

Evaluating the conservation status of plant genetic resources for food and agriculture in Romania – with special focus on organic farming

Maria-Mihaela Antofie, Camelia Sava



Origin of this idea



- **Article 5: Conservation, Exploration, Collection, Characterization, Evaluation and Documentation**



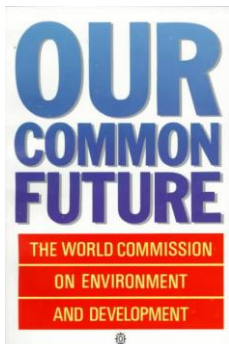
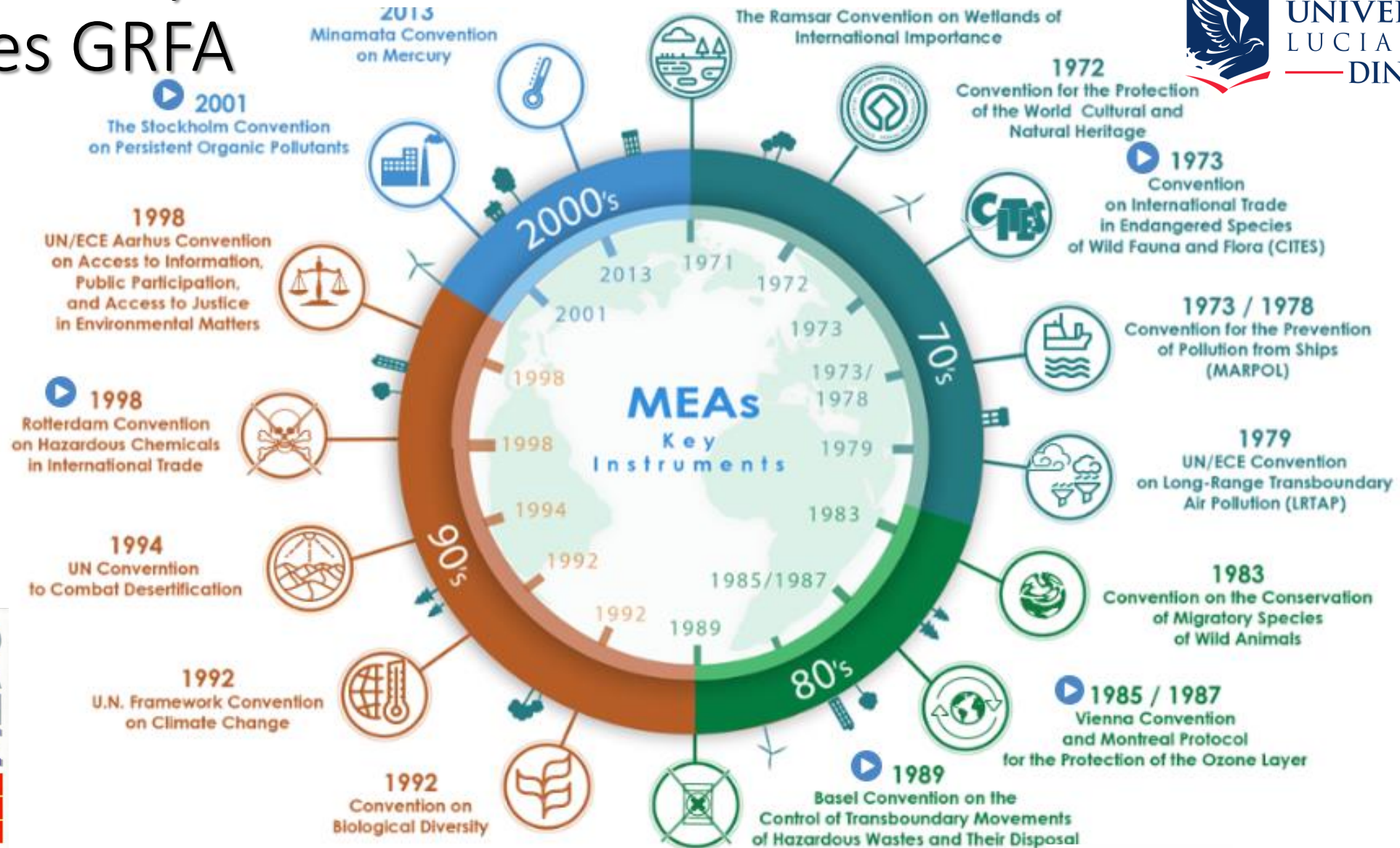
Each Contracting party shall..., in cooperation with other Contracting Parties...., promote an integrated approach to the exploration, conservation and sustainable use of plant genetic resources for food and agriculture



Biodiversity includes GRFA



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— DIN SIBIU —



9/16/2022



The International Treaty
ON PLANT GENETIC RESOURCES
FOR FOOD AND AGRICULTURE



Food and Agriculture
Organization of the
United Nations

EXPO Kiállítás és Konferencia, Hungary



First ideas for red listing crops in Nepal

Red Listing of Agricultural Crop Species, Varieties and Landraces

Red Zoning and Red Listing of Agricultural Plant Genetic Resources

Red Listing of Agricultural Crop Species, Varieties and Landraces

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ABSTRACT

Red listing mechanism has been developed for wild fauna and flora. There are several documents illustrating red listed wild fauna and flora. But there is a lack of information on the red list and red listing criteria of agricultural crop species, varieties or landraces. For initiating on- farm, *in situ* and *ex situ* conservations, red listing is helpful in locating region of crop species, varieties or landraces diversity. The paper reviewed the red listing criteria used for the categorization of wild fauna and flora. Categorization of on-farm crop species, varieties and landraces is based on population, ecological, social, modernization and use criteria. Among them ecological, social and modernization criteria are useful in selecting location for sampling materials for *ex situ* conservation and appropriate sites for *in situ* conservation. Modernization and use criteria are suitable for categorization of crop genotypes. Combinations of these criteria are proposed for red listing crop genotypes and areas.

