 26 Evolution of researches on agro-ecology.



The questions of research: agro-ecology, a « high-tech » approach?

The French agro-ecological pattern has a double objective: analyse the possible progress margins, thanks to “organic” production systems, on the one hand, and by “conventional” production systems on the other hand. This, through two questions:

- How can organic farming become more productive and more competitive?
- How to organise the transition from a conventional agriculture towards a more sustainable one?

These two questions were worked out by different research institutes by leaning on a common rating table of productive, economic, environmental and social performance indicators, and by mobilising expertise on innovating agricultural systems which offer new compromises between these different performances; both in organic and in conventional agriculture¹. According to organisms and research institutes, some models and systems appear and inspire agro-ecology by bringing innovations and adaptations². Then a panel of agricultural patterns is shown off which F. LEGER (2014) sharpened (FIG 27). They go from progressive improvement of production practices and systems, by increasing the efficiency of inputs use of their substitution (incremental evolution), to the breaking models leading deep changes with the adoption of sudden innovations requiring another conception of production systems.

¹ INRA, *vers des agricultures à hautes performances. Etudes et impacts*. INRA, 2013, 4 vol.

Volume 1 - Performances de l'agriculture biologique. Available on : <http://www.strategie.gouv.fr/sites/strategie.gouv.fr/files/archives/rapport-INRA-pour-CGSP-VOLUME-1-web07102013.pdf>

Volume 2 - Conception et évaluation de systèmes innovants en agriculture conventionnelle. Available on:

<http://www.strategie.gouv.fr/sites/strategie.gouv.fr/files/archives/rapport-INRA-pour-CGSP-VOLUME-2-web07102013.pdf>

Volume 3 - Évaluation des performances de pratiques innovantes en agriculture conventionnelle. Available on:

<http://www.strategie.gouv.fr/sites/strategie.gouv.fr/files/archives/rapport-INRA-pour-CGSP-VOLUME-3-web07102013.pdf>

Volume 4 - Analyse des voies de progrès en agriculture conventionnelle par orientation productive. Available on:

<http://www.strategie.gouv.fr/sites/strategie.gouv.fr/files/archives/rapport-INRA-pour-CGSP-VOLUME-4-web07102013.pdf>

² Cf OCDE. 2005. The definition applied is the one proposed by the OCDE which gathers all the business sectors.

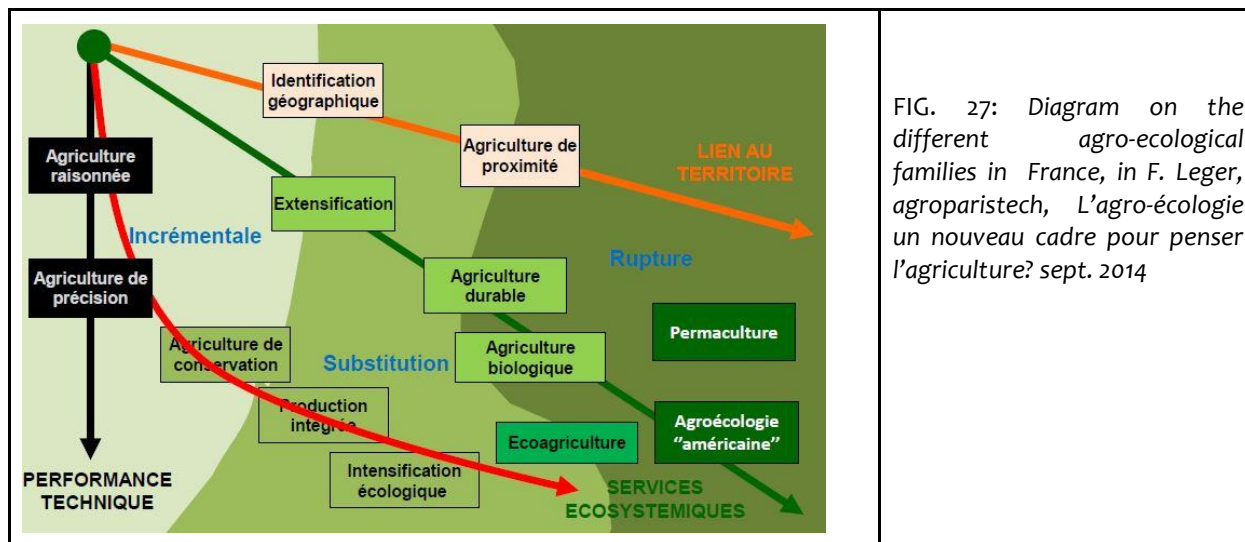


FIG. 27: Diagram on the different agro-ecological families in France, in F. Leger, agroparistech, *L'agro-écologie un nouveau cadre pour penser l'agriculture?* sept. 2014

All these researches tend to find adapted answers to develop a sustainable agriculture, enabling a production which would be at one with food needs qualitatively and quantitatively, while respecting the environment¹. The developed researches tend to progress in the knowledge of biotics interactions (in particular plants-plants and plants-microorganisms) within the agro-systems, in order to conceive innovative and eco-friendly culture systems.

They answer to two major stakes:

- Analyse, understand and act on interactions and regulations within communities at different space and time scales;
- Propose innovating culture systems enabling to guarantee a quality agricultural production, sufficiently, while respecting the environment quality.

These researches are led at different integration levels (from the cell to the community) and space and time scales (microcosm, plot, landscape, culture cycle, rotation...). They implement complementary expertise in the fields of agronomy, ecology, biology, physiology and l'ecophysiology, genetics, microbiology, and modelisation. The expected results concern specifically:

- In academic terms, on the one hand, a better knowledge and understanding of agro-ecosystems ecology. On the other hand, plants and microbial organism's characteristics (genetics and physiological), As well as mechanisms implied in plants-microorganism's interactions for their adaptation to the environment,
- In concrete terms, the proposition of agro-environmental diagnosis elements with bio-indicators and repositories, the development of multi-criteria patterns for the forecast of impacts on agricultural systems and the conception of innovating agricultural systems.

According to C. DUPRAZ², there are 5 promising ways for Europe regarding agro-ecology:

- The agroforestry systems,
- The systems of monospecific perennial crops which can benefit from the introduction of plants with environmental capacities,
- Covered seeding systems for herbaceous cultures,
- Ecological supplementation crops, real biodiversity thanks, necessary for the cultivation systems,
- The mix of varieties.

¹ <https://www6.dijon.inra.fr/umragroecologie>

² DUPRAZ. Christian, LIAGRE. Fabien. *Agroforesterie, des arbres et des cultures*. 2^{ème} éd. Paris : Editions France agricole, 2011, 456 p. ISBN : 9782855572055

Besides the research programs, these ideas are found in experiments led on agricultural farms, both for individual practices and for groups of farmers who test and implement new production techniques, more resilient and more sustainable, such as the projects led by the GIEE.

For the INRA, the reference institute for agronomic research in France, five scientific priorities are considered to develop the theoretical bases and the applications for agroecology¹:

- comprehend the entire biotics interactions in the agro-ecosystems and be able to use their answers when changing practices or environment,
- the landscape agro-ecology: the applications concern in particular the organisation of compromises between agro-ecosystems services going from landscape to region,
- the multi-criteria assessment: the evaluation of environmental sustainability of agricultural systems can be renewed thanks to the integration of biodiversity and services within the ecosystems,
- the sustainable management of the soil and water multi-functionality: the acquired can be beneficial to reduce the inputs and the rejections and to preserve the land and water resources,
- the conception and transition towards new agricultural systems: the transition requires an adapted support; social sciences can be a first step to analyse the change levers.

Comparatively, facing the challenges of global changes, the CIRAD devotes a very important part of its researches to the study of the functioning and development of agro-ecological systems, aiming at developing a credible option to the conventional patterns of production in the tropical and Mediterranean regions. The CIRAD studies in agro-ecology concern several organisation scales: plants, cultivation systems, farms, rural organisations, businesses and territories. The research plan combines diagnosis, knowledge production and gathering of local knowledge, reinforcement of skills and support to the innovation process. It develops original interdisciplinary knowledge and operational solutions for the agro-ecological transitions of southern agricultures². Three key themes are mentioned:

- mobilise biodiversity: understanding the biophysical mechanisms and interactions within the agro-systems to improve the natural regulations and the efficiency of resource use;
- create systems : Conceive agro-ecological production systems and evaluate their performances;
- accompany the transition : Accompany the agro-ecological transition and its actors.

These studies are a way of creating and evaluating innovative cultivation systems in Africa, Latin America, the Caribbean, the Indian Ocean and Asia, in diversified production contexts as family farms, agroforestry, horticultural systems, rural and suburbs areas, export cultures.

For the technical institutes, agro-ecology is at the heart of new objective contracts to be signed with the state, the dealt subjects are even more rooted in the reality of applied research, very close to farms and local agronomic problems. The developed tools can be technical tools of steering, of system management, of prophylaxy or any other agronomic question related to a specific production and/or a specific industry as for the French technical institutes of which the ACTA³ is at the head. It gathers 15 agricultural technical qualified institutes (IFV, EDELE, ITAB...) which propose professional tools for applied research and technological transfer to different agricultural industries.

The agro-ecological indicators set up for research and the partners of development and formation.

Working on the assumption that agro-ecology is an initiative aiming at reducing at a maximum the impact of agriculture on the environment, there is no miracle solution nor predetermined specifications as for organic farming, but a line of thought based on observation and made-to-measure to preserve the local eco-systems sustainably. Agro-

¹INRA. Chantier agro-écologie. INRA, 2012, 4 p. [seen on 21/01/2016]. Available on: <http://inra-dam-front-resources-cdn.brainsonic.com/ressources/afile/242811-bf37f-resource-resume-du-rapport-du-chantier-agro-ecologie-de-l-inra-2012.html>

INRA. L'agro-écologie à l'INRA, la recherche s'organise. In : INRA science et impact [on line]. INRA, the 11/10/2013 [seen on 21/01/2016]. Available on : [http://www.inra.fr/Chercheurs-etudiants/Agroecologie/Tous-les-dossiers/L-agro-ecologie-a-l-Inra-la-recherche-s-organise/Focus-sur-les-metaprogrammes/\(key\)/5](http://www.inra.fr/Chercheurs-etudiants/Agroecologie/Tous-les-dossiers/L-agro-ecologie-a-l-Inra-la-recherche-s-organise/Focus-sur-les-metaprogrammes/(key)/5)

²CIRAD. L'agro-écologie pour les agricultures tropicales et méditerranéennes Le positionnement des recherches du Cirad. CIRAD, nc, 6 p. [seen on 21/01/2016]. Available on: [L'agro-écologie pour les agricultures tropicales et méditerranéennes - Le positionnement des recherches du Cirad](http://www.cirad.fr/fr/agro-ecologie-pour-les-agricultures-tropicales-et-mediterraneeennes-le-positionnement-des-recherches-du-cirad)

³ ACTA. Le réseau des instituts des filières animales et végétales, Available on : <http://www.acta.asso.fr/>

ecology then represents a panel of reflexions, techniques, innovations, to adapt on specific territories. It is thus difficult to establish generic indicators. Nevertheless, according to Solagro¹: the study Afterres 2050 proposes several scenarios for French agriculture. These tendencies have a common point: “...the change of food system brings to a space reorganisation in order to organise the agricultural production, which has an impact on the organisation of natural and forest spaces”. This study confirms the interest of approach systems to study and propose resilient agro-ecological patterns.

