Agricultural Heritage Systems

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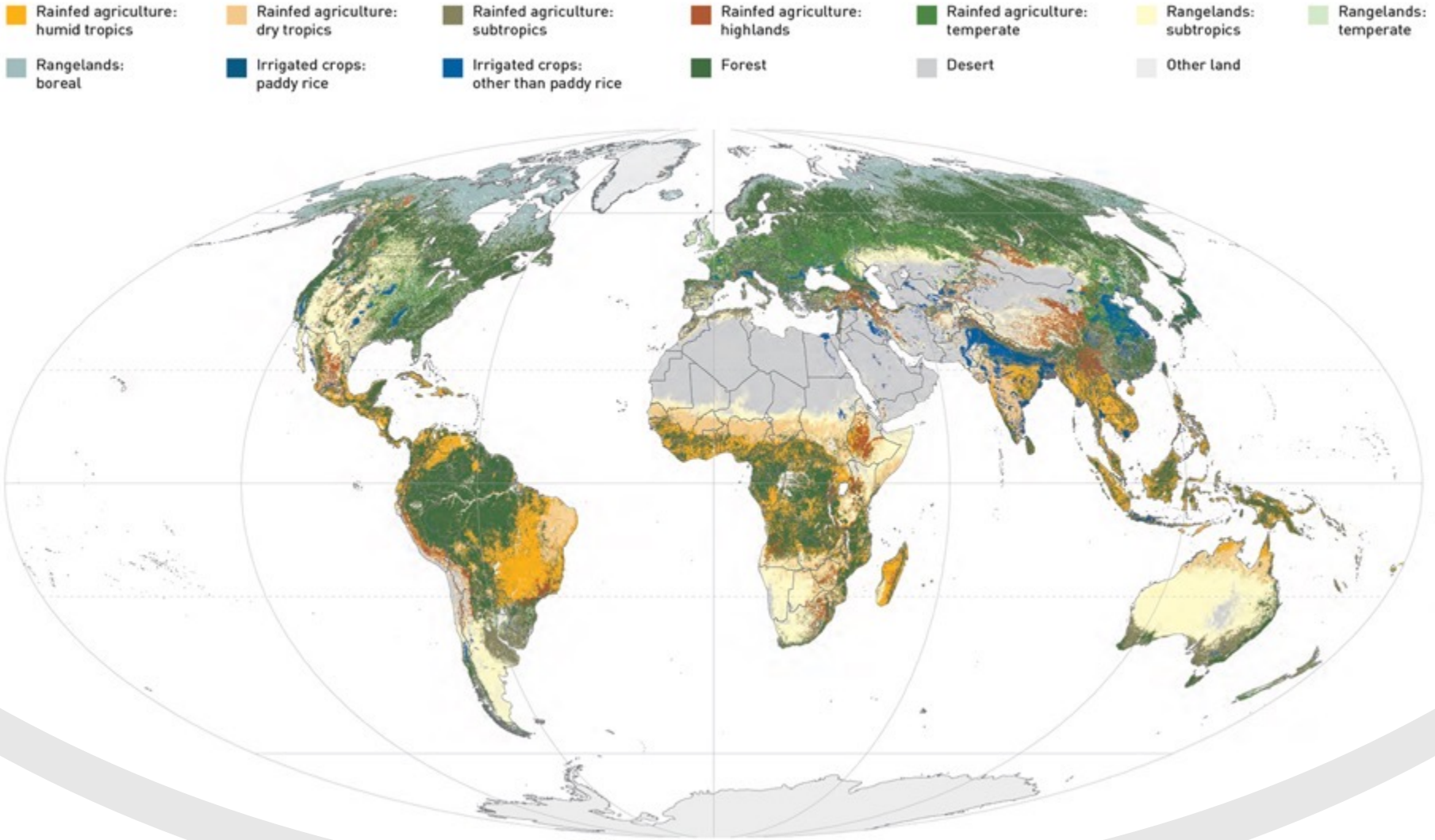
MAJOR AGRICULTURAL SYSTEMS