Red Zoning and Red Listing of Agricultural Plant Genetic Resources

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Abstract

Conservation status varies among different species, landraces and varieties. Different categories have been in practices for wild and agricultural genetic resources. Documenting the conservation status is necessary to prioritize the conservation of endangered and rare genotypes. Since 2003, red listing systems have been started using in agriculture. In agriculture, red listing is applied at varietal/ landrace level. NAGRC has developed different approaches for red listing agricultural genetic resources. These approaches are 1. Red zone base, 2. Population size and distribution base, 3. Trait distribution base and 4. Age base. Landrace or varietal groups based on red list criteria (generally called five cell analysis) are common, vulnerable (localized), endangered, rare and extinct. Assessment of conservation status (red list) of APGRs and rescue mission in red zone areas and for endangered and rare landraces and crops are needed to carry out across the country.

Keywords: Endangered, rare, landrace, population size, farming land

Origin of

- *Project in 2011: The Crop Red List a strategic tool in supporting eco-economy and bio-economy*
 - First Crop Red List for Romania to be published as a tool for prioritizing efforts for a new strategy regarding agronomical research and a new agricultural policy at national level

Genetic Resources and Crop Evolution (2005) 52: 249–265

Towards a ‘red list’ for crop plant species

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Received 26 November 2004; accepted in revised form 13 December 2004

8 september 2022, ÖKO EXPO Kiállítás és Konferencia,

Key words: Angiospermae, Crops, Extinction, IUCN criteria, Red list, Threatened plants



<https://pgrdeu.genres.de/liste-pgr/?L=0>

Threatened Crop Species Diversity

There is still a third level of loss of diversity, the one of loss of agro-ecosystems. Although very important, this is not the focus of the present discussion.

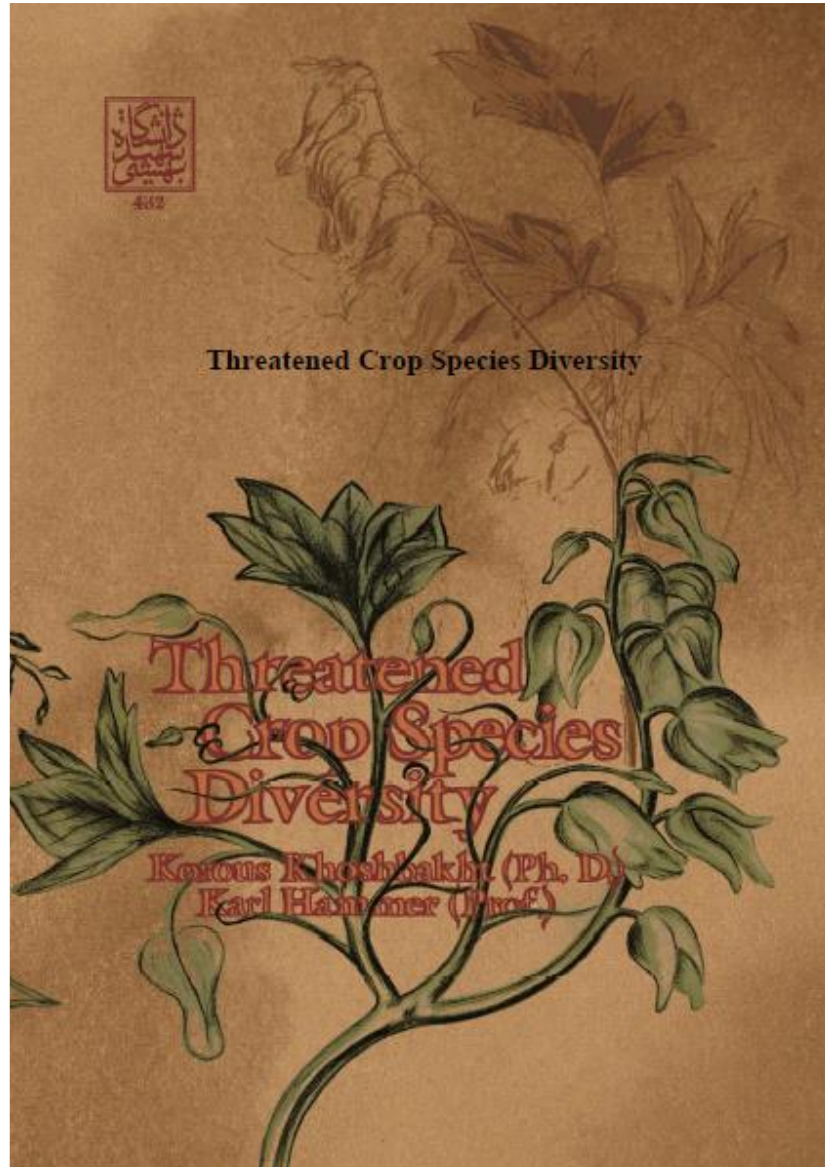
From theoretical considerations and practical experiences it is clear that a continuing loss on the genetic level will finally culminate in a loss on the species level, i.e. in extinction. Thus, the reduction in growing area of many species to a few species and the decreasing number of cultivars and their infraspecific diversity have lead to the situation that today less than 30 crop species have to secure the nutrition of the human world population.

Extinction and genetic erosion in cultivated plants have, therefore, to be addressed with highest priority. It is not the task of this book to present apocalyptic scenarios but to develop the basis for understanding the amount of genetic erosion in the hope of finding ways for slowing down or even reverting this trend.