Then, we can find in the scientific literature a range of tools and diagnosis methods of farms, going from plot to territory with selected indicators. To make these tools accessible regarding their objectives and their terms of use, a platform was created, dedicated to the evaluation of systems and agricultural territories sustainability. This was possible after the PLAGÉ project works (2008-2014) and after the RMT ERYTAGE². These works enabled to identify several ways of classifying evaluation tools for sustainability³ in function of the sustainable theme dealt by the tool, and of the space scale given by the evaluation indicators. The choice of the tool or the method is then made regarding the needs. A decision tree was created by experts from the PLAGÉ web. It includes the following criteria:

- dimensions of sustainability: environmental, social and economic stakes to evaluate;
- types of productions, animal and plants;
- context of the evaluation: geographic area, space scale (from the plot to the territory) time scale (from year to the cultural heritage) to evaluate;
- kind of tools and indicators wanted.

Regarding the diversity of evaluation tools and their relevance and their objectives, the IDEA method will be the only one presented in this report. It is the most commonly used in particular in agricultural education⁴.

The IDEA method evaluates the sustainability of a farm from 42 indicators, integrating the three dimensions of sustainability (agro-ecological, social and territorial, and economical). This method is destined to a diverse public (teachers, farm managers of agricultural high-schools, technicians and development agents and farmers). It aims at:

- take part in the appropriation of the concept of sustainable agriculture (teaching tool) and to communicate on the notion of sustainable agriculture (debate and involving),
- enable an annual evaluation of a farm sustainability (by the farmer/ self-diagnosis or by an external person/ diagnosis),
- contribute in the emergence of improvement option on the sustainability for a farmer (decisional help tool) and to measure the obtained progress on their farm (management dimension),
- support the public decision in the settlement of public policies directed towards the support to agricultural systems sustainability.

Focus on IDEA environmental indicators (FIG. 28)

The IDEA method takes into account 18 agro-ecological indicators. They are necessary to understand and assess different points such as the use of non-renewable energy, the capacity to protect water and natural places or the participation to diverse sources of pollution. The indicators are gathered in three components: the domestic diversity, the organisation of space and the agricultural practices.

- Domestic diversity refers to the diversity of raw productions, their diversity level and the diversity of works.
- Concerning the indicators related to space organisation, they make us think about the plot organisation, the management of places which are not directly productive and to the mixed valuation of spaces.

¹Solagro [on line]. Available on : [http://www.solagro.org/site/im_user/0468\\$syntheseafterres2050_web.pdf](http://www.solagro.org/site/im_user/0468$syntheseafterres2050_web.pdf)

² RMT ERYTAGE : made up of a national communication network among actors of agricultural Research, Formation and Development. For further information, see on : <http://www.plage-evaluation.fr/webplage/>

³Cf. grid of classification of tools for the evaluation of sustainability http://www.plage-evaluation.fr/webplage/index.php?option=com_flexicontent&view=item&cid=80&id=190&Itemid=108

⁴Examples of other valuation methods proposed by the INRA : <http://www.inra.fr/Chercheurs-etudiants/Systemes-agricoles/Tous-les-dossiers/Modelisation-et-agrosystemes/DEXiPM/%28key%29/2>

- Finally, indicators related to agricultural practices are defined. They enable to draw a picture of the coherence of these practices related to technical-economical choices but also to the environment and to living environment.

The different indicators taken into account by the method enable a translation for the farmer of the different parameters to get their farm better. The diagnosis and the assessment keep on with a continuous improvement project.

Components		Indicators
Domestic diversity	A1	diversity of annual or temporary cultures
	A2	diversity of perinnial crops
	A3	Animal diversity
	A4	Valorisation and conservation of genetic heritage
Space management	A5	Crop rotation system
	A6	plots dimensions
	A7	management of organic material
	A8	ecological regulation area
	A9	contribution to the territory environment stakes
	A10	valorisation of space
agricultural practices	A11	management of fodder crops
	A12	fertilisation
	A13	liquid organic effluents
	A14	pesticides
	A15	veterinary medication
	A16	protection of the soil resource
	A17	water resource management
	A18	energetic dependency

FIG. 28: Agro-ecological indicators in IDEA

ITALY

research

Organic farming is the main driver of agro-ecological research in Italy.

Besides the incentives that the Rural Development Programmes provide for the research, an Italian Finance Act edited in 2000 (L. 12/23/1999 no. 488) established a fund for research on organic and quality agriculture. The fund was aimed at financing every year national and regional research programs in the field of organic farming, as well as on the theme of safety and healthiness of food. The fund, fed by a 2% contribution based on the previous year's turnover of companies' sales of pesticides and synthetic fertilizers, is managed by the Italian Ministry of Agriculture. It finances a number of research activities among which the European program CORE Organic (Coordination of European Transnational Research in Organic Food and Farming Systems). It is part of the ERA-NET activities, which are coordinating and supporting activities part of the EU Research Framework Programme

(<http://www.coreorganic.org/>). The Sinab (Italian Information System on Organic Agriculture) regularly reports on the research and experimentation projects launched as part of this fund (www.sinab.it).

In September 2015 the International Conference “**Agroecology for Organic Agriculture in the Mediterranean**” was held in Vignola (Modena), with the objective to improve interdisciplinary scientific dialogue, information exchange and dissemination of knowledge and innovation in the field of “Mediterranean Agroecology and organic agriculture. Mainstreaming agro-ecological research and organic farming innovation”. The conference, celebrating its 25th edition, was organized by IFOAM AgriBioMediterraneo, established in Vignola in 1990 as a regional department of the “International Federation of Organic Agricultural Movement (IFOAM).

CREA – The Council for Agricultural Research and Analysis of Agricultural Economics. Consists of **12 Centers**, of which 6 related to specific areas and 6 related to the supply chain. “Research for organic and biodynamic farming: an overview” was the title of the workshop organized in January 2016 by CREA, which saw the participation of most of the Italian institutions and researchers involved in the sector. During the meeting the Deputy Minister of Agriculture, Food and Forestry announced the launch of the National Strategic Plan for the development of the Italian organic farming system, which foresees the drafting of a ***national plan for research and innovation in organic farming*** and the establishment of a *standing committee for the overall coordination of research in organic and biodynamic farming*, with the involvement of institutions supervised by the Italian Ministry of Agriculture. Contacts: www.crea.gov.it. Via Po, 14 – 00198 Rome.



Other Organizations involved in the research activities in Agro-ecology and organic farming in Italy are: INROF, PTBio Italia, FROBA.

INROF - Italian Network for the Research in Organic Farming (in Italian: “RIRAB – Rete Italiana per la Ricerca in Agricoltura Biologica”). In November 2010, INROF/RIRAB adopted a new organizational structure, intending to strengthen its commitment towards scientific research advancement in the field of organic food and farming in Italy. The Italian Network for the Research in Organic Farming is now organized into nine Thematic Working Groups with more than 300 members. The 2nd INROF Congress took place in Rome in June 2014 and was structured in 3 sessions: agro-ecology, sustainable organic food chains, biodiversity. Contacts: www.rirab.it – Headquarters at CNR (The National Research Council) Agribusiness Department, Piazzale Aldo Moro, 7 – 00185 – Rome.



PTBio Italia - Italian Technology Platform on Organic Food and Farming. In March 2010 a discussion Forum promoted by INROF - Italian Network for the Research in Organic Farming - was activated and a decision to actively participate in building an Italian Technology Platform on Organic Food and Farming was taken. At the end of an intensive preparatory work, PTBio Italia has been officially presented to Italian policy makers (Representatives of the Ministry of the Agriculture Policy and Ministry of the Environment) and more recently a website (www.ptbioitalia.it) has been established.



Italian Technology Platform

FROBA - Italian Foundation for Research in Organic and Biodynamic Agriculture (in Italian: “FIRAB – Fondazione Italiana per la Ricerca in Agricoltura Biologica e Biodinamica”) was founded to progress in the knowledge area on, for, from and with organic farmers. The Foundation’s rationale was in fact aimed to: the promotion of information on the multiple roles organic farming plays in sustainable development; the dissemination of research results thus increasing organic farmers’ ability to cope with technical and economic problems; the sharing of on-farm experiences and best practices; the creation of an enabling environment for research partnership. FIRAB has thus the ambition to translate into concrete operative options the cooperative research approach, facilitating the exchange of information and expertise among organic farmers and scientists.



FROBA was initiated in 2007 following a proposition launched by **AIAB** (Italian Association for Organic Farming) and the **Italian Biodynamic Association**, soon endorsed by other social organizations, who later became co-founders: **Legambiente** (the main national environmental organization) and **UILA** (one of the most representative agroindustry workers union).

FIRAB is an unique Italian not-for-profit entity with a specific focus on research in organic and biodynamic farming.

FIRAB vision is to investigate on a sustainable development model for agriculture, taking as a basis organic and biodynamic agriculture for its positive impact on production activities, environment conservation, quality of food and therefore of people wellbeing. Contacts: www.firab.it. Via Pio Molajoni, 76 - 00159 Rome.

LITHUANIA

research

Main Lithuanian research bodies active in research fields such as Rural Development and Agriculture development are:

1. **The Aleksandras Stulginskis University** (former Lithuanian Agriculture University). It is the only state institution of higher education and research in Lithuania awarding the diplomas and degrees at PhD, MSc and BSc levels in the fields of food sciences, agriculture, forestry, water and land resources management, bioenergy and mechanical engineering, climate change and sustainable use of natural resources. At present about 5000 undergraduate, postgraduate and PhD students are studying at the University. Research and teaching staff of the University consists of 400 people, including 200 professors and associated professors. Faculty of Agronomy, Faculty of Economics and Management, Faculty of Forestry and Ecology, faculty of Water and Land Management, Faculty of Agricultural Engineering. The new structure since October 2012 has introduced 14 research and study institutes within all five faculties. They replaced former 28 academic departments.
2. **The Lithuanian Agrarian Economy Institute**. It is a state institution founded in 1990 by the Ministry of Agriculture by way of restructuring the Lithuanian Scientific Research Institute of Agricultural Economics founded in 1959. The Institute has the total number of 60 employees and 38 involved in scientific research, including 10 doctors of science.
3. **The Lithuanian Research Centre for Agriculture and Forestry**. It was established in 2010 as a merge of three related research institutions:
 - Lithuanian Institute of Agriculture
 - Lithuanian Institute of Horticulture
 - Lithuanian Institute of Forestry

The mission of Centre is the conduct of basic and applied research relevant for science, national economic development and ecological needs, rational and sustainable use of land, forest and environmental resources and high quality production in compliance with the envisaged major directions of the scientific activities; development of experimental and other activities in the fields of agronomy, horticulture, forestry science, ecology and other related braches; accumulation of new scientific knowledge, its systemization and dissemination to the public; promotion of balanced and sustainable land and forest economy and rural development.

Abstract of the research performed

Aleksandras Stulginskis University

From 2006 to 2015 – no international or national research projects on topic of agroecology were held. Main research topics that could be somehow linked with definition “agroecology” were focused on organic (ecological) farming, its impact on nature and development of added value of the organic farming. The other research path was social, economical and territorial development of rural areas (ASU, 2016). However definition “agroecology” is used in some handbooks or researches by famous Lithuanian professors V. Pilipavičius and P. Lazauskas.

Lithuanian Agrarian Economy Institute

From 2004 to 2016 no international or national research projects on topic of agroecology held. Main research topics that could be somehow linked with definition “agroecology” were focused on organic (ecological) farming development, added value development from organic farming, policy and support measures for organic farming development. Other research path was social and economic development of rural areas (LAEI, 2016). In research path one research can be found which is clearly related with definition agroecology. Researcher Virginijus Skulskis in his research “Modeling factors of organic farming” (Skulskis, 2010) uses theoretical base of “agroecology” linking income, social value, personal satisfaction, personal values for mapping decisions of choosing farming systems, however V.Skulskis is not developing problematic or definition of agroecology itself (LAEI, 2016).