FA0 2011

Industrialization

Low cost of labor

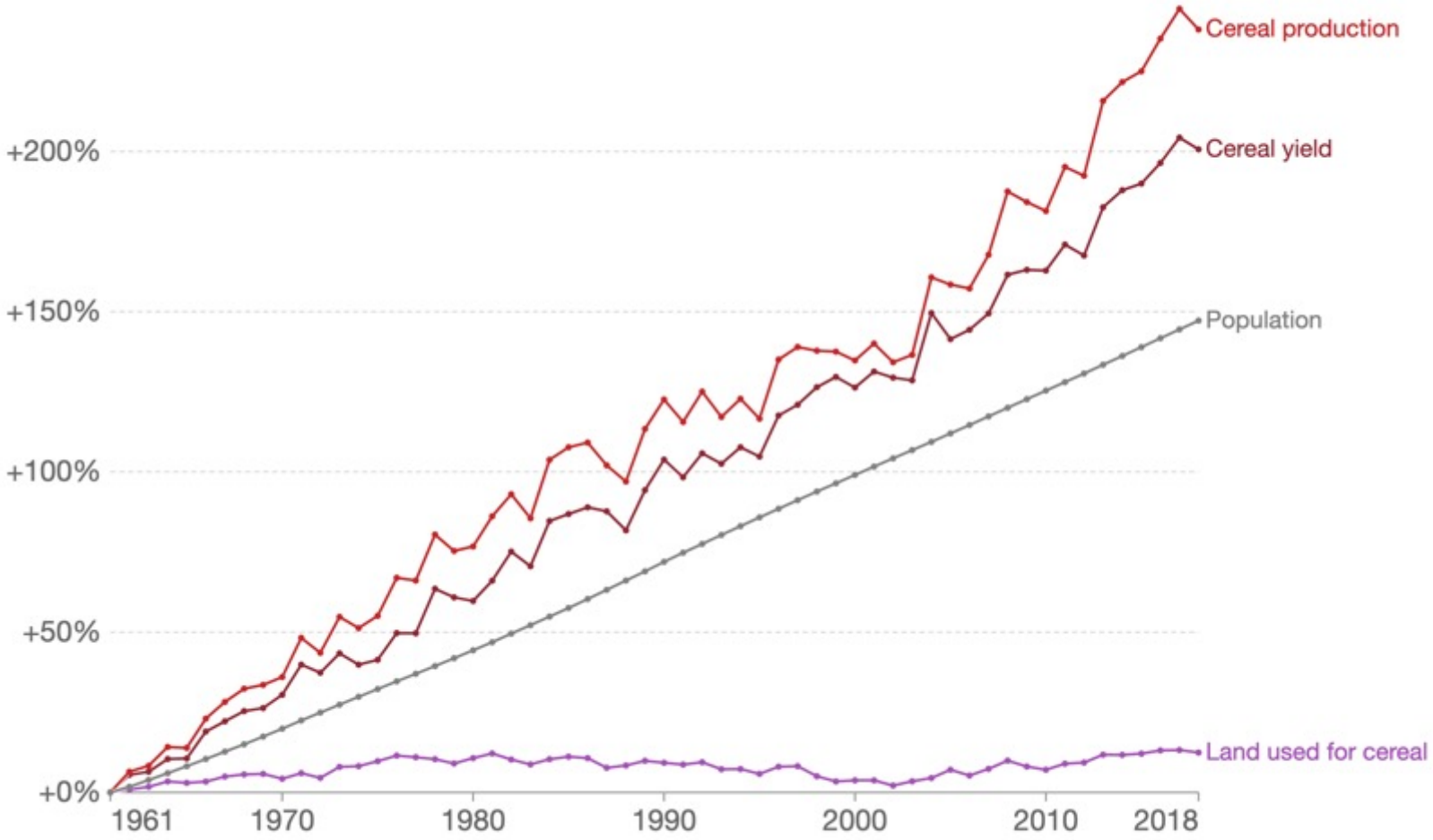
Large amounts of products

Low quality of food

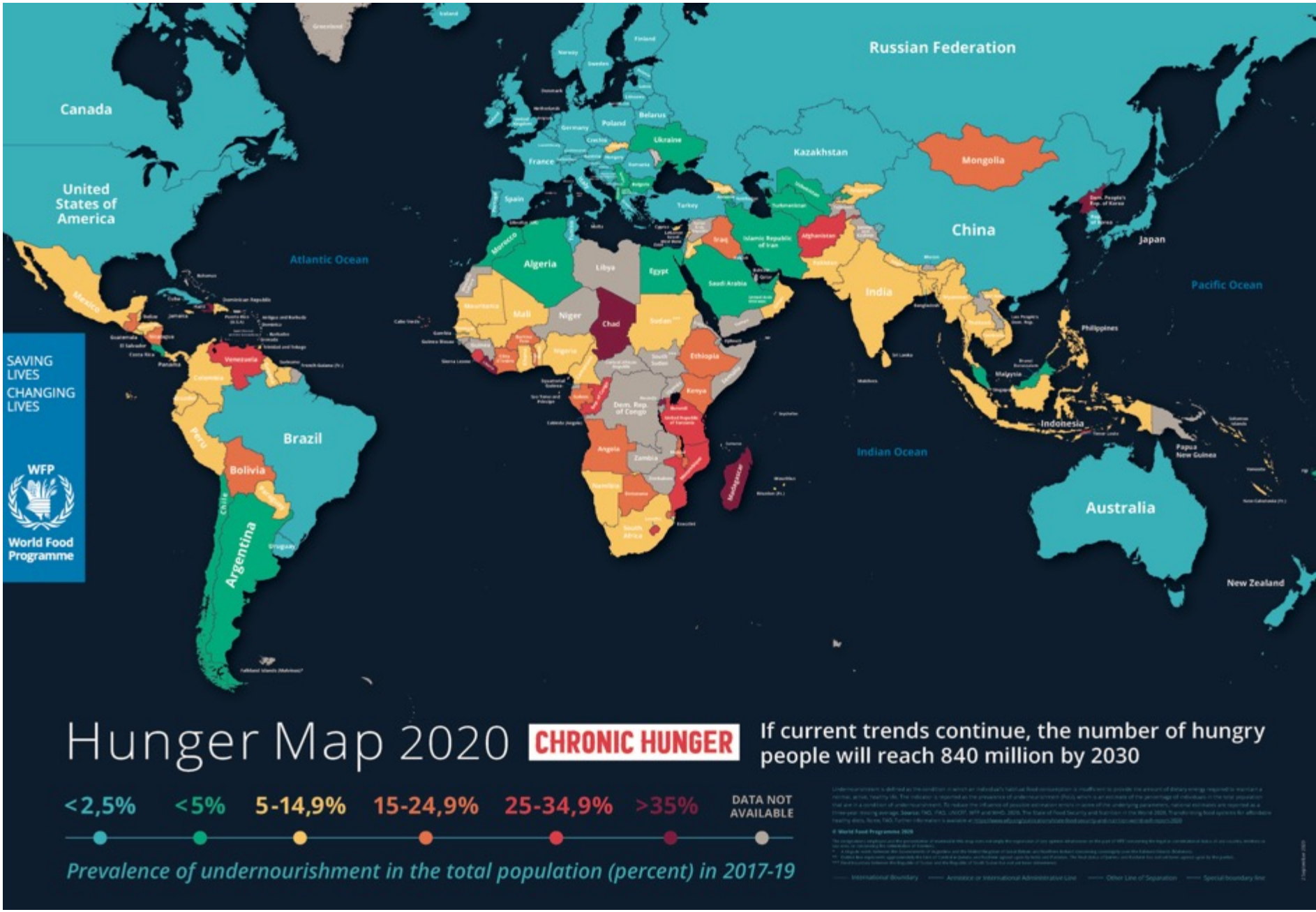
Big companies controlling the food market

Change in cereal production, yield and land use, World, 1961 to 2018

Population and cereal production, yield and land use figures are indexed to the year 1961 (i.e. 1961 = 0).



Source: Our World in Data based on World Bank, Food and Agriculture Organization of the United Nations
OurWorldInData.org/crop-yields • CC BY



Hunger Map 2020

CHRONIC HUNGER

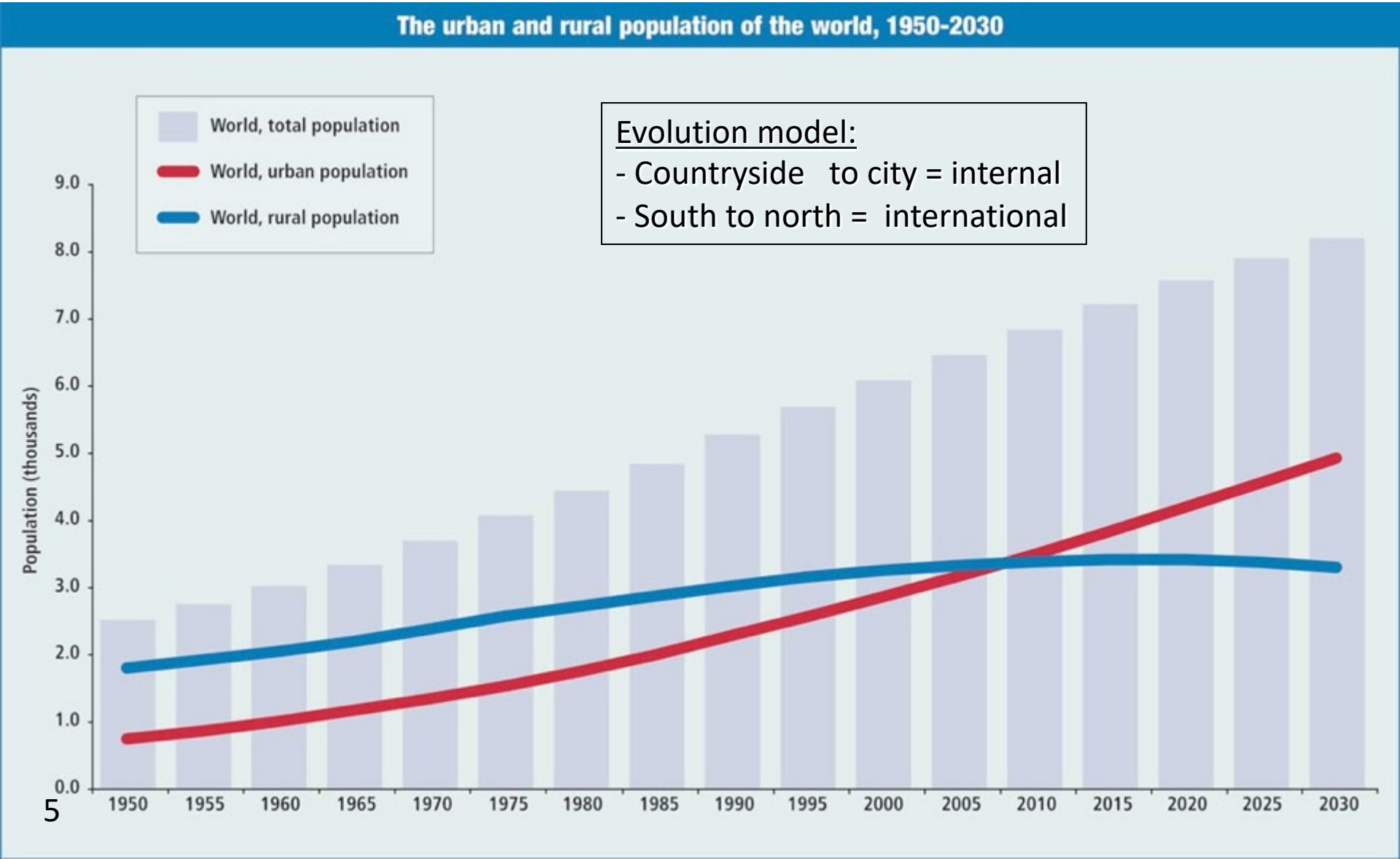
If current trends continue, the number of hungry people will reach 840 million by 2030