Karl Hammer

Korous Khoshbakht

2010



Prioritizing efforts in supporting real biodiversity needs for preservation

Generating lists of GRFA connected to functional agro-ecosystems as the Best Practices



On-farm conservation of neglected and underutilized species: status, trends and novel approaches to cope with climate change

Padulosi, S., N. Bergamini and T. Lawrence, Editors
 Proceedings of the International Conference
 Friedrichsdorf, Frankfurt, 14-16 June, 2011



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Maria Mihaela ANTOFIE

The Red List of Crop Varieties for Romania

Lista Roșie a varietăților plantelor de cultură din România

SCOLA POSTDOCTORALĂ PENTRU BIODIVERSITATE ZOOTECNICĂ ȘI BIOTEHNOLOGII ALIMENTARE PE BAZA ECOECONOMIEI ȘI BIOECONOMIEI NECESARE ECOSANOGENEZEI – contract POSDRU/8/1.5/S/6/2/25



Red Lists for Cultivated Species

why we need it and suggestions for the way forward

Padulosi S., P. Bala Ravi, W. Rojas, S. Shapit, A. Subedi, E. Dulloo, K. Hammer, R. Vögel, M.M. Antofie, V. Negri, N. Bergamini, G. Galluzzi, M. Jäger, B. Shapit, R. Rana, I. Oliver King, N. Warthmann

The world's food basket is today shrinking at an alarming rate and most concerning is the reduction in the number of species and varieties used by humankind for food and nutrition, which raises serious concerns about the sustainability of feeding the world today and in the future.

Yet, whereas we deploy consistent efforts in monitoring the status of wild biodiversity, very limited is the research in monitoring diversity of plants used by farmers, assess threats of genetic erosion, understand how diversity is helping farmers in coping with climate change, etc...

Documenting and monitoring agrobiodiversity on-farm is fundamental for enhancing its sustainable use and prevent losses of both genetic diversity and indigenous knowledge to happen before it is too late.

These actions are also consistent with the predicaments of important international conventions and agreements, such as the CBD (Art. 7), the ITPGRFA (Art. 5), and the FAO GFA for PGRA (Activity 18).

However, except for recent efforts of limited collaboration, research on monitoring and Red Listing of cultivated species is still very poor. Reasons for that include the sheer number of crop species and varieties on-farm, the difficulty in assessing their distribution, the dynamic nature of cultivation displaying diversity in different ways, the absence of farmer-based mechanisms to which to anchor a monitoring system, and the lack of supportive policies such as those related to access and use of information generated from these efforts.

Currently, an international UN Project supported by IFAD and the CCAFS Programme of the CGIAR is being implemented in Nepal, India and Bolivia.



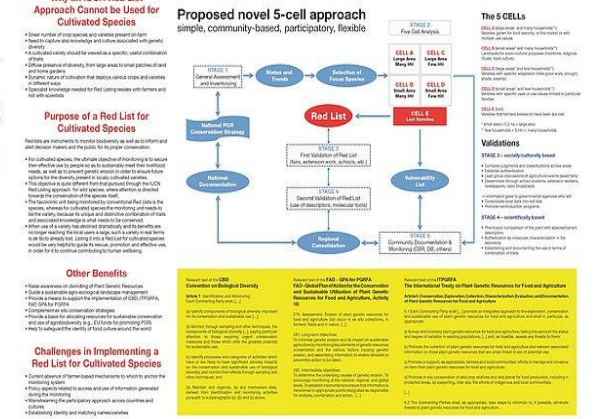
'Why' on-farm conservation?

Biological considerations
 On-farm conservation is the foundation of crop diversity. It is the source of genetic diversity and the basis for crop improvement.

Ecological considerations
 On-farm conservation makes important contributions to the conservation of ecosystems and agriculture, which are integral and interdependent.

Socio-cultural considerations
 On-farm conservation is a key to the preservation of traditional knowledge and practices, which are integral and interdependent.

Social considerations
 On-farm conservation is a key to the preservation of traditional knowledge and practices, which are integral and interdependent.



PGRFA – where to look?

- Official papers such as:
 - ITPGRFA
 - European Union Official Catalogue
 - Romanian Official Catalogue
 - Gene Bank from Suceava NFP ITPGRFA
- Recordings into Research Institutes
- Smallholders, farmers - saved seeds
- Markets - wild PGRFA (medicinal plants, mushrooms, artisanal artifacts comprising parts of PGRFA)



Directive 53/2002/EC

on the common catalogue of varieties of agricultural plant species

Art. 20

- 2. Without prejudice to Council Regulation (EC) No 1467/94 of 20 June 1994 on *the conservation, characterisation, collection and utilisation of genetic resources in agriculture* (1), specific conditions shall be established in accordance with the procedure referred to in Article 23(2) to take account of developments in relation *to the conservation in situ and the sustainable use of plant genetic resources through growing and marketing of seed of landraces and varieties which are naturally adapted to the local and regional conditions and threatened by genetic erosion.*



Why we connect to organic farming?

Positive issues to be addressed

1. Small holders, small farmers
2. Certified seeds
3. Preserving the landscape and agro-ecosystems
4. Eliminating pesticides
5. Eliminating chemical fertilizers
6. PGRFA
 1. Wild population of flora
 2. Landraces
 3. Old races