Lithuanian Research Center for Agriculture and Forestry

From 2010 to 2016 no international or national research projects on topic of agroecology were held. Clear specialization of researchers on field and forestry research. Main research topics that could be somehow linked with definition “agroecology” were focused on organic (ecological) farming development, its impact on nature, use of organic fertilizers, development of new plant and crop species for organic farming (LAMMC, 2016)

SLOVENIA*research*

In this chapter, we present key research institutions at the national level in Slovenia (agricultural faculties, private and public institutions and societies), which operate in the various fields related to OF and other sustainable forms of farming (permaculture, biodynamics). Research results also include areas such as biodiversity, renewable energy, environmental protection, rural development, and content related to the area of agroecology in the broadest sense. The part of the national research activity in agriculture is carried out and financially supported within the Measures of Rural Development Programme 2014-2020, with target research programme »Ensure us food for tomorrow«. Slovenian Research Agency and Ministry of Agriculture, Forestry and Food are the main policy institutions of funding knowledge and innovation system. This research work is also mostly linked with basic EU and national strategic documents and legislation, aiming to ensuring food security and sustainable food production.

http://www.impresa-project.eu/fileadmin/user_upload/IMPRESA/Filesharing/IMPRESA_country_report_Slovenia.pdf

Faculty of Agriculture and Life Sciences, University of Maribor¹

Faculty of Agriculture and Life Sciences, University of Maribor, independently and in collaboration with scientific groups and other institutions is engaged in the development, applied and fundamental researches as research projects for direct users. Research activity is carried out through the research groups and a number of independent research projects (International, fundamental, applied, targeted research and other research projects for direct users). The researchers published the results of research in top international scientific journals, on scientific congresses and symposia at the global and European level, as well as at home. In recent years, this is a very mutually strengthened international cooperation FKBV with a number of eminent global and European institutions. The faculty is involved in many research projects in the field of organic farming.

On the website of the faculty, we came across the fact that at the Department of Agricultural Economics and rural development, which was formally established in 2003, also works in the area of research for rural development, agriculture, AE space. Research was carried out under the methodological premises such as: statistical methods in the environment and biological, that are organized in three different sessions/Labs (Agricultural Economics, agricultural policy, marketing of the agricultural and rural development and management and information systems in the agricultural sector). Members of the Department are active as leaders of national and international research projects

¹ <http://fkbv.um.si/en/research-development-and-innovations>

and their research results are published in a high-profile scientific journals with impact factor, spatial analysis and socioeconomic analysis.

The Agricultural Institute of Slovenia¹

The Agricultural Institute of Slovenia is the leading research institute in the field of agriculture in Slovenia. It comprehensively deals with the issues of modern agriculture and is expanding its activities into the fields of environmental protection and ecology. It employs 176 workers, of which 85 are researchers. It is a public research institute that performs fundamental, applied and development research and specialist tasks and agriculture, publishes the results of scientific research work as well as professional and supervisory work, performs tasks based on authorization and accreditations and checks the quality of agricultural products and products used, and agriculture. The Institute also engages in the training of producers, education of young persons and consultation for various users and agriculture. The Institute performs its activity within the nine departments and an independent Service for Official Certification of Seed and Plant Propagation Material. The majority of research and professional work is done at the laboratories and in the experimental fields and plantations.

Research work at the Agricultural Institute of Slovenia is linked to the broader areas of agriculture, ecology and protection of the environment and follows the needs of providing food security and sustainable food production in Slovenia, which is reflected in the protection of the environment, preservation of soil fertility, biodiversity and traditional rural agricultural landscape. Research work is based on the Resolution on the strategic development of the Slovenian agriculture and agri-food sectors by 2020 – "Zagotovimo.si food for tomorrow," and in the European framework programme for research and the innovation of 2014-2020-"Horizon 2020". The research work is carried out in the framework of the programming of the groups Agrobiodiversity, sustainable agriculture, the competitiveness of the agri-food and Infrastructure programs.

The scope of the research program Agrobiodiversity includes agricultural plants and animals and their wild relatives and the species which are connected with them in any relation. The researches focus on the genetic structure of populations, provide insight and understanding of the ecological and evolutionary processes and contribute to the theoretical and practical starting points for the development of effective and environmentally friendly methods to control the economically important pest and quicker adaptation to climate change. Development of the methods and tools for the purpose of breeding agricultural plants, study the genome, biology of plants and pathogens and physiological research.

The research work of the program Sustainable agriculture refers to the quantitative and qualitative aspects of food production (livestock farming, beekeeping, fruits, berries, viticulture and winemaking), and environmental issues (in the direction of improved production technologies for plant protection, the rational use of energy, water and soil protection and preventing of greenhouse gas emissions).

Biotechnical Faculty (BF), University of Ljubljana²

The research work of BF includes areas of science in agronomy, biology, genetics, biotechnology, forestry, landscape architecture, wood science and technology, microbiology, natural heritage protection, zootechnics and agri-food sectors and is organized into 22 different programs and 47 research groups. Pedagogic work is successfully linked and supplemented by basic and applied research work.

On the website we came across with the fact that different departments of the Faculty in recent years have carried out a variety of research programmes, in particular in the field of agriculture, ecology, environmental protection and rural development. In 2015, the Department of Agronomy carried out some research programs that are substantively related to AE: agroecosystems, crops-genetics and modern technology, animal health, the environment and food safety.

¹ http://www.kis.si/en/About_the_Institute_1/

² <http://www.bf.uni-lj.si/en/deans-office/scientific-research/>

Institute for Sustainable Development (ISD)¹

ISD is a private non-profit institute founded in 1995. Its broader objective is the implementation of the principles of sustainable development in the praxis as well as their integration into national and EU strategic development programmes. ISD is an active member of EEB – European Environmental Bureau and IFOAM – International Federation of Organic Agriculture Movements and IFOAM EU Regional Group.

ISD's specific objectives are: Implementation of sustainable development in agriculture and rural development; Protection of nature in agriculture and by the help of agriculture and Enhancement of living connections between urban – rural – nature.

Topics of work are:

- OF – conversion, technologies, system approach; support of marketing initiatives
- Implementation of sustainable development principles in policy and practice
- Protection of environment and biodiversity, sustainable management of natural resources in agriculture
- Agricultural and rural development policy
- Millennium Development Goals and OF
- Impact of our lifestyle (focus: food, fodder, fuel) on Developing Countries
- Innovative projects of sustainable rural development
- Holistic approach to nutrition and quality of food
- Sustainable production and consumption / lifestyle
- Eco-tourism / agro-eco-tourism
- Enhancing the role of the non-governmental organisations in the development of strategic programmes at different levels (national, EU, international) and their implementation.

Methods of work: Research and development; providing advisory and expertise (especially in OF); informing, awareness raising, training, education, publication; organisation of conferences, seminars, workshops and other public events; networking and lobbying; focused work with target groups (farmers, rural population, experts, children...).

Chamber of Agriculture and Forestry of Slovenia (CAFS)²

Chamber of Agriculture and Forestry of Slovenia is the umbrella interest organization of natural and legal persons in the Republic of Slovenia engaged in agriculture, forestry and fishery. Its central task is to protect and represent their interests, to consult them and accelerate economical and environment friendly activities.

Preferential tasks are: Acceleration of development and improvement of economic conditions; Assurance of specialist services operation; Co-formation of legislation; Improvement of social conditions in life; Keeping settlement of Slovenian rural areas; Promotion of Slovenian agriculture at home and abroad

Specialised services of the chamber are: Agricultural advisory service; Selection and monitoring production in stockbreeding; Forestry advisory service; Centres for fruit-growing and nursery.

The Chamber works on 3 levels: Chamber's Headquarters in Ljubljana, 13 district subsidiaries established throughout Slovenia; 59 local units operating on a local level.

The Chamber is also involved in various projects and research, which are substantially related to the field of OF and sustainable development. The content of the international research project SAGITER, content-specific refers to the field of AE and we have explained in more detail in the chapter on Definitions of AE.

International centre for ecoremediation (ICM), Faculty of Arts, University of Maribor

The International centre operates within the Faculty of Arts at the University of Maribor, in the context of development, international and national research projects in the field of sustainable development, self-sufficiency, ecoremediations, AE, natural resources, monitoring of soil properties and the properties of the water.

¹ <http://www.itr.si/home>

² <http://www.kgzs.si/gv/eu-in-svet/english.aspx>

A broad preventive work of the centre: prevention of pollution of the environment by educating, raising awareness and information; Protection and development of the protected areas with ecoremediation (sustainable tourism, agriculture); The protection of the environment by ecoremediation, in particular in areas where it is not possible to use the classical technologies (compilation on rural sewage with a dispersed urban dwelling, protection of the coastal area, the protection of sources of drinking water, groundwater protection, protection of watersheds, mitigating climatic extremes of watercourses such as drought and floods); On the degraded areas to carrying out sustainable ways of rehabilitating (sustainable eco-remediation of landfills, dumps, sediments with heavy metals, municipal had and others).

Below we present a survey conducted by the Institute for the promotion of environmental protection, the results were used in the article Permaculture as a new opportunity for the younger generations and it was published in the International Journal of Infinity Press in England.

Permaculture as a new opportunity for the younger generations.

Large youth unemployment in Slovenia as well as in Europe demand search for new work opportunities especially for young people. Permaculture as a complex approach connects environmental, social and economic aspects. Due to the innovative approaches and natural appearance is interesting for both; the young and the elderly. We made the four-year study, where we monitored the attitudes of young people (students) to permaculture at the learning polygon for self-sufficiency in the municipality Poljčane. We found that interest in permaculture is growing and there is a growing need to deploy permaculture in practice. Therefore, permaculture means a new opportunity for work for the younger generation who will have to deal with saving natural resources and ensure a higher degree of self-sufficiency.

Introduction.

Permaculture is an ecological design system for sustainability in all aspects of human endeavour. It teaches us how to design natural homes and abundant food production systems, regenerate degraded landscapes and ecosystems, develop ethical economies and communities, and much more. As an ecological design system, permaculture focuses on the interconnections between things more than individual parts (Permaculture institute, 2013). Permaculture is much more than a land-use planning, the combination of stocking and food production, water supply, energy, waste water treatment with ecoremediation and cohabitation with animals (Whitefield, 2012). Permaculture is an increasingly popular trend around the world and, whether they achieve it fully or not, many gardeners aspire to its basic principles. Permaculture is all about design; it is a way of creating everything from abundant and self-sustaining homes and gardens to truly meaningful community projects (Permaculture Free Persse). It is increasingly recognized that only industrial production and processing of food and the globalized approaches are not the ways to provide healthy food and water as well as the required standard for all people. Therefore, the necessary initiatives at the local level were established to promote sustainable modes of food production and life, to create new jobs and many services and activities at the local level. Food security is the basis of survival of mankind (Raman, 2006), it is therefore a key challenge for any economy sustainable provision of adequate quantity and quality of food for the population. Although agriculture is the need we should take into the account of the natural capacity for food production (Pierce, 1990), are the main natural sources fertile soil and water quality. Natural soil fertility reduces the degradation processes such as erosion, flooding, drought and disease. The strategy of providing food safety for each country includes sustainable self-sufficiency by the use of domestic that is locally grown and processed products. Merely that creates jobs, innovative occupations, motivate people for sustainable technologies and reduce energy consumption (less mobility, use of local resources) and, most importantly, increases the value of the subsistence country and allows the employability of people.