<2,5% | <5% | 5-14,9% | 15-24,9% | 25-34,9% | >35% | DATA NOT AVAILABLE

Prevalence of undernourishment in the total population (percent) in 2017-19

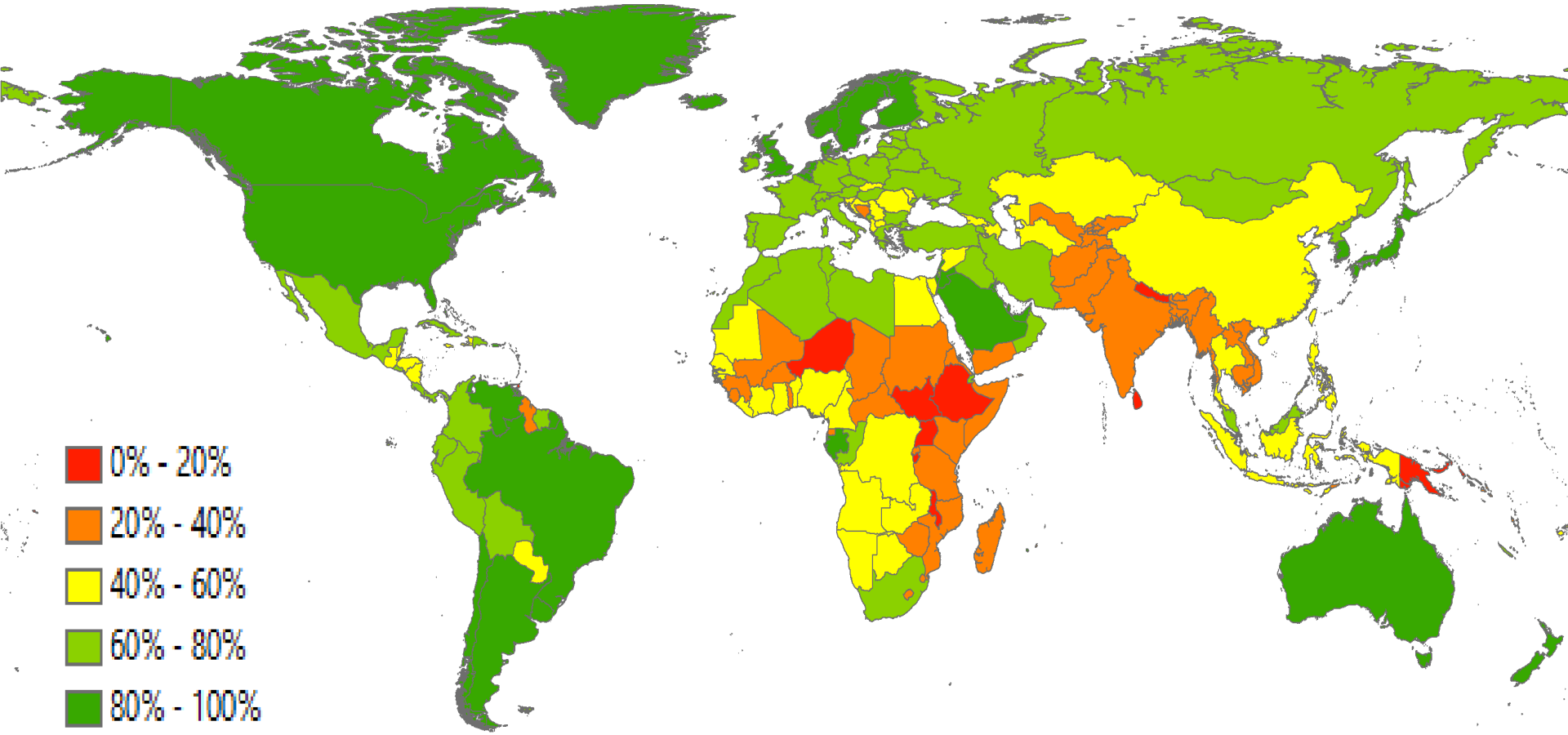
© World Food Programme 2020

Urbanization and urban sprawl



Evolution model:
- Countryside to city = internal
- South to north = international