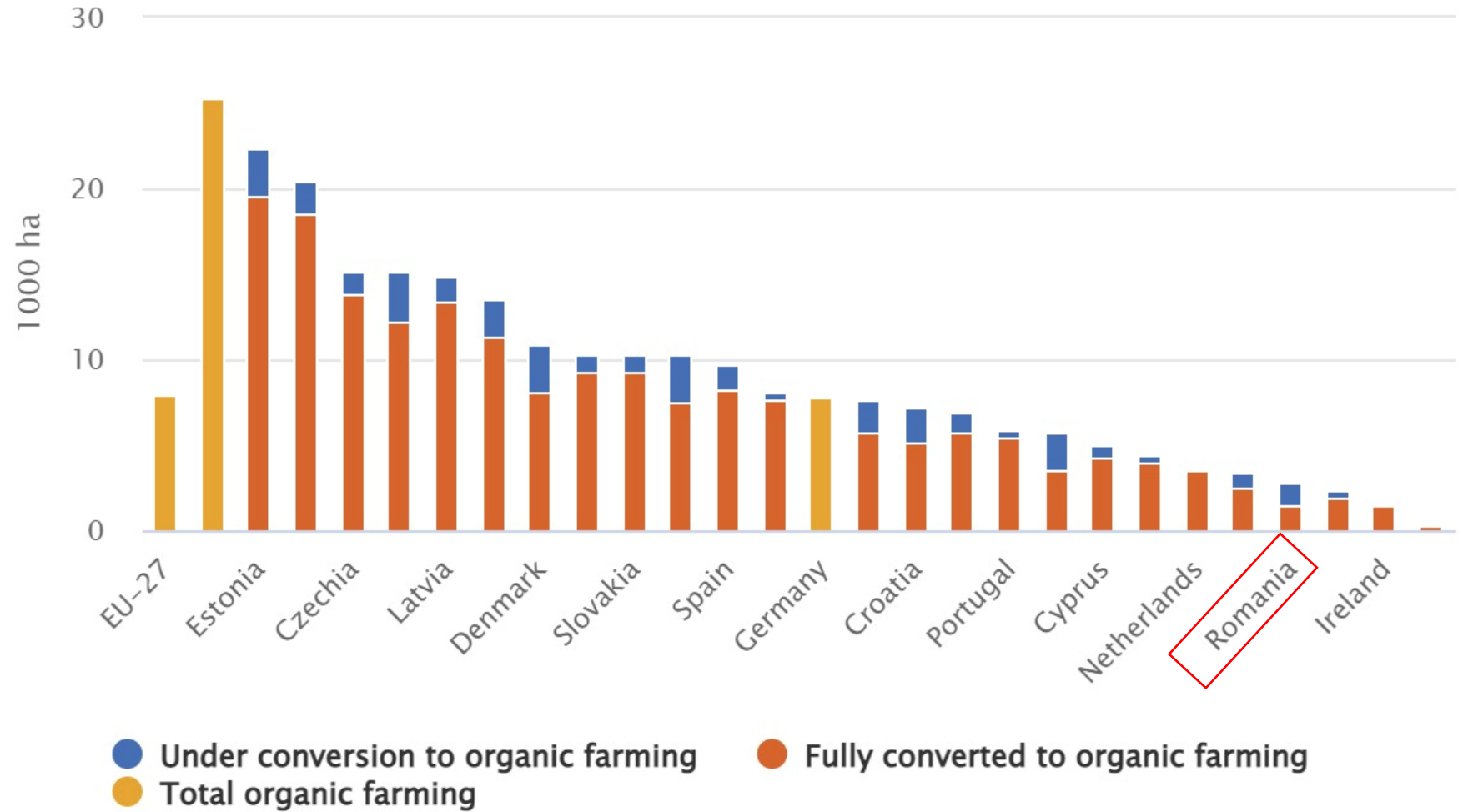
Level of action

1. World trade markets
2. International treaties WTO, TRIPS, UPOV
3. EU regulatory framework
4. Shares on Nasdaq
5. International trade
6. International recognized
 - monitoring system
 - inspection and control
 - labeling

Romania status

Share of organic area in total utilised agricultural area (UAA), by country, 2019

Source: Eurostat (online data codes: org_cropar and apro_cpsh1)



1.531.000 ha of
8.686.000 ha Total



Organic agriculture: RO official websites

- [Producers](#)
- [Certified operators](#)
- 13 certifying inspection bodies most from abroad



- 2022 [Report](#) on seeds
- 2021 [Report](#) on seeds
- 2020 [Report](#) on seeds
- [PRODUCERS](#)
- [PROCESSATORS](#)
- [RETAILERS](#) 66
- [IMPORTS](#)
- [AQUACULTURE](#)
- [WILD FLORA](#)

Data explored more by statistics

- The ten countries with the **largest areas of organic agricultural land** 2019
- The countries with the **highest shares** of organic farmland shares
- **Growth** of the organic agricultural land by continent/2012-2019/ Source: FiBL-IFOAM survey 2012-2021
- The biggest organic **markets worldwide**



COM(2021)141 final of 25.03.2022

COMMUNICATION FROM THE COMMISSION
TO THE EUROPEAN PARLIAMENT, THE
COUNCIL, THE EUROPEAN ECONOMIC AND
SOCIAL COMMITTEE AND THE COMMITTEE OF
THE REGIONS EMPT

ON AN ACTION PLAN FOR THE DEVELOPMENT OF
ORGANIC PRODUCTION



Chapter 3.2. Enhancing genetic biodiversity and increasing yields

The **role** of organic farming in **maintaining** a healthy ecosystem, **respecting biodiversity** and the existence of natural predators, and **preserving** an ecological equilibrium, is well recognised.

Regulation 2018/848 on organic production introduces specific objectives and related principles **to protect biodiversity**, which will strengthen the role of **organic farmers as promoters of biodiversity preservation**. As part of the Farm to Fork strategy, the Commission will also revise the **Seeds Marketing Directives** to facilitate the registration of **seed varieties**, including those used for organic farming, and develop actions to **conserve genetic resources and develop seeds with a higher genetic variability and broader biodiversity potential**



What instruments can be accessed to support the **biodiversity preservation**?

- What biodiversity is?
- How it is related to traditional (TK) and local knowledge (LK)?
- How can we support the idea that it is important for local communities? Develop economy?
- How can we treat the liaison between local communities – agro-ecosystems preservation – circular economy and food security for long term?
- How can we link all together for increasing our organic agriculture sharing to the country level?



Plant genetic resources for food and agriculture



- **Common varieties and species** trade according to national official catalogue, UPOV.