According to FAO we could require current food production until 2050 increased by 50%, whereas it is not enough of additional arable land at the disposal, it is necessary to deal with the land extremely carefully and efficient production approaches must be used by permaculture (permanent culture, the way of food production with special care for the earth and water) and ecoremediation (taking into account of natural processes in nature). In the middle of the 21st century there will be about 10 billion people in the world for whose current eating habits we do not have enough

fertile land and, consequently food. Vegetarian food habits require between 700 and 800 m² of cultivated land per person, meat-and-dairy food habits is 4000 m² (Sage, 2012). In Slovenia we have 858 m² of cultivated land per capital, the lowest across the EU (the EU average was 2080 m²) (Plut, 2012). All this forces us to think about getting a land where we could grow food, regardless of land ownership (even those who have no agricultural land and live in cities). Passive people's attitude to a situation of self-sufficiency can mean even greater deterioration of the situation, for which we are all responsible. Therefore, it is to increase self-sufficiency to put a greater responsibility in education that can bring closer this content to everyone (from kindergarten to lifelong learning) and to incorporate it into everyday learning. Self-sufficiency is extremely wide, and is not only the domain of the agricultural profession. These are the reasons why we in Slovenia in the municipality of Poljčane (Picture 29) created a learning polygon for self-sufficiency based on permaculture, which can be mainly used for young people to learn about food and sustainable ways of living by the experiential method.



Figure 29: The location of Educational polygon for self-sufficiency Dole.

With educational programs on the learning polygon in Dole, we found a high likeability of permaculture to young people. Therefore, we monitored the responses of young people to participate in educational seminars for permaculture and got an insight into the transfer of knowledge from learning polygon in the local environment. In the four years of monitoring the responses of young people (we have limited the student population between the ages of 19 and 24 years), we found that permaculture has great potential for shifts in thinking in particular of young people and their acceptance as an attractive, thrifty and easy way to self-sufficiency.

Methodology.

In 2009, was established in Poljčane municipality in eastern Slovenia a learning polygon for self-sufficiency based on permaculture. This is the first such polygon in Slovenia and is mainly intended to support experiential education and understanding of sustainable approaches. Because this polygon also works as the area for teaching practice and students' fieldworks of different orientations for geographers, ecologists, environmentalists, technicians, farmers and social scientists, we have established as the implementation of educational programs a system of monitoring visitors to this polygon.

Permaculture as a motivation of young people for self-sufficiency.

Permaculture systems increased self-sufficiency and in recent years established itself as an attractive approach for the production of food. Permaculture is like a scientific way of an integrated design used in all areas of life. The basic permaculture ethics are care for the Earth, care for people and care for sharing of surpluses and permacultural design principles. The main feature of permaculture planning is the placement of things in the right place in space with respect to their relations with other elements of the system, which allows efficient use of time, energy and resources. An example of permacultural approach to the house is such that a spiral beam with herbs is placed near the kitchen because it is required several times a day; compost pile placed away from the entrance to the house that we do not

mind any odour, water intake is placed to take advantage of gravitational energy. In planning are the main source of knowledge ecosystems and their natural features. Permaculture is a versatile. Never determined regulations are not underwritten only by one function. For example: in a hedge plant are some plants which are bee pasture and give us edible fruits, firewood, enriching the soil and are consistent with natural ecosystems (Picture 30). Therefore, we should avoid planting cypresses because it has only mulch function and do not perform, the new ecosystem roles. With such concrete examples we approach young people responsibilities for deciding on care for the environment and nature.



Figure 30: Learning polygon integrated natural resources as a basis for responsibility agriculture.

The loss of importance of agricultural production, unemployment, emigration of young people and population ageing are the most significant of these changes (Picture 31).



Figure 31: Young people are actively integrated in the permacultural process.

Inhabitants of the countryside can see the development of rural areas, mainly in the promotion of tourism, development of agro-tourism or rural tourism, and thus in the adequate diversification of activities. This brings about new ways of thinking and behaviour of the rural population (Jakešova, Vaishar, 2012).

Conclusion.

At the learning polygon for self-sufficiency, we teach permaculture to different generations. In four years' increased, the number of school-age children in the learning polygon and the number of others, including a large population of pensioners. For the intergenerational transmission of knowledge permaculture is ideal because the older people still know the consideration of natural principles and the younger people have an interest to use this in practice. The second group is also significant potential generation of pensioners which is still active and can be as permaculture owner again actively involved in society. It is also a recognition that the content of sustainable development in primary school is compulsory, so all students have the opportunity to learn about permaculture as an approach to achieve sustainability. From 2009 to 2013, the number of target groups increased, student generations want to have practice during the study to obtain their own professional experience. Here again has proved permaculture as an ideal approach for innovative practical education and a responsible attitude to natural resources, increase of self-sufficiency and as a contribution to social responsibility. With permaculture we develop green jobs, the possibility of supplementary activities in rural areas, and thus the possibility of self-employment. Since the permaculture in Slovenia starts to have lot of adherents in this area it is opening up new opportunities for young people that some have used.

TRAINING / PEDAGOGY

This chapter of the report provides a glimpse about educational institutions in Austria, France, Italy, Lithuania, Slovenia, providing skills and knowledge about AE on different levels.

AUSTRIA

training/pedagogy

TERTIARY EDUCATION: UNIVERSITIES.

Education on related to AE and OF at the tertiary educational level in Austria is offered by several universities and universities for applied science. For a brief comparison and description two highly relevant institutions were selected.

UNIVERSITÄT FÜR BODENKULTUR WIEN - UNIVERSITY OF NATURAL RESOURCES AND LIFE SCIENCES, VIENNA¹

The University of Natural Resources and Life Sciences is a teaching and research institution for renewable resources and offers many different degrees on the level of Bachelor, Master and PhD (for more information see section above). The master programme *Organic Agricultural Systems and Agroecology* is designed to offer holistic education related to all aspects of the organic sector and AE, covering the special skills and knowledge required in the production, processing and marketing of organically grown food. Special skills and knowledge comprise and link ecological, economic, political, cultural, geographical as well as production related characteristics of sustainable land-use systems (organic crop production, organic animal husbandry, organic farming in the tropics and subtropics, organic food chains and networks, influence of European policy on the development of the organic sector, consumer demands, organic market development in different European countries etc.).

Learning and research is problem- and project-oriented using practical inter- and transdisciplinary methods. This approach enables critical reflection and discrete thinking to design sound and sustainable land-use systems.

The master degree offers 30 ECTS-Credits comprising a basis in “Organic Agricultural Systems and Agroecology” (in the English Language) and the opportunity to select one (obligatory) focus out of three foci:

- i.) *Organic Agriculture* (taught in English and German)
- ii.) The international master programme *EUR-Organic* – entirely taught in English and offered in cooperation with four other European Universities
- iii.) *Agroecology* (taught in English and German).

The international master programme *EUR-Organic* was designed and implemented by:

- Partner universities within the Euroleague for Life Sciences (ELLS) network
University of Hohenheim, Germany
Warsaw University of Life Sciences, Poland
- External partner universities
Aarhus University, Denmark
Institut supérieur d'agriculture et d'agroalimentaire Rhône-Alpes, Lyon, France (ISARA)

The programme offers education and training in organic agro-food chains (including topics such as ethics, production systems, quality, policies, consumer demand, and market development) in an international context, and the possibility to specialise according to the distinct profiles offered by the partner universities.

Students who complete the M.Sc. Programme are awarded a degree from two of these universities.

HOCHSCHULE FÜR AGRAR- UND UMWELTPÄDAGOGIK²

The University College for Agrarian and Environmental Pedagogy strives to educate and prepare students for a life of green teaching or green jobs. They specifically focus on agriculture and environmental education.

¹ <http://www.boku.ac.at/en/>

² <http://www.agrarumweltpaedagogik.ac.at>

They predominantly educate future teachers for positions in regional agriculture and forestry vocational schools in Austria. The perspectives of these schools towards AE can be in projects like BOgrün, wherein the University College for Agrarian and Environmental Pedagogy offers support in environmental and sustainability pedagogy for teachers in primary schools. The college also acts as an advisor in areas of practical agriculture and green jobs for prospective teachers and trainers at other levels. Their program specifically includes bachelor studies in Agrarian Pedagogy and Environmental Education, as well as a few master course offerings in similar areas. The fact that this school teaches and influences future educators is important for the possibilities of expanding an agroecological curriculum.

SECONDARY EDUCATION: FACHSCHULEN – VOCATIONAL TRAINING SCHOOLS AND VOCATIONAL HIGHER SCHOOLS

There is a variety of different vocational training schools and vocational higher schools in Austria, located mainly in the countryside. Some of them deal specifically with OF others not – this depends on the focus of the specific school and/or the specific interests of the teachers involved. Here we present of the most relevant vocational school – the *Bioschule Schlägl*, primarily because of its interest and dedication to organic farming and its sharing of AE goals. In this section we also include one example (HBLFA Schönbrunn) with no specific OF focus, but dealing with OF as one of many agricultural and gardening themes.

THE ORGANIC VOCATIONAL SCHOOL OF SCHLÄGL (BIOSCHULE SCHLÄGL)¹

This school first became a farming institute in 1924, and in 2002 was transitioned into a school specifically for organic farming and its connections to regional development as it is located in the BIOREGION Mühlviertel. It predominantly focuses on students from the 9th-11th grades, offers a boarding school option and potential students from all regions can partake in the curriculum. There is also a smaller adult program available. The school focuses heavily on practical examples and learning by doing in their goal of preparing technically and professionally trained graduates. The school hosts the *Organic centre of excellence Schlägl* (Bio-Kompetenzzentrum Schlägl) which was founded in 2011 by the Alumni Union of the Bioschule and FiBL Austria and is financially supported by the regional government of Upper Austria. The Organic centre of excellence Schlägl is conduction research and field trials with the regional rye variety *Schlägler Roggen*.

HÖHERE BUNDESLEHR - UND FORSCHUNGSANSTALT FÜR GARTENBAU SCHÖNBRUNN (HBLFA SCHÖNBRUNN)²

The HBLFA is an institute for higher learning and research in horticulture. Their research focuses surround themes of all plants from ornamental and woody plants as well as market gardening—e.g., seedlings, planting, raising, harvesting, etc. They also breech topics such as marketing, landscape design, plant protection, and materials for structural issues. They are a well known resource for market gardeners and breech some AE topics dealing with soil and pests.

FRANCE

training/pedagogy

Evolution of agricultural education towards « Teaching how to produce differently ».

Modern French agricultural education « was shaped by the laws of 1960-1962, destined to organise the formation of productive farmers » (Board of education, 2013). The priority was then given to the production development. Since the mid 90's, it has stepped on to processes of agriculture, sustainable development and education for a sustainable

¹ <http://www.bioschule.at>
<http://www.biokompetenzzentrum.at/startseite.html> resp. <http://www.biokompetenzzentrum.at/schlaegler-roggen.html>

² <http://www.gartenbau.at/index.html>

development. The experiences drawn from these action programs (1995 – 2006) have been abundant even if they noted different appropriations of the concept of sustainability (GABORIEAU, PELTIER, 2011).

Today, it is about introducing a movement towards agricultural practices compatible with the agro-ecology¹. The role of agricultural education in this transition takes part into two levels: “producing differently”, but also “teaching how to produce differently”. *«[I]f in the post-war economic boom, the agricultural education meant to train producers able to set up specialised production patterns considered as the more efficient from an economic point of view, it is now necessary to operate a “paradigm shift”, to put, or put back, agronomy at the center of interests, and to practice global approach multidisciplinary, and draw a benefit from the diversity of geographical situations and of production modes, to prepare to master uncertainty...»* (ONEA, 2013).