urbanization



URBANIZATION: Italy

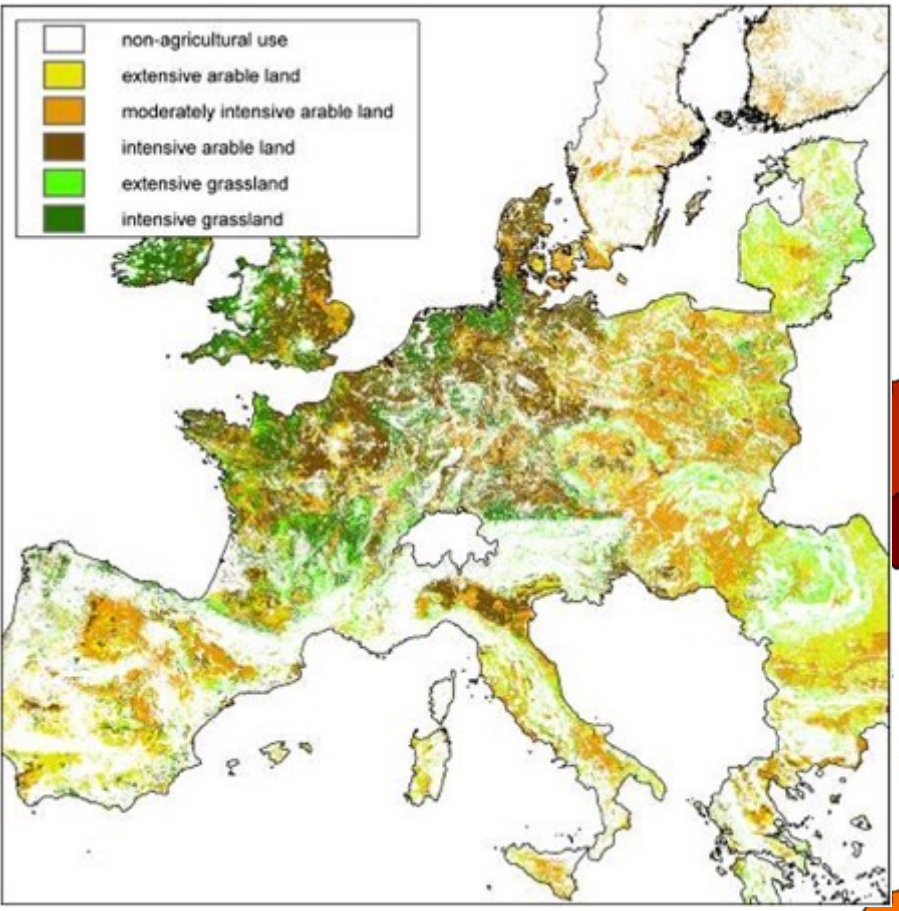
Urban sprawl in Lombardia

1955

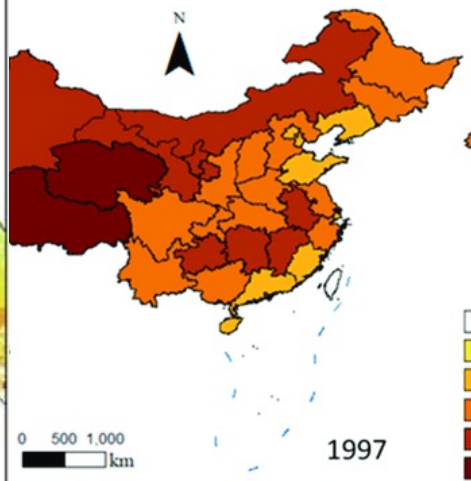
2007

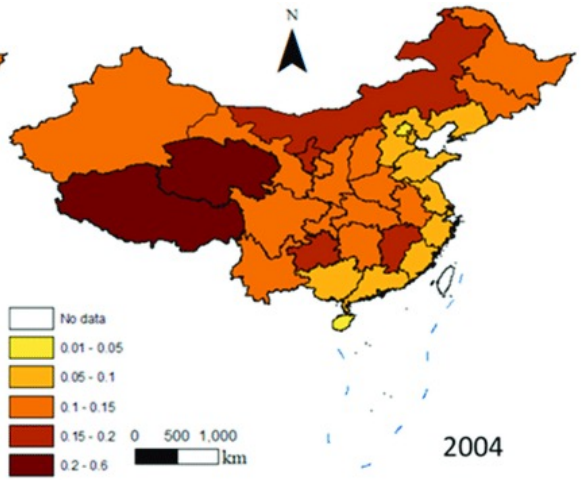
Agricoltural intensification

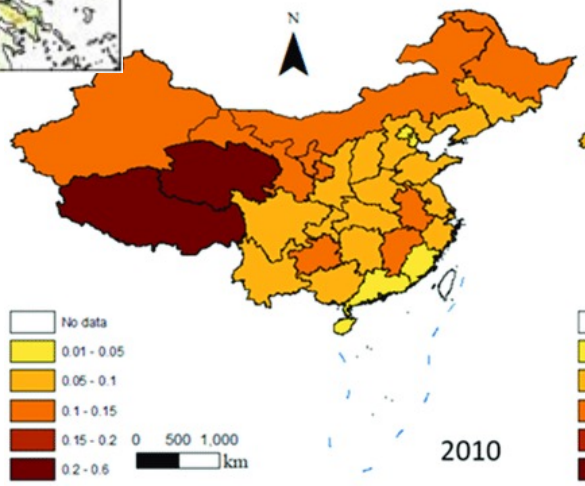
Europe

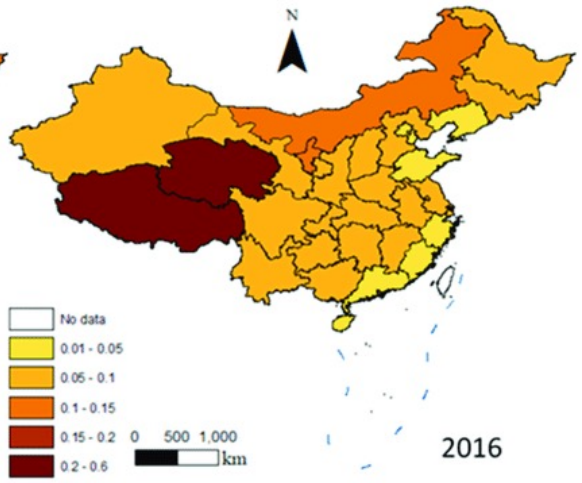


China

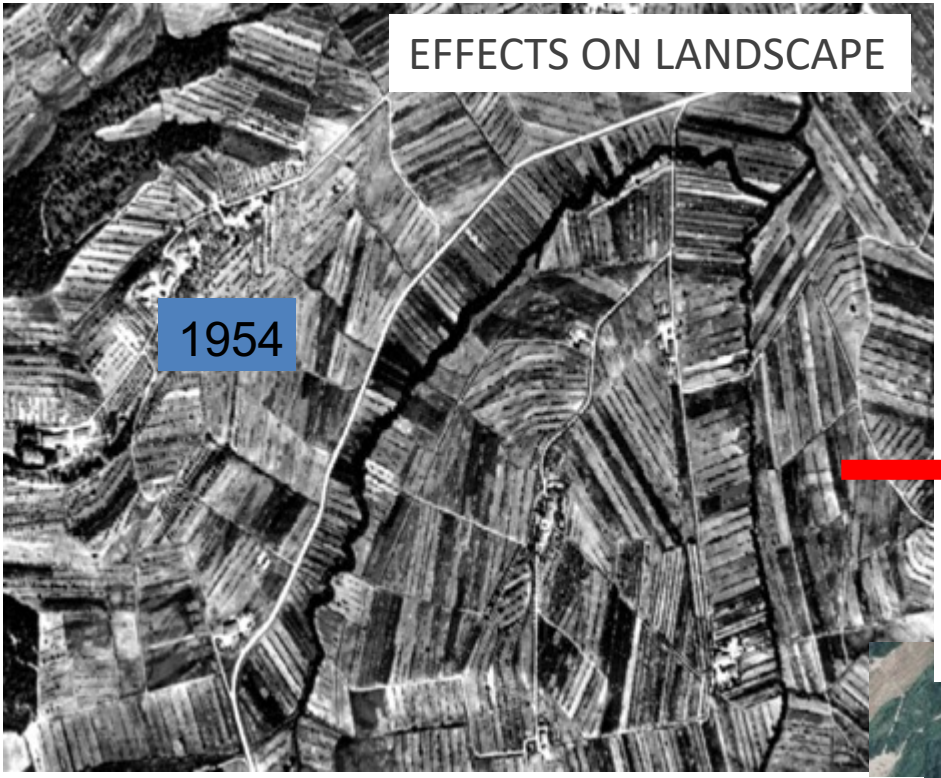




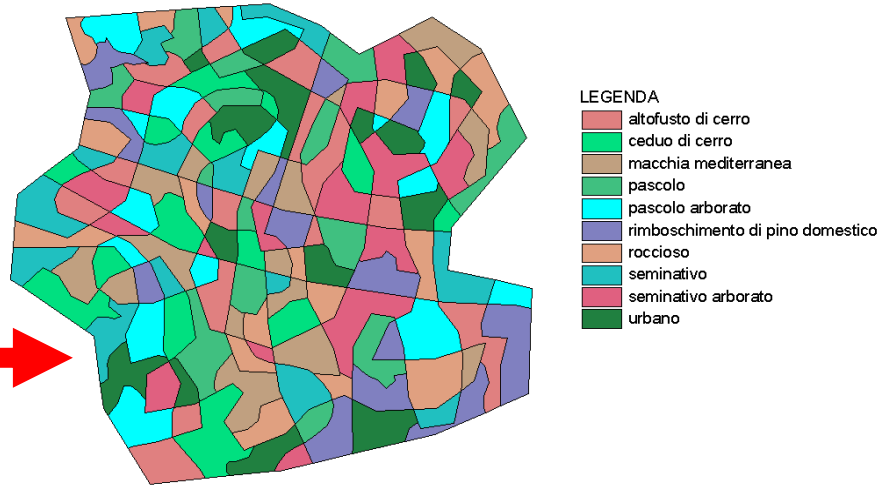




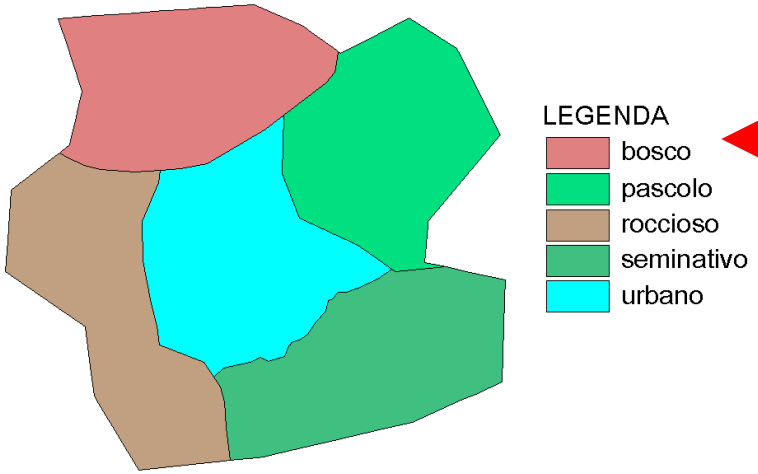
EFFECTS ON LANDSCAPE



Fine grained landscape mosaic



Coarse grained landscape mosaic



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Globally Important AGRICULTURAL HERITAGE Systems