- **Conservation** varieties, according to [EU Official Catalogue](#)

392 items among which AT: 28, BE 1, CZ 1, EE 5, FI 23,

FR 11, DE 29, IR 18, IT 6, LV 3, LI 1, NL 1, RO 1

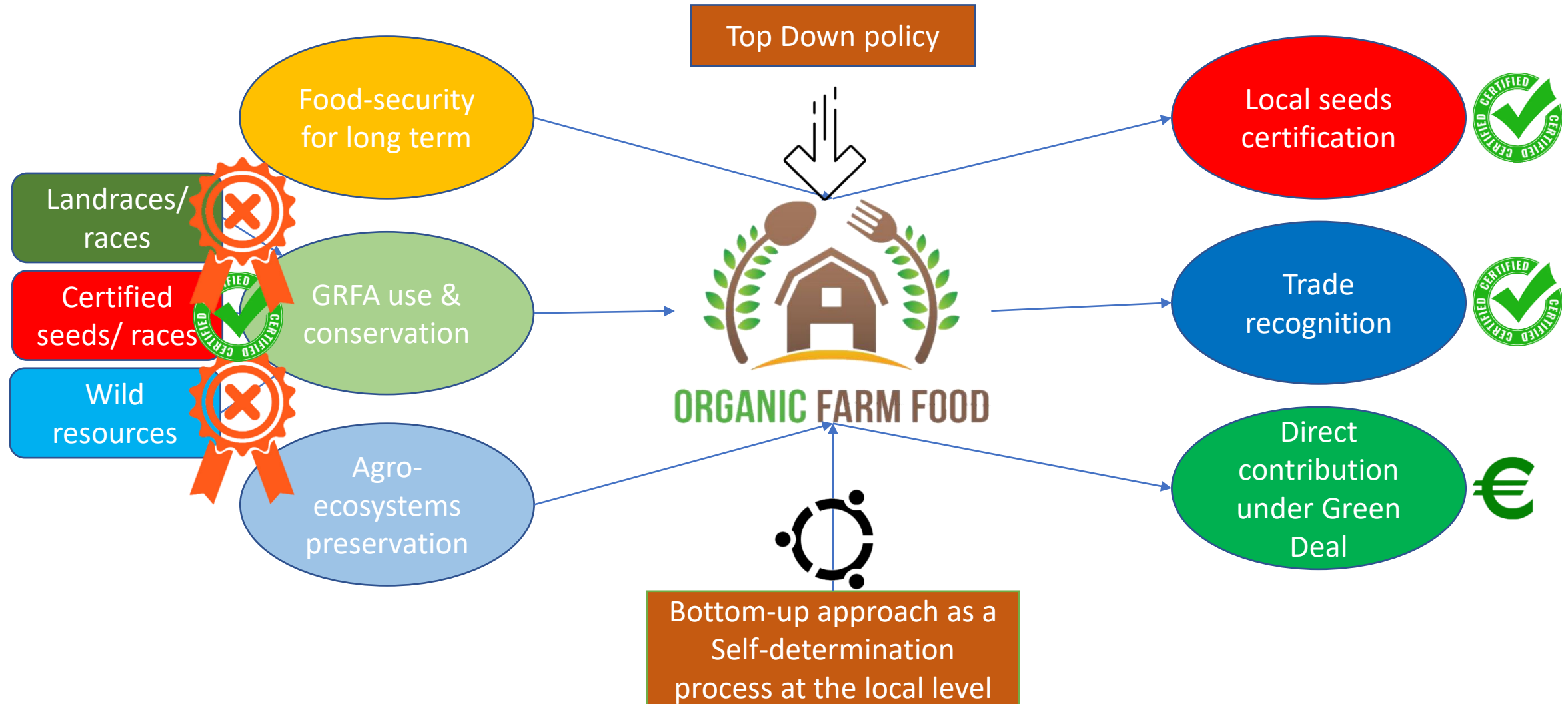


- **Neglected and underutilized species** [NUS](#)

- **Crop wild relatives** [CWR](#)



In between





Generation and corruption

"whether things come into being through causes, through some prime material, or whether everything is generated purely through "alteration."

Alteration concerned itself with the ability for subjects (nouns such as components) to change based on common and uncommon attributes.

It is a fantastic philosophy highly supporting us to generate further logic mechanisms of *thinking*

ON GENERATION AND CORRUPTION

Aristotle

Scientific principles

Scientific standard

Scientific responsibility

Logical and rational presenting results
from specific to general framework!

Historical resources evaluation

Fossilized Neolithic Cultivated Plant or Wild PGRFA, from the archaic cuisine



Neoliticul european

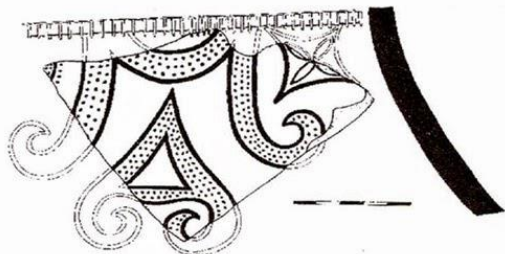
Simbolul "M"



Mileniul al V-lea î.e.n.,
Cucuteni, România



1600-1150 î.e.n.,
Gârla Mare, România



Secolul I e.n.,
Grădiștea de Munte, România



Secolul I e.n.,





Standardized household inventory of local varieties (sowing, cultivation, harvesting, storage, use for food and feed, TK/LK for choosing seeds, TK/LK menus for 365 days)

Defining local identity in terms of cultural **intangible heritage** – for access for benefit sharing ABS under the CBD for revenues to the regions

Local rural communities and intangible heritage



Welcome in Așel Sibiu, Romania



- Forest 30%
- Arable land 30%
- Pasture 30%
- Transport
- Water courses
- Houses areas

Functional
landscapes
(Godwit)

Free Clean Aer
Natural Potable Water
Soil fertility





TK/LK – related to
local agricultural practices
crop varieties, animal races
wild species, food processing,
local taste, local pride, beliefs



9/16/2022

Welcome in Rod, Sibiel Mărginimea Sibiului

Welcome in Orlat
Sibiu, county



Welcome in Moşna, Sibiu
County at Cabbage
festival



Rășinari fir nursery

Welcome to
Păltiniș, Sibiu
county



Traditional orchards in Romania: case study Fântânele, Sibiu County

Maria Mihaela Antofie · Ion Barbu ·
Camelia Sava Sand · Robert Blaj

Received: 3 May 2015 / Accepted: 28 July 2015
© Springer Science+Business Media Dordrecht 2015

Abstract In the last 10 years traditional orchards became more and more important for biodiversity conservation as priority habitats on one hand and for *in situ* conservation of plant genetic resources for food and agriculture in supporting the food security resilience of local communities on the other hand. Fântânele is a small village positioned at the foot of Căndrel Mountain, belonging to the Romanian Carpathians, in the buffering zone of the protected area ROSCI0085 'Frumoasa' which is famous in the region for its traditional orchards established for more than four centuries. The main scope of this article is to survey these traditional orchards for the existing old fruit tree species and varieties. As a result from a total of 401 surveyed trees, 20 old apple tree varieties have

European level was recorded in the area of this village for the first time (i.e. habitat of *Molinia caerulea* (L.) Moench subsp. *arundinacea*) and also protected species according to the European Union regulatory framework for Natura 2000 have been observed.