The Direction Générale de l’Enseignement et de la Recherche (DGER) then officially launched the action plan « Teaching how to produce differently » during the national seminar of 13 April 2014², to go with the « agro-ecological transition » and help the teaching staffs to equip with adequate tools to ensure this transition which is made easier by:

- *The fact that we can find farms and technological workshops in schools.*

The 190 farms and 33 technological workshops of agricultural education are put (back) at the heart of the strategic policy of schools, interfacing between production and pedagogy. These “educational” farms and workshops “provide the adaptation and formation to practical, technical and economic realities, and contribute to the display, experimentation and broadcasting of new techniques³ ». 57% of these farms and workshops take part in a quality approach of the product, 74% have a technical organic farming tendency, whether sustainable or managed. These farms and workshops are used for small training periods, worksites, practical classes, and take part in experiments, development and innovation.

- *A long story regarding multidisciplinary and education to sustainable development.*

The French agricultural education benefits from an old tradition concerning nature since the 70’s and thereafter concerning the environment at the end of these years, before going into sustainable development education in 2007⁴. It also benefits from a strong identity developed around multidisciplinary, with notably environment studies since 1960; and ecology education in 1971. Finally, in the repositories, agricultural education benefits from numerous freedoms of action for schools, from specific subjects and from the possibility of implementing group trainings regarding sustainability and/or territories.

- *A strong territorial anchorage and a culture of networking.*

Indeed, with a wealth experience of its 5 missions, including hosting and territories’ development, agricultural education is besides very implied on territories, both in teachings, but also through teachers (about 80), who benefit from a third of their work time off for the implementation of a territory project within the school. This implication of educative actions in territorial projects make learners and the educative community face complexity, the entanglement of space and time scales, the systemic approach, the participation and learning of negotiation and conflict. Finally, agricultural education also has a deeply rooted culture regarding “networks”, whether national, thematic or regional.

That is on these benefits seen as many opportunities, that leaned the implementation of the “Teaching how to produce differently” plan.

Implementation approach of the « Teaching how to produce differently » Plan.

- *Regional versions*

¹Le projet agro-écologique pour la France. In : Alim’agri [on line]. Ministère de l’agriculture de l’agroalimentaire et de la forêt, 16/10/2013 [seen on 23/12/2015]. Available on : <http://agriculture.gouv.fr/le-projet-agro-ecologique-pour-la-france>

² “Enseigner à produire autrement” pour l’enseignement agricole. In : Chlorofil [on line]. Ministère de l’agriculture de l’agroalimentaire et de la forêt, updated on 26/10/2015, [seen on 21/01/2016]. Available on : <http://www.chlorofil.fr/enseigner-a-produire-autrement/le-plan-enseigner-a-produire-autrement.html>

³ Article L811-8 du Code rural et de la pêche maritime

⁴ Circulaire DGER/SDRIC/C2007-2015 du 12 septembre 2007

The Plan implementation is set up at a regional level, as part as a procedure including the regional direction of agriculture food and forest (DRAAF)¹, the different agriculture educational institutions, partners and professionals. A regional agriculture educational program for agro-ecological transition was thus written par each region. These projects try to involve the entire educational community, to increase exchanges between partners and territories and aim at reinforcing the regional governance in order to host and coordinate the schools' initiatives, and lead the follow-up and the evaluation.

- The formation of regional advisors « *Teaching to produce differently- Enseigner à produire autrement* » (EPA).

A network of 130 EPA regional advisors was set up to accompany schools in the implementation of their agro-ecological projects. These advisors are essentially teachers who benefit from 2 hours off a week. They are led to host group meetings, list the needs in terms of formation, connect formation with research and development...Two training periods, carried by the national support device to agricultural education, were developed in order to enable understand the key principles of agro-ecology, to work on the evolution this transition implies in terms of pedagogy and to develop hosting and team work skills.

- *Calls for project.*

Some calls for projects were launched aiming at « *reinforcing the commitment of farms and technical workshops in the implementation of the agro-ecological project* »². They tend to settle, in each region, one or several farms or technical workshops around a pilot project which purpose would be « *the production of references [...] and proposals in terms of transfer and educational exploitation of the results.* »³.

- *Support and formation.*

The entire national plan of support to technical agricultural education was displayed and the teams can then benefit from local, regional or national trainings. In 2015, 39 formations were offered thanks to the formation national program. Some deal with thematic topics, other question professional citizenship, the jobs taught in agricultural education and even, more specifically, educational and didactic topics.

- *An action-formation, « Pepieta ».*

The Pepieta projet is a action training called « *pédagogie en équipe pluridisciplinaire pour enseigner la transition agro-écologique* », which means team multidisciplinary pedagogy to teach agro-ecological transition. It points to enable 10 teams working on different disciplines (theoretical and technical), from different sectors, levels, schooling... to develop adapted educational projects to teach agro-ecological transition. The support lays on the settling of a collective dynamic and definition and building of an educational strategy, its implementation, and the educational project analysis.

- « *Teaching how to produce differently* », a watchword which irrigates all the formations.

At the end, the recommendation to “teach how to produce differently” is vigorous and the educational schools and the support institutions as well as the DRAAF seized upon it even if none remain uncertain (“we already do that”, “that’s fashionable”, ...). In the technical agricultural education, there is no specific formation to agro-ecology. The objective being to make of agro-ecology a cross and multidisciplinary education. The latter is supposed to be taught in all professional and theoretical. Some specific courses initiated by schools are however framed by the teams. Therefore, philosophy and animal breeding teachers can work together on the relations Man-animal or Man-Nature. Some formation depositories for professional-qualification degrees were worked out and now offer new opportunities for these multidisciplinary courses. Finally, sectors of technology, general courses, but also landscaping, horticulture, forests, processing... also seize these questions. However, the first supports show that the actors take part in this recommendation in various ways.

The limits of the « teaching how to produce differently » action plan adoption.

¹ DRAAF, Directions régionales de l'agriculture, de l'alimentation et de la forêt

² Memorandum DGER/SDRICI/2014-392 21/05/2014

³ Ibid.

- At a regional level.

Even if all the regions have written a regional program, it is true that their development display very changeable configurations. Some are almost exclusively centered on « producing differently »: the focus is on the farms and the rest is unessential. For others, the focus is on “producing differently” but also on “teaching differently”, even building knowledge with partners. Educational times are put forward (classes, courses...). Finally, in some regions, the programs deal with “teaching differently to produce differently”. There is then a real research for balance between the different functions of agricultural education (production, pedagogy, experimentation, display). The skills and knowledge learnt through situations on farms (including the school ones), are, in fine, the horizon of « producing differently ». Several measures and devices are then considered for the support of teaching teams.

- At the level of realisations related to agro-ecology and agro-ecological transition.

As for sustainability (weak/strong), different meanings of the word agro-ecology are used by teachers, whether an agro-ecology tending to economic efficiency under the constraint of environment, or an agro-ecology tending to the food systems. But these different conceptions often remain implicit and are rarely named. Apart from the fact that some teachers sometimes have an approximate or caricatured approach of agro-ecology, some others welcome it as a new prerequisite- a new title- and do not conceptualise. Agro-ecology is not always identified as a complex subject but as a set of “good practices” without going back to its funding problems. The concept of transition in itself takes on several meanings. Some see a linear and improving process, made of incremental innovations, even “good practices”; whether others see revolutionary transformations, breaking innovations to be figured out. Finally, as it means for teachers to support the agro-ecological transition, the question they must reflect is also going beyond and towards what and in relation with what?

- At the level of educational and didactic transition.

If there is a paradigmatic break in terms of agricultural practices, it would not be without consequences on “what is to be taught” and the way to do it. Some repositories have been revised, they are written from professional repositories which identify the capacities that the evaluation must certify. *“reaching these capacities requires the formulation of a formation repository based on the building and development of these-ones and not the transfer of knowledge out of touch with reality.”* (Inspectorate, 2013), *“this demands the implementation of a repository which points out professional situation experiments, and so practical questioning”*. Indeed, the main stake is to teach the learners to think (MAYEN, 2013; HOUE, 2014), to consider problems related to professional situations, to build contextualised solutions, to work in a network, to handle risk-takings. Accompanying a conventional agricultural pattern towards an agro-ecological one calls then for a reflexion on scientific and technical knowledge to teach, a reflexion on the Man-Nature relations (work on vs work with) and a didactic reflexion on concepts, strong knowledge, those of transition...but, we can notice a tendency for teachers to start from disciplinary habits, trying to bring in agro-ecological transition in the repositories instead of considering it as an element which questions the disciplinary habits and inherent educational practices. The work situation with the living change, new space and time scales are underlined (MAYEN, 2014), we cannot therefore teach to “produce differently” as we trained yesterday in the context of a “productivist agriculture”. But the necessary cultural changes have not taken place yet- *“France is the only country who has not done its constructivist revolution”* (ASTOLFI in FLEURY, 2010) – and the jobs and disciplines epistemology remains a question in order to go out of the “technicist” and prevailing positivist model. Finally, if multidisciplinary had promising days, we can observe multidisciplinary work conceptions which are sometimes reducing (sometimes several teachers for one group, juxtaposition of non-crossed subjects...). At the end, the elements collected during the supports seem to show the necessity of a minimum knowledge in education sciences as well as a focus on learnings (HATTIE, 2012). Concerning agro-ecology, a triple approach of the concept should be relevant when for teachers by questioning it (What problem is it the solution of?), by identifying the associated concepts and by building with them tool-knowledge to give rise to reality.

The new courses of action: make a link among technique, teaching and production of references for the territories and the learners.

These difficulties thus push the agricultural education to question on a renewal of the teaching, didactic and epistemological culture of the teaching staff, in particular on:

- the way « produce differently » is conceived and implemented on the farm and technical workshops;
- the way the groups around the exploitation projects build knowledge with internal and external stakeholders;
- the educational, didactic and pedagogic processes used by different actors for the benefit of learners;
- *in fine*, what the young build as knowledge (information, tool-knowledge...).

A «EPA placement tool » (RNEDD, 2015) was thus built in order to accompany the educational system by opening their eyes on their own postures and practices. Because, if this recommendation “teaching how to produce differently” requires a support to the teams, its content cannot be composed of standardised bringing, but of adaptation to situations characteristic of each school to be coherent with the “philosophy” promoted by agro-ecology.

ITALY

training/pedagogy

The educational and training offer in agro-ecology and organic farming in Italy is very high and distributed to all levels of education, from primary schools (with awareness programs included in POF), in the secondary ones (in particular those that propose agricultural studies), up to university careers and the Masters of Science in Agroecology.

We report below some of the most interesting courses of study.

The University Sant’Anna of Pisa promotes a course on “applied agroecology” targeted to undergraduate and post-graduate, an international PhD Programme in Agrobiodiversity and research activities on the Management of functional biodiversity at species and habitat level for the provision of agroecosystem services; agroecological management in low external input (LEI) and organic cropping and farming systems; integrated pest and weed management. Professor Paolo Bàrberi, head of the Agroecology research area of the Institute of Life Sciences of the University Sant’Anna, participated in January 2016 at the creation of **Agroecology Europe**, a European association to promote Agroecology, with the participation of 19 founders from 10 countries. Agroecology Europe intends to place Agroecology high on the European agenda of sustainable development of farming and food systems. It wants to foster interactions between actors in sciences, practices and social movements, by facilitating knowledge sharing and action. It aims at the creation of an inclusive European community of professionals, practitioners, and more generally societal stakeholders in agroecology.