Degradation of landscape quality + erosion

Dry stone terraces: erosion 20 t/ha/year

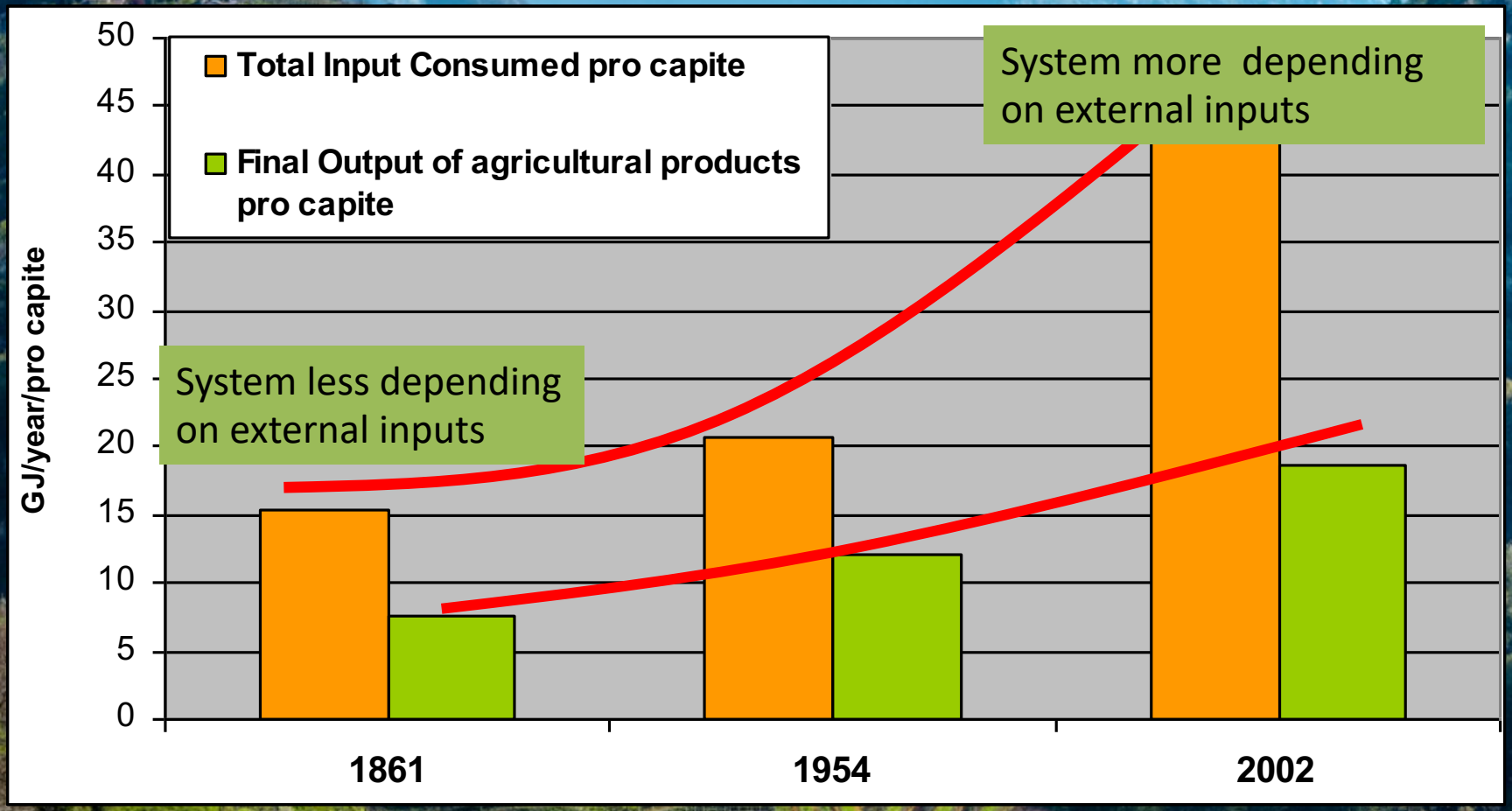
Castello d'Albola,
(Chianti - Tuscany)

Uphill cultivations: erosion 250 t/ha/year

Energy inputs and outputs in agriculture

- Traditional agricultural landscapes are more efficient in terms of energy

- Modern agriculture is more productive (yield /ha) but less efficient in terms of energy



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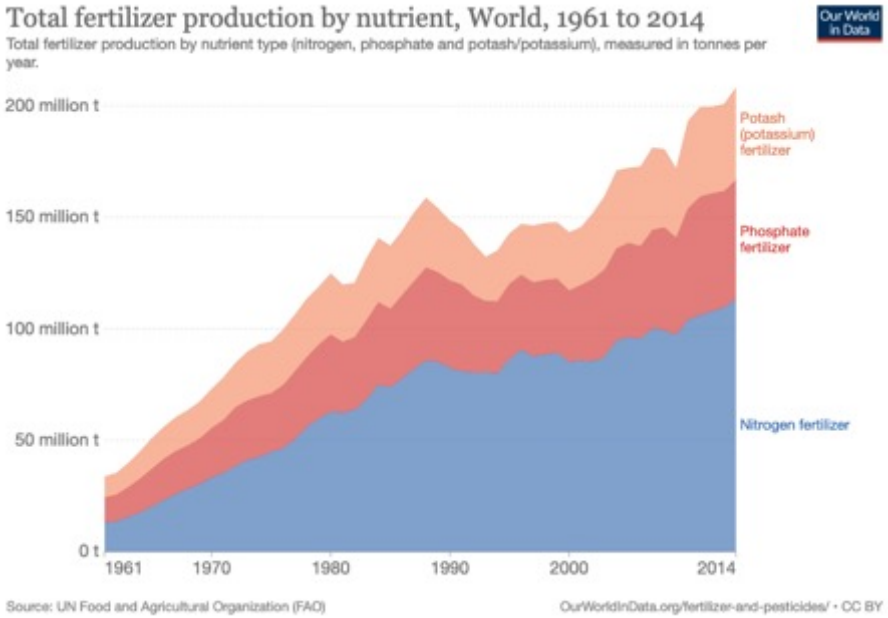
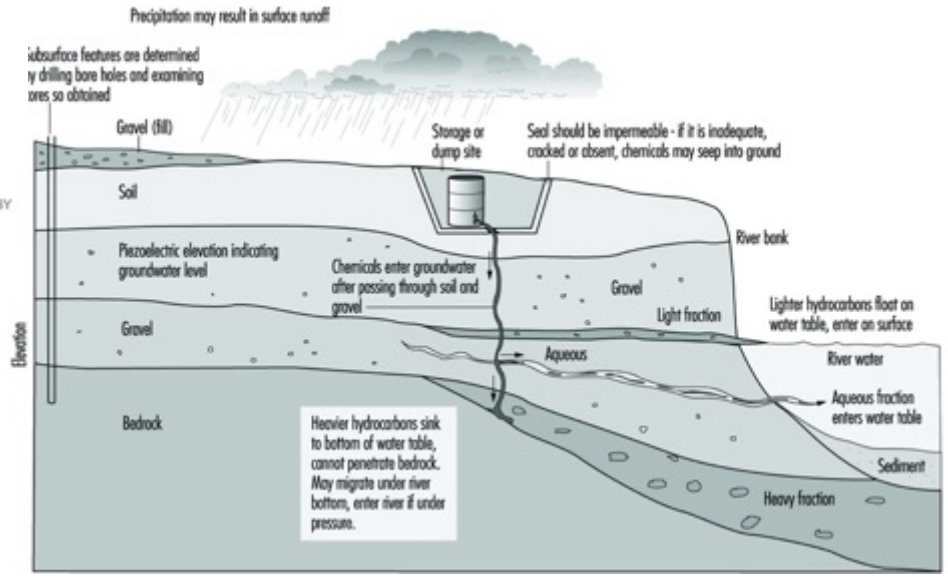
Globally Important AGRICULTURAL HERITAGE Systems