Keywords Biodiversity conservation · Fruit tree genetic resources · Priority habitats · Romania · Traditional orchards

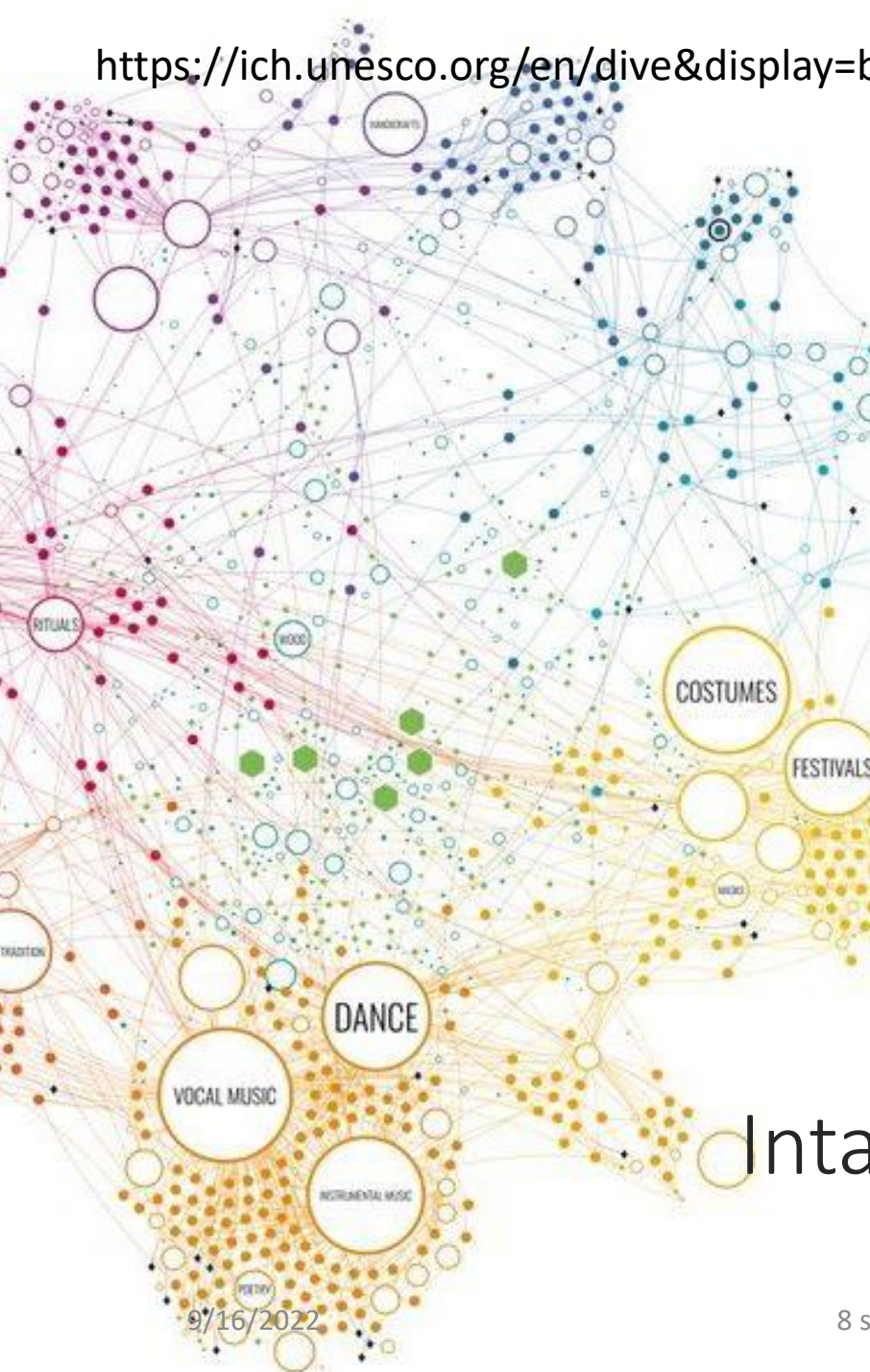
Introduction

The agricultural landscape constantly evolved, particularly due to human agricultural evolution which was,