The working Group “Sustainable Agriculture and land management” is part of the Department of Agrifood Production and Environmental Sciences, **University of Florence (UNIFI-DISPAA)**. It offers courses for a number of programs at the School of Agriculture of the University of Florence and other public and private bodies in Italy, including the Mediterranean Agronomic Institute of Bari (MAIB), part of the International Centre for Advanced Mediterranean Agronomic Studies (CIHEAM) and the University of Gastronomic Sciences at Bra, Italy. Course topics range from agroecology, sustainable management of agroecosystems, indicator-based methods for integrated sustainability impact assessment, eco-management auditing. Current research interests include sustainable agriculture and land management, integrated ecological-economic modelling and evaluation of farming systems, organic agriculture, agri-environmental indicators, eco-management auditing, participatory frameworks for assessment of natural resource management projects.

The international Master of Science in Agroecology is 2 years long, corresponding to 120 credits (ECTS). Originated by the collaboration between the University of Tuscia and the University of Turin, which, together with NOVA (association of seven Scandinavian Universities) and FESIA (a French association of five Agricultural Schools for Agricultural Engineering and Agricultural Productions), designed the programme in order to best integrate the skills of the different universities in the field of Agroecology. As a second level study programme (MSc), it completes logically and consistently the Bachelor’s Degrees in Ecological Agriculture, Organic Production and Farming, Protection of Horticultural Crops, Agricultural Science and Technology.

This interesting and new international didactic programme is approved and financed by the Italian Ministry for Education, University and Research within the Internationalization plan for increasing of the university system. Currently, however, it is active in Norway (through NOVA) and France (through ISARA Lyon).

The Mediterranean Agronomic Institute of Bari (MAIB), part of the International Centre for Advanced Mediterranean Agronomic Studies (CIHEAM) promotes the MOA – Mediterranean Organic Agriculture Master programme that aims at preparing graduates to produce innovation in Mediterranean organic agriculture, creating and maintaining sustainability in the farming system, assisting and contributing to national development of organic legislations and regulatory framework.

Among the **pedagogical initiatives** we can highlight **the agro-ecological food garden promoted by Slow Food**, during Expo 2015 in Milan. A laboratory that gave visitors plenty of inspiration to create their own food gardens, to raise beds or in pots on a balcony. The initiative, which was very successful during Expo 2015, keeps expanding thanks to the association Slow Food. The garden is a site for on-going education. Wandering past the beds, you can pick up essential tips on how to create a garden using an agro-ecological approach, while discovering the functions of different plants, understanding the best techniques for planning and cultivation, seeing how flowers can help protect crops from harmful insects and learning how to naturally enrich the soil.

LITHUANIA

training/pedagogy

VOCATIONAL EDUCATION AND TRAINING.

Currently, in Lithuania, there are 3 curriculum (out of 1074) at vocational level related with organic agriculture and no training programs related directly with agroecology. Training programs are the following:

- “Organic farm worker”,
- “The basics of Organic farming”,
- “Organic farm employee”.

There are five vocational schools providing education by these programs – Simnas Agricultural School, Alanta Business and Technology School, Alytus Vocational Centre, Panevėžys Vocational Centre, Joniškėlis Agricultural School (AIKOS, 2016). The curriculum includes legal issues and requirements for ecological farming, drafting business plan and investment project, farm territory planning, accounting, document management, planning crop rotation, soil management, fertilizing, plant protection, labour and fire safety, rations for cattle and poultry, manure management and composting, production and direct marketing.

HIGHER EDUCATION AND TRAINING.

At college level there is 1 curriculum (out of 440) related with sustainable agriculture and no training programs related directly with agroecology. The curriculum is:

- “Sustainable farming”.

It is provided by Žemaitijos College (AIKOS, 2016). Study includes:

1. apply specialty, business language and information technology expertise and professional ethics and principles of sustainable economic activity in the exchanges and cooperation, in accordance with the professional activity, responsibility, critical thinking provisions;
2. collecting and organizing scientific and technical information, to link it to sustainable farming and agro-tourism integration opportunities, partnerships adapting to specific situations, in accordance with the responsibility and duty;
3. analyze the agricultural business environment assessment of environment-friendly and safe farming ideas, constructive communication and cooperation, acceptance of responsibility for performance;
4. apply the agricultural production of technological knowledge, research-based modeling, design and implement environmentally friendly technology to ensure human and environmental safety;

5. apply the agricultural products processing technological knowledge in selecting agricultural production storage, primary processing and marketing processes, balancing the benefits to the consumer, cost, environmental friendliness, aesthetics;
6. run farmhouse renovation works in conjunction with the sustainable development of the territory, exceptional local social, cultural and environmental characteristics, taking into account the ethnic, social and cultural context of their work;
7. identify agro-tourism organize services, linking with sustainable farming principles, plan and organize the provision of, in accordance with professional ethics, communication and cooperation, creativity and ethno-cultural elements;
8. plan and organize farming business, prepare and carry out projects to assess the problems and their causality and plan their solutions, in a changing business environment, constructive communication and cooperation, and to adapt to new situations.

At University level bachelor there are 3 curriculum (out of 1350) related with agroecology:

- “Ecology”;
- “Environment”;
- “Applied Ecology”.

Future ecologists study environmental chemistry and toxicology, air, soil, water quality and assessment, soil science, plant biology, dendrology, microbiology, different kinds of biology and zoology, general and special ecology, landscape ecology and land management, biodiversity protection, sustainable development basics environmental impact assessment and monitoring of environmental economics, management and law, and so on. These program studies are provided by three state universities, such as Vilnius University, Vytautas Magnus University, Aleksandras Stulginskis University (AIKOS, 2016).

At University level master there is 1 curriculum (out of 1350) related directly with agroecology:

- “Agro-ecosystems”.

Future Masters of Ecology study the following subjects: agricultural plant biology, research planning and analysis of plant and soil chemical analysis, information technology agronomy, agro-ecology and the environment, crops and their investigations, weed ecology, land cultivation and the environment, ecological agriculture. The curriculum is provided by Aleksandras Stulginskis University (AIKOS, 2016).

CONTINUES VOCATIONAL EDUCATION AND TRAINING.

At continues education for farmers there are 4 training programmes (out of 440) related with organic agriculture and no training programs related directly with agroecology:

- “Organic farming bases”, duration 24 acc. hours;
- “New technologies in organic farming” duration 16 acc. Hours;
- “Participation in environmental measures” duration 10 acc. Hours;
- “Sustainable farming” duration 24 acc. hours.

The training programs aim to provide the farmers with the scientific knowledge based on the recommendations of organic farming, organic substance and to present the basic requirements of organic farming. After completing the trainings, the participant is able to manage production in compliance with the rules of the organic agriculture production and choose the right economic specialization and plant varieties, plan the food base for the selected livestock specialization, manage the necessary documents for the certification body and the National Paying Agency under the Ministry of Agriculture (PLZMMC, 2016).

SLOVENIA

training/pedagogy

In this chapter, we present the key institutions of formal education (agricultural faculties and higher education levels of the biotechnical schools) in Slovenia, carrying out the educational programme under which learners acquire

knowledge and skills, especially in the field of agriculture, ecology, nature conservation, spatial planning and protection of the environment. A support for formal education are as well various training programs and education, carried out by the institutions and institutes in particular for beneficiaries of environmental measures and the interested public, both at the local, regional and national level.

Faculty of Agriculture and Life Sciences (FALS), University of Maribor .

FALS is the second largest educational institution in the field of agriculture in the country. With its operation, it contributes to the development and strengthening of agriculture throughout Slovenia. In the last period, it has also crucially contributed to the preservation and further recovery of the whole agricultural sector in the northeast of Slovenia. The faculty plays an important role in the environment, in particular in terms of economic development. The mission of the Faculty is to search for technological and business-organizational solutions to achieve a significantly higher level of self-sufficiency of the Republic of Slovenia with food through innovative production, manufacturing and business processes.

The training is carried out at all stages of Bologna study programmes, which is continuously updated with the achievements of basic research conducted within the framework of scientific research work at the University.

Modern studies of agriculture give an expert profile with the necessary general professional as well as completely specific skills. Graduates gain, in the context of education at various levels of study, a lot of basic and practical knowledge that is offered to them by top-trained professors.

Study programmes are carried out in the framework of the 14 different chairs. At the I. Bologna cycle, there is one university (agriculture) and six higher professional study programmes (Livestock, organic agriculture, agronomy-ornamental plants, vegetables and other crops, Biosystemic engineering, viticulture, fruit growing and wine production and management in the agro-food sector and rural development), at the II. Bologna cycle there are three study programs (agriculture, Agricultural Economics and food safety in the food industry) and at the III. Bologna cycle, there are two study programmes (agriculture and agrarian economics).

On the Faculty website, we identified that the contents of agro-ecology are a part of a study program which are AE and agro-ecosystem and AE and mineral nutrition of field and vegetable crops.

Study programme: Management in agro-industry and rural development 1. Bologna cycle and Agriculture and the environment.

Course: **Agroecology and agroecosystems** (ECST points: 6)

<https://aips.um.si/PredmetiBP5/UcnaEnotaInfo.asp?Zavod=10&Jezik=&Leto=2015&Nacin=1&Predmet=7337>

Syllabus outline:

abiotic environmental sources. Organisms-links between organisms and the environment, population parameters. Interaction – the intra and inter-specific relationships. Organization – the flow of matter and energy, the structure of the organisation. Agroecosystems-structure, functions, biodiversity. The stability of agroecosystems. The management of agroecosystems. Preservation of agroecosystems.

Objectives:

to introduce to the students, the basics of ecology and agro-ecology, the structure and operation of the agroecosystems. The ability to interpret the stability in a particular agroecosystem. The ability of management of agroecosystems.

Predicted learning outcomes-knowledge and understanding:

introducing to the students the richness and distribution of organisms in agroecosystems, and identify the physical, chemical and biological factors and interactions that have an impact on the stability of agro-ecosystems. The ability of the sustainable management of agroecosystems. To think critically.

Methods of teaching and learning:

the methodology: an introduction to theoretical issues and practical work on individual issues, field work.

We can immediately see that the focus of the courses is not in the context of the definition of agro-ecology, but in the use or understanding of the nature for food production (classical thinking in the direction of ecology in agriculture).

Study programme: Agriculture, 2nd level, Academic year 1, Semester: 2.

Course: **Agroecology and mineral nutrition field and vegetable crops** (ECST points: 3).

Syllabus outline:

additional topics of analysis and effects of agro-ecological (climatic, pedologic and edaphonic) conditions for growth, development, yield formation and quality. Latest research on beneficial microorganisms: nitrogen fixators, mycorrhiza, plant growth promoting rhizobacteria etc. Analyses of nutritional requirements of selected (chosen) species with regard to environmental protection. Plant growth and development regulation in indoor. Nitrogen and nitrogen cycle depending on different production systems. Application of appropriate nutritional and climatic models for vegetable and field crops.

Objectives and competences:

in-deep knowledge about factors those are influencing growth and development of vegetables and field crops. Understanding of different production systems enables the students of effective knowledge application into practice (nutritional and climatic models for vegetable and field crops).

Intended learning outcomes:

knowledge and Understanding in regulation of agro-ecological and plant nutritional requirements in field crop and vegetable production practice.

Transferable/Key Skills and other attributes: Autonomy in planning, analyses, evaluations and management of plant production systems in term of plant nutrition and adaptation of growth and development to climatic conditions.