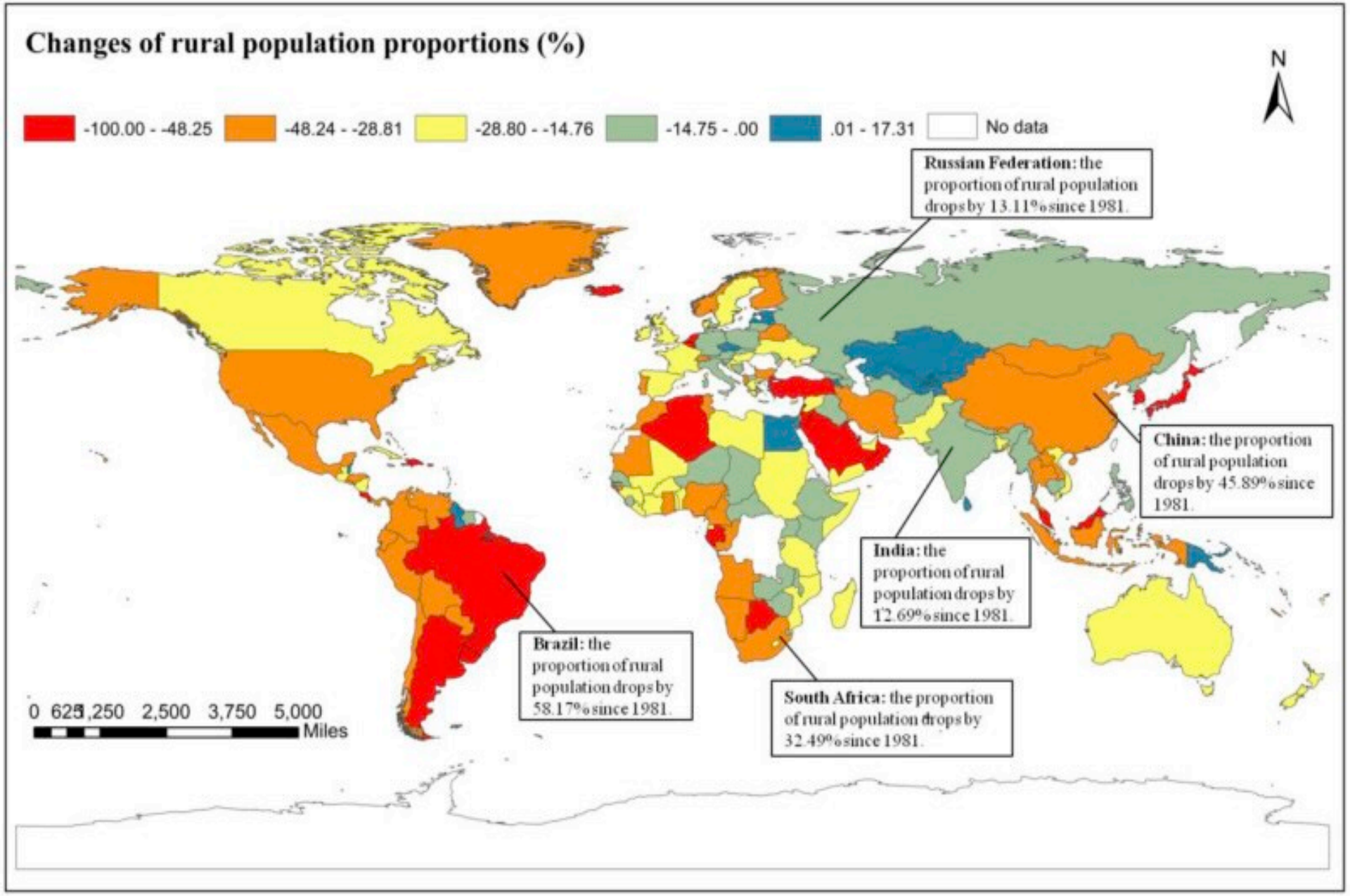
Soil degradation

Increasing amounts of fertilizers to increase production negatively affect soil





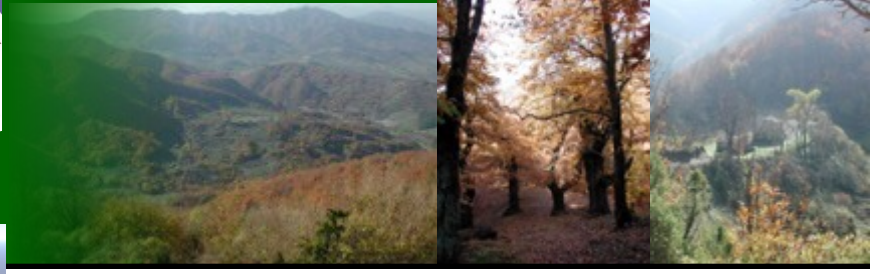
Decreasing rural population



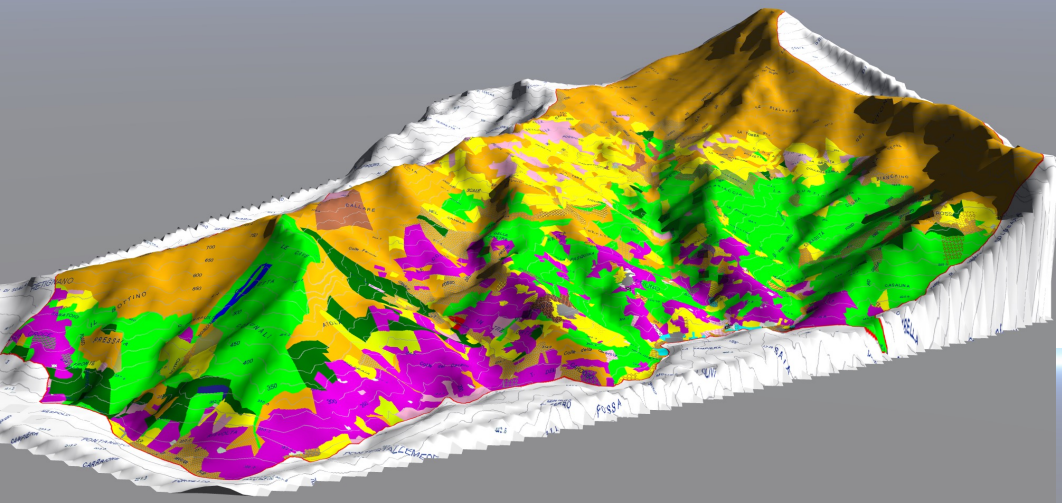
abandonment of the countryside

THE CASE OF TUSCANY

Apuane mountains 1832-2010



1832



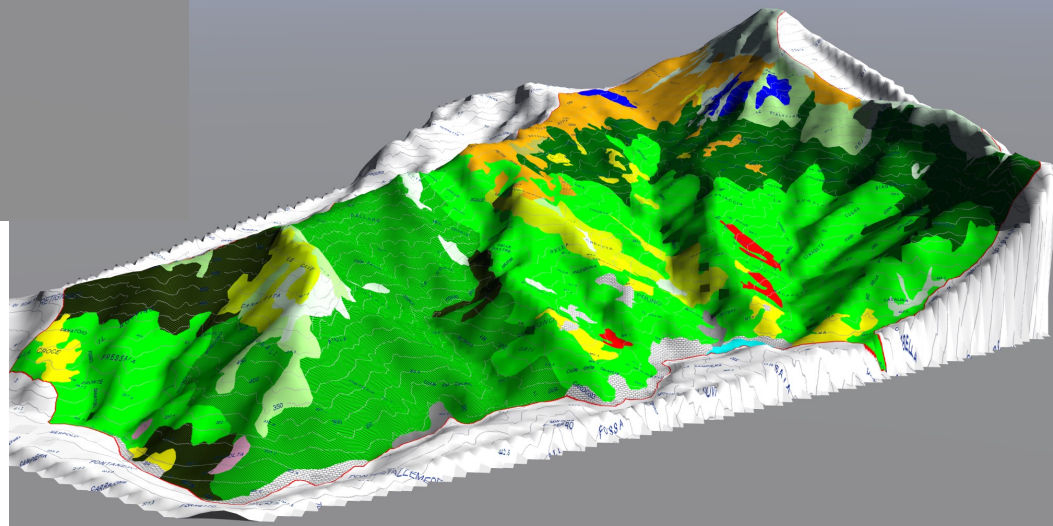
Land uses in 1832: 65

arable: 21 — 22%

Pasture: 15