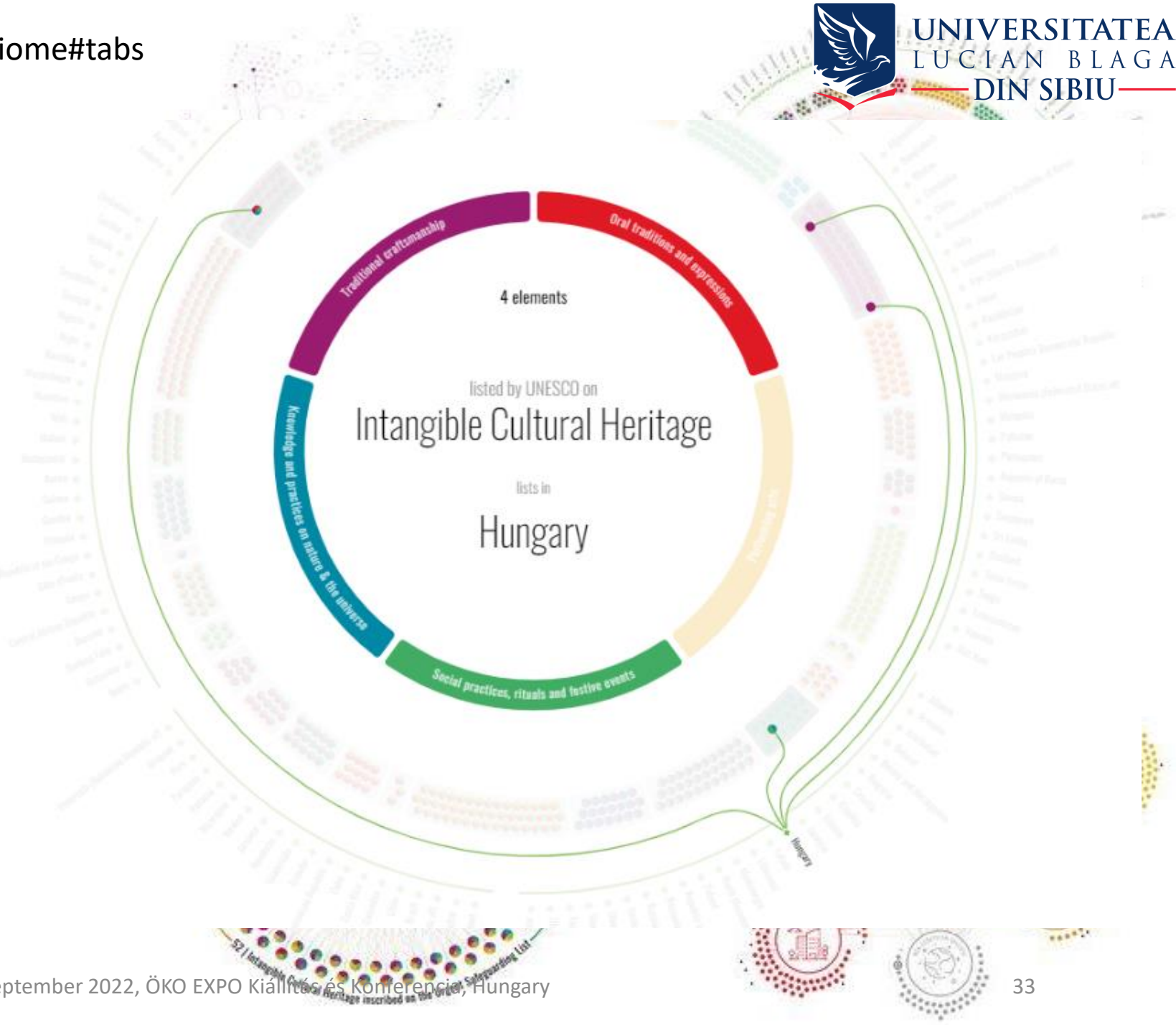


Traditional orchards

Over 400 years proved by historical documents and over 6.000 years documented by archeological discoveries



Inta



How can we support organic agriculture development and in the same time
how can we support local communities to **achieve resilience** towards food
insecurity for *long term*?

*Is it possible to recognize plant or animal genetic resources as having cultural
immaterial heritage values?*



United Nations
Educational, Scientific and
Cultural Organization



Intangible
Cultural
Heritage



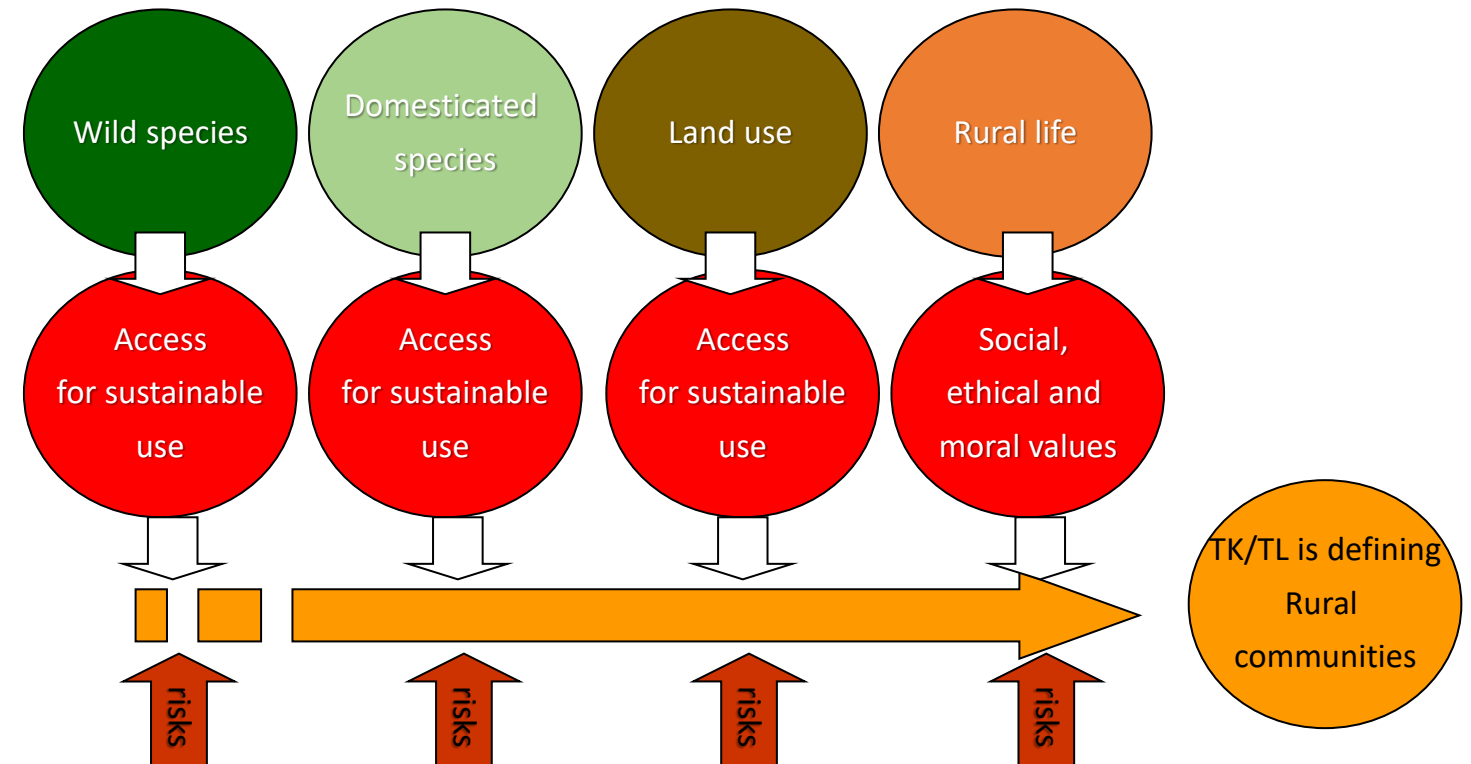
Convention on
Biological Diversity

What is missing? What we have?