Learning and teaching methods: Lectures, tutorial, seminar, labour and field work.

Faculty of mathematics, natural sciences and information technology, UNIVERSITY OF PRIMORSKA.

In the context of the University of Primorska, they carried out a regular master's 2. Bologna cycle study programme (120 ECTS). After the completion of the study a graduate acquires a master's degree in nature conservation and environmental protection. The program will educate graduates with the essential knowledge and skills in the field of the protection of nature and the environment. The basis for this is the understanding of the role of organisms at different levels, understanding of the importance of ecosystem services and the identification of changes in nature. Study programme covers both terrestrial as well as protection of marine ecosystems, which gives students a chance to choose a desired areas of nature conservation.

The aims of the curriculum are: to familiarize the students with the importance of diversity at the area of breeds, ecosystem and genetic level; to acquaint students with the principles of the natural population; to educate students in the field of environmental engineering and environmental technologies to address a wide range of environmental issues; to enable students to study interactions of plant and animal species with the environment; to inform students with possibilities of prevention and mitigation of changes in natural systems.

On the website of the faculty we discovered that in 2. year of the programme, the students can choose a modular elective subject Agroecology (6 ECTS).

Study programme: nature protection, 2nd level.

Course: **Agroecology** (ECST points: 6).

The contents of the subject Agroecology are divided into three sections: the first comprises a set of definitions, principles, objectives and importance of AE. The second section is devoted to the study and understanding of agroecosystems and the third section is devoted to the meaning of biodiversity in agroecosystems.

In the context of the subject Agroecology in addition to lectures, working in small groups is also a part of the subject. The groups deal with various cases related to agro-ecological topics in field work. The results of field observations and analysis will be presented in the form of a research paper. Depending on the topics of the seminars, additional lectures with guest professors or researchers, are predicted.

Unfortunately, after talking with the lecturer of the subject we found out that the subject has yet not been implemented.

<http://www.upr.si/sl/univerza>

Biotechnical Faculty (BF), University of Ljubljana.

Biotechnical faculty, University of Ljubljana, is the largest institution of this kind in the country and includes university, higher education, professional and postgraduate education, scientific, professional and advisory work in the field of living nature (Department of biology and Microbiology Department) and the agriculture, forestry and fisheries (Department of forestry, Department of animal science, Department of Agronomy) and related production technologies (Department of food science and Technology Department, and the Department of biotechnology). Scientific research work involves basic scientific areas of agronomy, biology, genetics, biotechnology, forestry, landscape architecture, wood science and technology, microbiology, natural heritage protection, zootechnics and agri-food sectors and is organized into 22 different programs and 47 research groups.

On nine different departments at the faculty is study programmes at all levels (higher education, University, master's and doctoral program), with a variety of subjects, in which the students acquire the knowledge and competences, in particular in the field of organic agriculture, ecology and biodiversity, forestry and forest ecosystems are carried out. Between the programs we have not noticed a subject that would directly address the area of AE, but students become familiar with the basics at least partly in the context of other subjects such as the ecological base of environmental protection, agricultural botany, plant ecology, plant and animal ecosystem etc.

The aim of the courses is to educate and to raise professionals who understand the interdisciplinary nature of the profession, knowledge of the basic methods of science, technology, economics and social sciences and are able to use it in the management and implementation of sustainable development in agriculture, forestry, landscape, agri-food sectors and biotechnology. The course of the study, students acquire the knowledge and skills such as planning, organization, management and implementation of technological processes and support services.

<http://www.bf.uni-lj.si/dekanat/studijski-programs/>

International centre for Ecoremediation (ICE), Faculty of Arts, University of Maribor

ICE is developing new knowledge on the links between environment, economy and society, leads several projects, participates in educational programs of all levels and participates in the preparation of books, workbooks, manuals etc. The ITC also organizes and conducts professional development for teachers and workshops in the areas of soil, water and ecoremediations, self-sufficiency, permaculture and AE. The mission of the International Centre for ecoremediation at the Faculty of Arts is to develop knowledge for the coexistence of human with nature.

For the purpose of education ICE has produced a catalogue of educational programs in five different content sections: Programs for experiential teaching for teachers; Programs for creative and innovative research for pupils and students; Other useful skills for everyday life; Visits to the learning polygons; Tourist programs.

Every program is carried out in practice, at the starting point the work is experiential, participants learn how to plan, implement and evaluate the results of their work. With this they gain permanent skills that they can use in everyday life. Visits to the learning polygons are meant for pedagogical staff, learners, the heads of development agencies and various societies.

Higher education.

In the field of higher education in the field of agriculture, students can choose from a wide range of biotechnical professional high schools such as Biotechnical centre Naklo, Technical School Centre Nova Gorica, Biotechnical education centre Nova Gorica, Biotechnical educational centre Ljubljana, educational centre Pyramid Maribor. After the completion of education candidates obtain professional qualifications and the title of engineer.

While studying they gain a wide variety of professional theoretical and practically useful knowledge in the field of agriculture, breeding organisms, nature conservation, and many other content that are needed for agriculture and rural areas to make progress in terms of sustainable development.

Non-formal education and training.

Some of the faculties and institutes conducted an informal professional training and education, in particular for the beneficiaries of the measures of agri-environmental programmes. Thus, Faculty of Agriculture and Life Sciences, University of Maribor, with the collaboration of the Institute for sustainable development carried out mandatory annual training for organic farmers, who entered in the measure of payments for OF from rural development of the Republic of Slovenia for the period 2014-2020 (measure EK). Every year, farmers must take at least a 6-hour mandatory training programme in relation to the organic content, which are a condition for obtaining payment for the measure.

Chamber of Agriculture for agriculture carried out verification procedures and certification for obtaining national professional qualifications, which is intended for adults who:

- Do not have a public document of professional or technical education,
- Adults who have the professional competences (knowledge, skills, experience),
- Those who want to advance in their career, without having to obtain a higher level of professional education

An individual acquires a national professional qualification:

- after parts of the educational programs for the purpose of obtaining professional education,
- after programs of vocational training and advanced training if these programs are provided or
- if they prove that they reached the standards of the expertise and skills adopted in accordance with this Act.

The importance of agro-ecological knowledge for education.

In accordance with the present educational programmes and courses we consider that the knowledges of AE are not accessible to the general population of students, but only to those who are studying agriculture and to all those who choose elective subjects in the field of ecoremediation, protection of soil, sustainable water planning and sustainable development of protected areas, which shall be carried out through the Department of geography as a part of physical geography. Additional educational opportunities are through lifelong learning approach where very much is going on. In Slovenia, there are a variety of workshops, lectures and field views from the substantive areas of AE. Most of the training takes place in a private-individual level. This kind of education also links theory with practice. While the so-called academic education is more tied to the theoretical approach.

Trends in organic agriculture in Slovenia are not positive, because of the subsidy, on which this approach is based on, are declining and therefore the number of organic farms is also decreasing. Classical-oriented farms in Slovenia still use phytopharmaceutical products and extensive use of nitrogen, which has a negative impact on underground water and soil. Therefore, agriculture in Slovenia is considered as the main culprit for the polluted soil and underground water.

Selective subject AE at the University of Primorska exists seven years, but since the study programme has been formed it has not yet been selected, which can be an indicator of low interest in this content.

We conclude that official education in Slovenia with the current systems does not effect on the knowledge of AE and that this content should be more integrated into the educational process. This is already happening on the "unofficial" level, because many organized it for themselves and want to gain knowledge in the field of AE. Thankfully, schools are already informed and enable children additional field education in these areas. It is necessary to point out that this education also involves the generation of 65 + who attends workshops and many are starting with the natural way of food production for the first time in their lives. Therefore, there is more knowledge in the society about the AE than the official systems are showing. Here it is necessary to stress the importance of the media, who are daily trying to enter these kind of content on the radio and TV programme, many number of magazines have issued in the field of production and processing of food. And another important fact, Slovenians are a nation of gardeners and everyone wants to take a very good care of their land, so it is going to be a growth in AE.

CONCLUSIONS

From the encounter of the **modern agro-ecology** (that involves various approaches and dimensions, such as the environmental, the economic, the ethical and the social ones) with the **Organic 3.0** (“bringing organic out of its current niche”), **arises a new model, open, inclusive and comprehensive, able to support the ecological transition of the farms and of the territories.**

However, it should be noted that Agro-ecology and organic agriculture, as scientific disciplines, as approaches to sustainable farming practice, as social movements – have objectives similar, which, however, often they reach differently.

Austria’s relationship to and awareness of organic farming is so prevalent that it has a co-dependent relationship with Agroecology. As organic farming is pervasive in policy, in various educational and research institutions as well as widely accepted in the public sphere, it seems as though one cannot be addressed without the other. Austria’s ‘consumer patriotism’ for traditional, regional and organic products helps to further this occurrence. When attempting to observe Agroecology as an individual science in educational and research institutions throughout Austria, AE is very much perceived as solely a biophysical relationship. However due to organic as a movement addressing certain ethical positions in connection with food, farming and ecology, AE is interpreted by the public and many social organizations as something much broader: a movement.

It is our opinion that AE needs more attention from the academic side as to what these social perceptions of AE might entail and what their implications may be. Especially in relation to the well accepted organic movement in Austria, that through the conventionalization debate and clearly defined regulatory boundaries, the organic agenda may benefit from AE as a movement, particularly from its independence of such boundaries. Likewise, AE may benefit from the popularity and acceptance of the organic movement.

Therefore, the distance of AE as a historically accepted science to AE as a movement among scientists, practitioners, activists and consumers must be bridged in Austria in order to have a more coherent understanding and possible successful future. In Austria the collaboration of both movements may be necessarily for both of their futures.

The “Agro-ecological project” is an inspiring project for **French** agriculture (Fig. 32). It translates an original answer to a common question which concerns all countries: how to combine economy and environment? For France, the agro-ecological project aims at several objectives which can be summarised as following:

- inspire a change in the state of mind, through numerous actions and through a co-building with actors of the broader agricultural sector,
- ensure a long-life perspective where a major part of French farmers will be on agro-ecological patterns in 2020, but who need realisations and support in the short term, deal with all the questions together by the systemic thought,
- promote agricultural practices which are positive at the same time for economic, environmental, sanitary and social performances,
- adapt diverse solutions case by case: agro-ecology is not a range of practices or recipes,
- go from an incremental system to a changing system with re-building towards different situations, innovative and alternative, taking into account the fact that each farmer is preoccupied by the impacts of the economic change of farms,
- prefer collective processes which are a key factor for the support of the transition towards agro-ecology,
- deal with agricultural practices but also the food processing sector and the territories development,
- provide the formation for farmers with formation programs and adapted educational frames, ready to include agro-ecological knowledge more efficiently,

- mobilise research and development by using the European Partnership for Innovation (Partenariat Européen d'Innovation- PEI) to reinforce innovation and the broadcasting of knowledge and agro-ecological practices,
- reinforce the renewal of public support by investment grants based on agro-ecological projects,
- incite to the creation of economic and environmental interest groups which are a new legal tool, permitting the grouping of farmers and the implementation of a collective project to change the practices on farms at more relevant scales for agro-ecosystems,
- change the evaluation process of seeds, in order to take their environmental performance into account in a better way,
- push to the use of agro-ecological evaluation tools, which enable the farmers to measure their practices and their performances and to compare them with those of other farmers, and to set a regular following to evaluate the realised progresses.