meadows: 10 — 45%

woods: 13 — 30%



2010

Land uses in 2010: 17

Arable: 2 — 10%

Pastures: 3

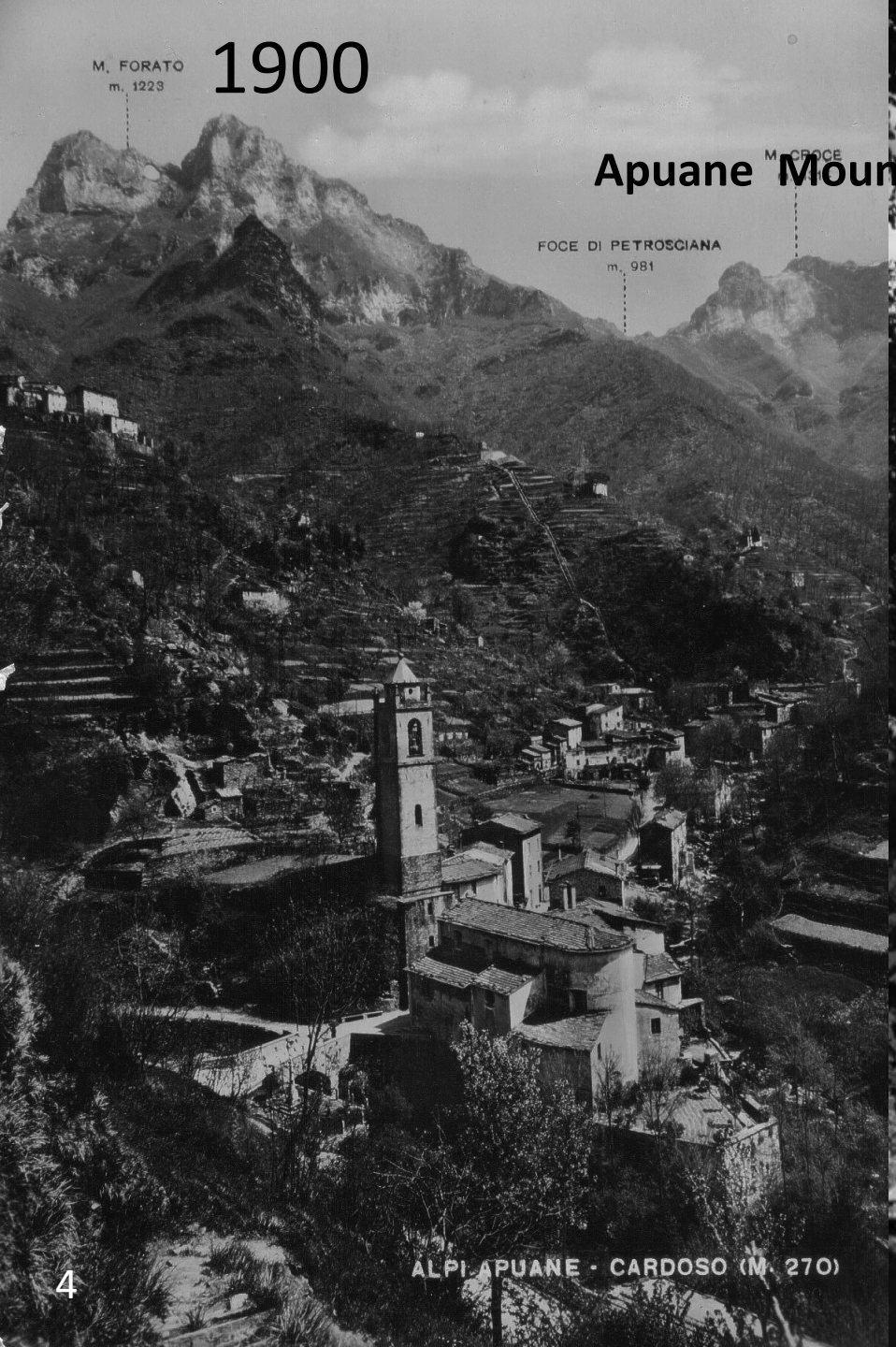
Meadows: 1 — 10%

Woods: 8 — 77%

1900

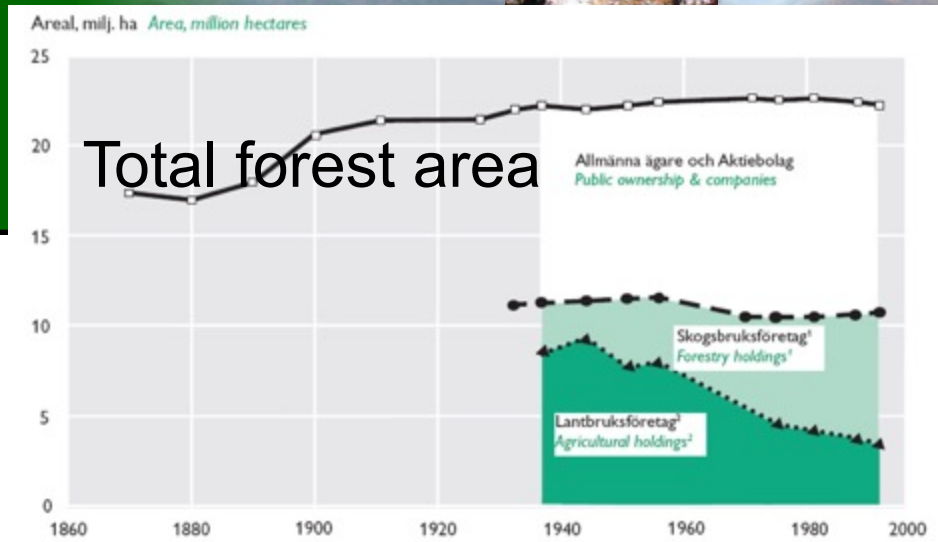
2014

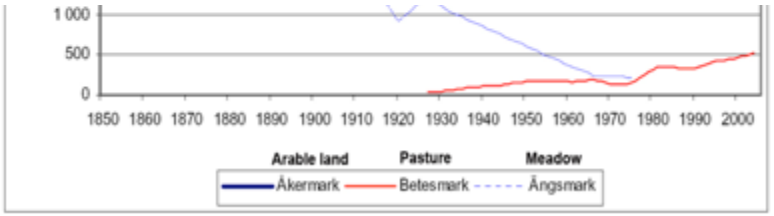
Apuane Mountains – Cardoso - Italy

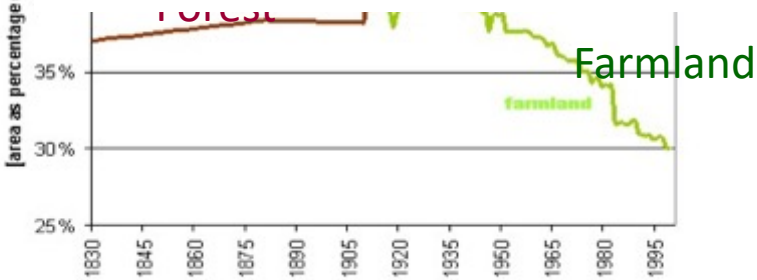


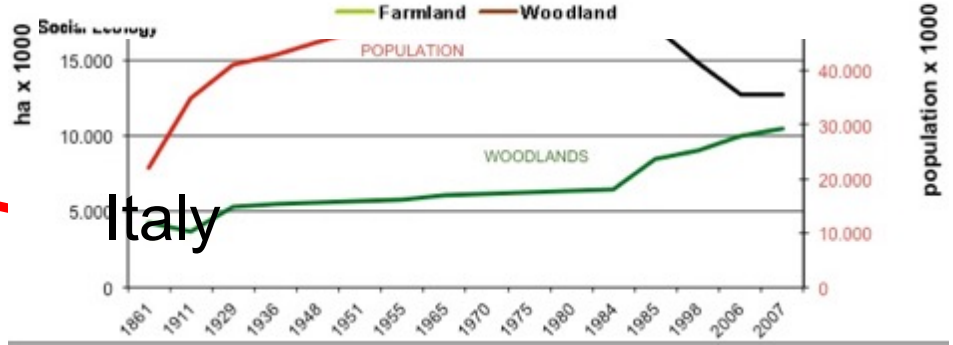
EU landscape dynamics