- Inventories of species of food security interest from
 - Spontaneous flora and fauna
 - Domestic species with local varieties and breeds (a proven age of more than 100 years in the same ecosystem)
- Inventory of activities
 - known and applied in agriculture
 - That implies access to genetic resources and **knowledge related to**
- Inventory of cultural elements
- Integrating activities into the religious calendar
- Modus vivendi



How can we integrate TK and LK in scientific research for organic farming further support?



MANAGEMENTUL INTEGRAT AL GRĂDINILOR TRADIȚIONALE SIBIENE



Universities can provide **scientific expertise** to define the intangible heritage values of rural life

The first Decision in Romania

DECISION No. 58/31.10.2019

regarding the recognition of genetic resources with heritage value for the Commune of Moșna.

Mosna City Council,

conidering: The results of the inventory of the gardens in the Moșna commune carried out within the Traditional Sibiian Gardens project, contract no. July 81/2, 2019, action co-financed by the Sibiu County Council, The recommendations published in the work Integrated management of traditional Sibiu gardens - good practice guide for local councils,

Aware of the need to urgently apply the principles of sustainable development, measures to adapt and reduce the effects of climate change and the imminent risks of the disappearance of local varieties together with their owners and to ensure the long-term food security of its inhabitants.

- Art. 1.** It is recognized and approved as important for ensuring food security the crop plant species cultivated in Moșna commune according to the AGR form 2A and 2B, until 2018, published in Annex no. 1.
- Art. 2.** The list of cultivated plant species cultivated for more than 50 years, published in Annex no. 2.
- Art. 3.** The list of local populations cultivated for more than 100 years, published in Annex no. 3.
- Art. 4.** The list of ancient animal breeds for Romania, published in Annex no. 4.
- Art. 5.** The list of families owning local varieties with heritage value, published in Annex no. 5.
- Art. 6.** The list of traditional gardens, published in Annex no. 6.
- Art. 7.** The future development strategy for agriculture will take into account the conservation and sustainable use of local varieties and ancient breeds of animals as well as the promotion of families that own such resources.
- Art. 8.** This decision will be carried out by the Mayor of Moșna Commune.
- Art. 9.** This Decision will be communicated to institutions and interested persons through the care of the agricultural officer.

Annex 1 List of crop species surveyed for European statistics in agriculture for Moşna Form AGR 2A

Denumire populară	Areas cultivated (ha)	Underutilized varieties
Cereales for grains 327 ha		
Autumn wheat	7	
Spring wheat	1	
Autumn wheat		before 1989
Spring wheat		before 1989
Autumn rye		before 1989
Spring rye		before 1989
Autumn Triticale		before 1989
Spring Triticale		before 1989
Barley		before 1989
Autumn barley		before 1989
Spring barley		before 1989
Autumn oat		before 1989
Spring oat	1	
Maize for grains	318	
Sorghum for grains		before 1989
Millet grains		before colectivizare
Einkorn		before colectivizare



Annex 2 List of local landraces having heritage values for Moşna

Vernacular name	No of the house	Over 50/100 years old
Apricot tree	268	Over 100 years
Local onion	254 ex, 268	Over 50 years
Thyme	254 ex, 206, 420	Over 100 years
Bean	418, 417, 420	Over 50 years
Quince tree	206	Over 100 years
Horseradish	420	Over 100 years
Menthe	420	Over 50 years
Parsley	268, 417, 420	Over 100 years
Peach wild	254 ex, 268	Over 100 years
Maize yellow cob 8 rows	12, 454	Over 100 years
Maize red	543	Over 100 years
Plum trees	268	Over 100 years
Rhubarb	530	Over 100 years
Salad	254 ex, 268, 418, 420	Over 50 years
Spinach	417	Over 50 years
Tarragon	417	Over 100 years
Garlic	254 ex	Over 100 years
Cabbage of Moşna	1/C, 254 ex, 268, 418, 402, 461	Over 100 years
Vine Nova	417	Over 100 years
Vine Black Pearl Perla Neagră	254 ex, 417	Over 100 years
Vine Riesling	254 ex	Over 100 years
Saxon raspberry	417, 430	Over 100 years



Bazna' pig



Most of the current SDGs should be achieved! ✓





Biodiversity conservation looks to have
more chances to be preserved

What's next?

- A **network of rural communities aware and preoccupied** to preserve their intangible heritage in direct relation with agriculture, food and feed that may become the best public to embrace organic agriculture
 - There is implemented *ecosystem approach principles* approved during COP7 of the CBD
- **Defining** traditional agro-ecosystems and gardens in connectivity with their intangible heritage
 - The harmony in between **autochthon genetic resources** and agro-ecosystems is established
- **Rewarding** the pride of local communities and adding modalities for the success in certifying regional landraces
- **Resilient** communities
- **Piloting** strategies with the support of economists for evaluating the economic impact for the future on our own heritage preservation
- **Increased** shares of each of the interested country and empower LC

Thank you!
Köszönöm!
Mulțumesc!



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NFP **AEWA** 2007-2009

NFP **CBD SBSTTA** – 2019- present

MEP RO expert **IPBES** – 2022-2026

IUCN CEC Member since 2009