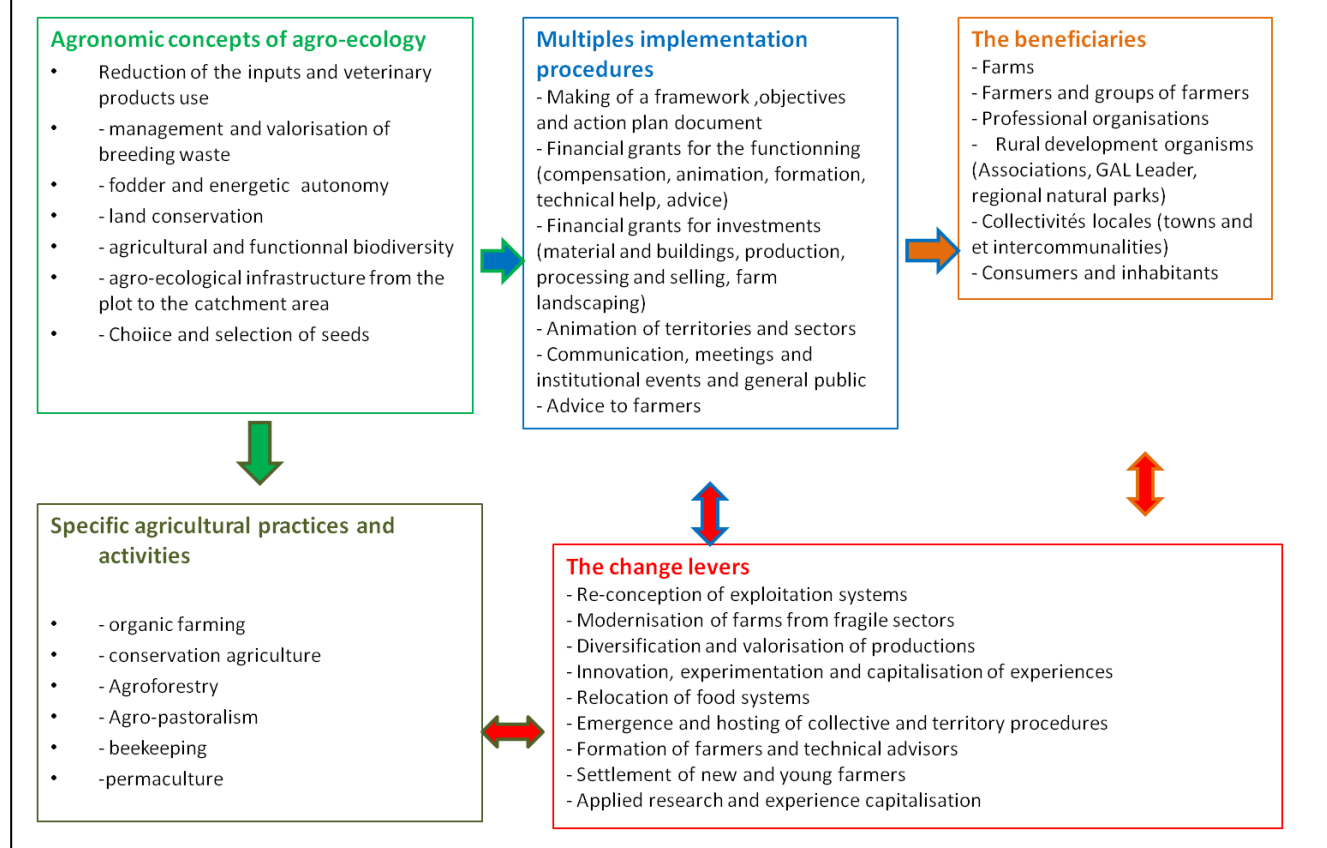
Nevertheless, this political project and the different action plans on its settlement partly answer the activists' groups for a "*rural agro-ecology*". Their demands turn around the reworking of the CAP and an orientation agricultural law funded in particular on the following proposals:

- Relocation of agriculture privileging local products,
- Support to rural and organic farming,
- Struggle at the source against green algae,
- Support to the change towards a sustainable and economically viable fishing,
- Cancellation of the political support to agro-fuels, etc.

They denounce a « *purely technico-economical vision of agro-ecology which promotes practices that have nothing to do with this latter* » by blaming the government of « *working with protagonists of the industrial agriculture pattern* ». This activist agro-ecology, tend to fundamentally call into question an agricultural system supposed intensive, productivist or industrial, in order to replace it by an alternative called "*rural agriculture*". This is not about improving the current system by taking more into account the environmental requirements in order to be able to answer the two current dominant preoccupations concerning food quality and the impact of agricultural productions on the environment and climate change, but this is about change it totally.

FIG. 32: political policies to accompany the change :

Schematic diagram and organization of public policies in favor of agro-ecology in France



The law¹ and the public policy tendencies to promote and make the agro-ecological production systems sustainable are much more moderate. In reality, this is not about upsetting the agricultural world, but about accompanying it in the provided change towards systems that combine economic, social, environmental and sanitary performances. "These systems favour the farm's independence and the improvement of their competitiveness, by maintaining or increasing the economical profitability, by improving the production added value and reducing the consumption of energy, water, fertilisers, phyto-pharmaceutical products and veterinary medicines, in particular antibiotics. They are based on the biological interactions and the use of eco-systemic services and of potentials offered by natural resources, in particular water ones, biodiversity, photosynthesis, land, air, and now their capacity to be renewed from a qualitative and quantitative point of view. They contribute to the decrease and adaptation to the effects of climate change."

The expressed political will is for sure to take the world towards agro-ecological systems from now on 2015, and to do it progressively, that is to say moving forward slowly instead of supporting those who are already there. French agriculture is diverse, very diversified, at different scales, reason why making a national plan which does not apply to all. The ambition is strong but the process is weak, that is what is reproached to these agricultural public policies².

¹ JORF n°0238 du 14 octobre 2014 page 16601 text n° 1 / LOI n° 2014-1170 du 13 octobre 2014 d'avenir pour l'agriculture, l'alimentation et la forêt (1) <http://www.legifrance.gouv.fr/eli/loi/2014/10/13/AGR1324417L/jo/texte>
<http://www.legifrance.gouv.fr/eli/loi/2014/10/13/AGR1324417L/jo/texte>

² for further details Cf. : <http://wikiagri.fr/articles/agroecologie-lideologie-derriere-le-concept/1264>

In **Italy** the organic sector shows concrete agro-ecological solutions for agriculture and food systems.

There are 21 RDPs approved by EU, for a total amount of 1.689 millions of euro of public support for the organic farming sector, in transition from Organic 2.0 to Organic 3.0.

The Italian Ministry of Agriculture, in 2016, introduced the agro-ecological approach in the National Action Plan for organic farming.

The Italian experience of the bio-district/Eco-region responds perfectly to this new model, and combines in the best way agro-ecology and organic farming.

An analytical framework for the classification and performance monitoring of the Bio-districts/Eco-regions¹, was carried out by Professor Cesare Zanasi of Bologna University. The framework integrates four different approaches: an adaptation of the Porters' Diamond analysis of the Industrial Clusters competitiveness; an evaluation scheme for measuring the degree of compliance of the Bio-districts/Eco-Regions with their principles; a classification scheme of the Clusters' stage of development and a classification scheme for defining the Bio-districts/Eco-Regions' market orientation typologies.

Organic farming is the main driver of agro-ecological research in Italy.

The educational and training offer in AE and OF in Italy is very high and distributed to all levels of education.

In Italy even environmental associations are engaged in the dissemination of agro-ecology principles. Legambiente² has been always committed to promote a new paradigm of eco-quality agriculture in order to avoid the excessive exploitation of natural resources, soil, water and air: a new agriculture aiming at producing healthy GMO-free and safe food in total respect of the Environment. Agriculture must also play a key role to reduce soil exploitation, mitigate climate change effects, contribute to revive the economy of the country and develop a green economy creating new jobs.

In 2015, on the event of the International Expo of Milan, entitled "Feeding the planet, energy for life", the historical awareness campaign of Legambiente "Green Train" has been focused on agriculture and food. That was a great opportunity to introduce the *"New Agriculture Manifesto"* and the new agriculture project involving farmers, scientists, agriculture and environment ministries and departments of all regions.

Such instrument aims at increasing biological production in Italy in the next years and enlarging the "bio" agricultural areas from the actual 9% to 20% within 2020.

In **Lithuania** the agroecology as a branch of science or movement is not widely known. It is not included into the priorities of the Government of Lithuania, as well. However, the 16th Government of the Republic of Lithuania pays attention to the sustainable development and ecology itself, as several measures, such as for example, promotion of sustainable agriculture and strengthening of eco-tourism or development of ecological technologies, included into the Programme of the Government for 2012-2016 period.

Only very few researches were made on agroecology during last 10 years. Mainly, the researches made by the researches of the organic agriculture sector. There are some curricular developed and applied in the vocational and higher education, as well as some continues vocational education training programmes developed.

In summarising the analysis and data collected, the conclusions are following:

- the agroecology is not a priority area at the national policy of Agriculture in Lithuania, however the sustainable Agriculture and sustainable Rural Development are defined as a priority. The definition of the national priorities in agriculture sector linked with the priorities set by the European Commission. It is

¹ Cesare Zanasi, Annarita Antonelli, Salvatore Basile, Patrizia Pugliese, Cosimo Rota (2015), Eco-Regions: an innovative solution for the integrated sustainable development of rural areas. Global Bioeconomy Summit 2015, Berlin. http://gbs2015.com/fileadmin/gbs2015/Downloads/Proceedings_neu_2.pdf - pag. 66.

² <https://www.legambiente.it/>

assumed, that agroecology is not a priority at the EU level, as this theme has been never introduced into the national policy of the Republic of Lithuania;

- there is sufficient attention towards sustainable development and ecology at political level, mainly due to the EU regulations and, as well, due to the overall interest of the society towards ecology and natural and more healthy way of life;
- the organic farming has a history of 25 years in Lithuania and understood as a certified production of agricultural products. The number of organic farms increases due to support by the European Agriculture Fund for Rural Development, mainly;
- the scientific researches on agroecology held due to the personal interest of the researches than due to the need from the public policy;
- there is mainly no education and trainings on agroecology sector provided. It was caused by absence of clear statement from the Government that this issue is of key importance. Nevertheless, the need for know-how, technologies and practice on agroecology is needed for raising awareness among the population.

In **Slovenia** the term AE is again being asserted, although there is no use of it and is not used in any regulations. Also uniform and final common definition of AE on national level does not exist yet. Most of descriptions of AE are based on the environmental aspects of sustainability and underline its importance.

AE is implemented into the formal curricula only at two Facilities as an elective study programme, but students and pupils have more opportunities to learn about AE principles mostly within informal educational programmes based on learning by doing methods.

AE as a sustainable agriculture concept is not officially applied in the strategic policy, but some sustainable principles linked with AE are already carried out especially at local and regional level, particularly due to the preserved traditional agricultural management and knowledge of small family farms and informal educational trainings and programmes linked with AE.

The scope of the legislation and regulations shows that the focus is on financing forms of sustainable production of OF. Therefore, we miss policies put forth by AE consisting of the transfer of traditional forms of farming in the practice of what is now understood as an alternative farming. In addition to OF today we have developed other forms such as permaculture and biodynamic farming which are still not financially supported or implemented in the legislation and strategic documents but have gained big support among the general public and local farmers.

Slovenia has a rich diversity and it has great potential for further development toward AE, but the cooperation of all stakeholders and innovative approaches are needed for developing unique Slovenian agriculture based on sustainable small size family farming model with adequate social standards.

On the national level the interest for AE knowledge and practice were recognised, but the administrative and financial limitations enable more effective progress toward AE.

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