The reduction of farmed land and Increase of forests on abandoned Land in Europe: 800.00 ha/year









Italy

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Globally Important AGRICULTURAL HERITAGE Systems

Loss of traditional knowledge

The new endangered species

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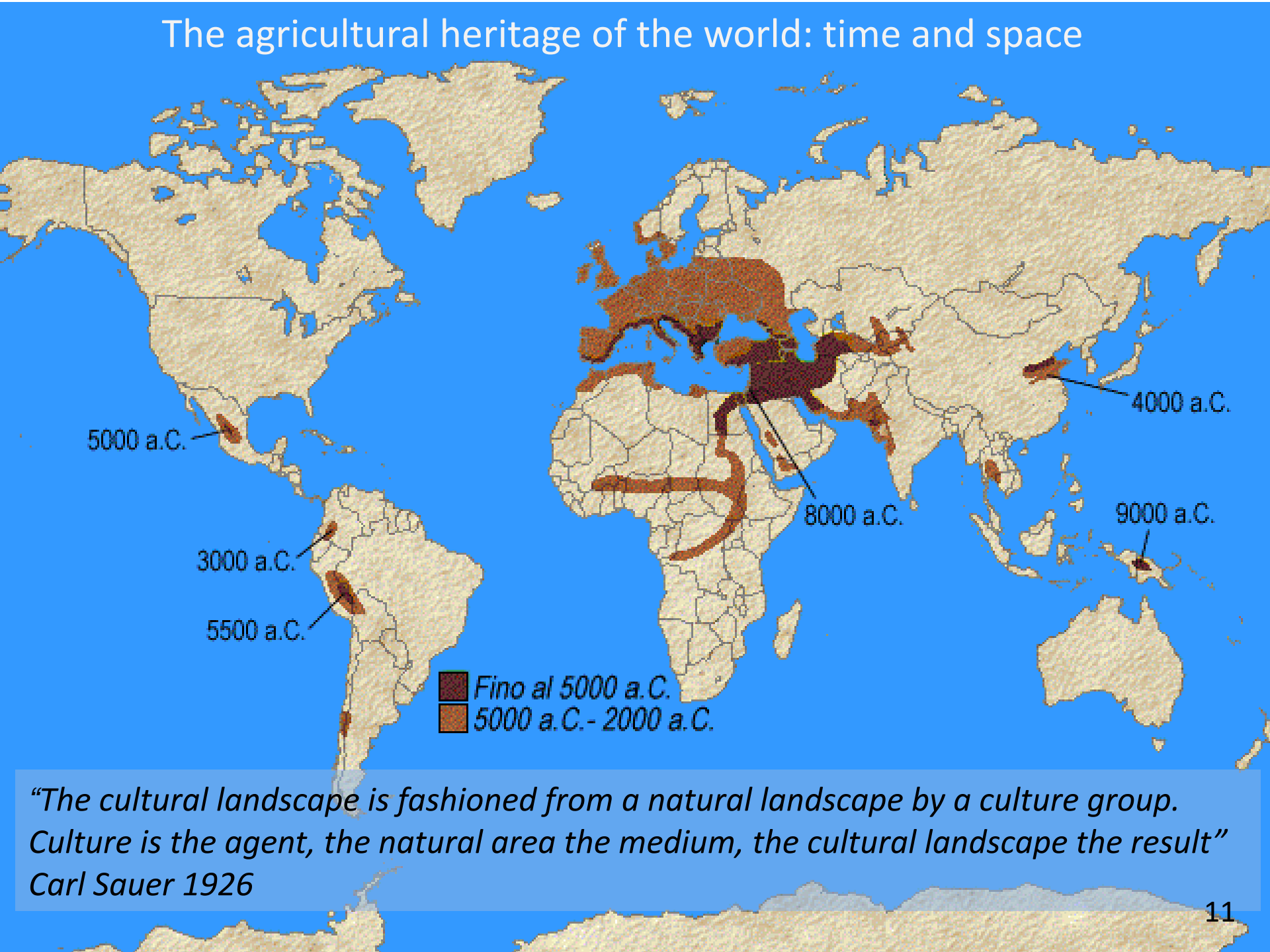
Globally Important AGRICULTURAL HERITAGE Systems

What are the agricultural heritage system?

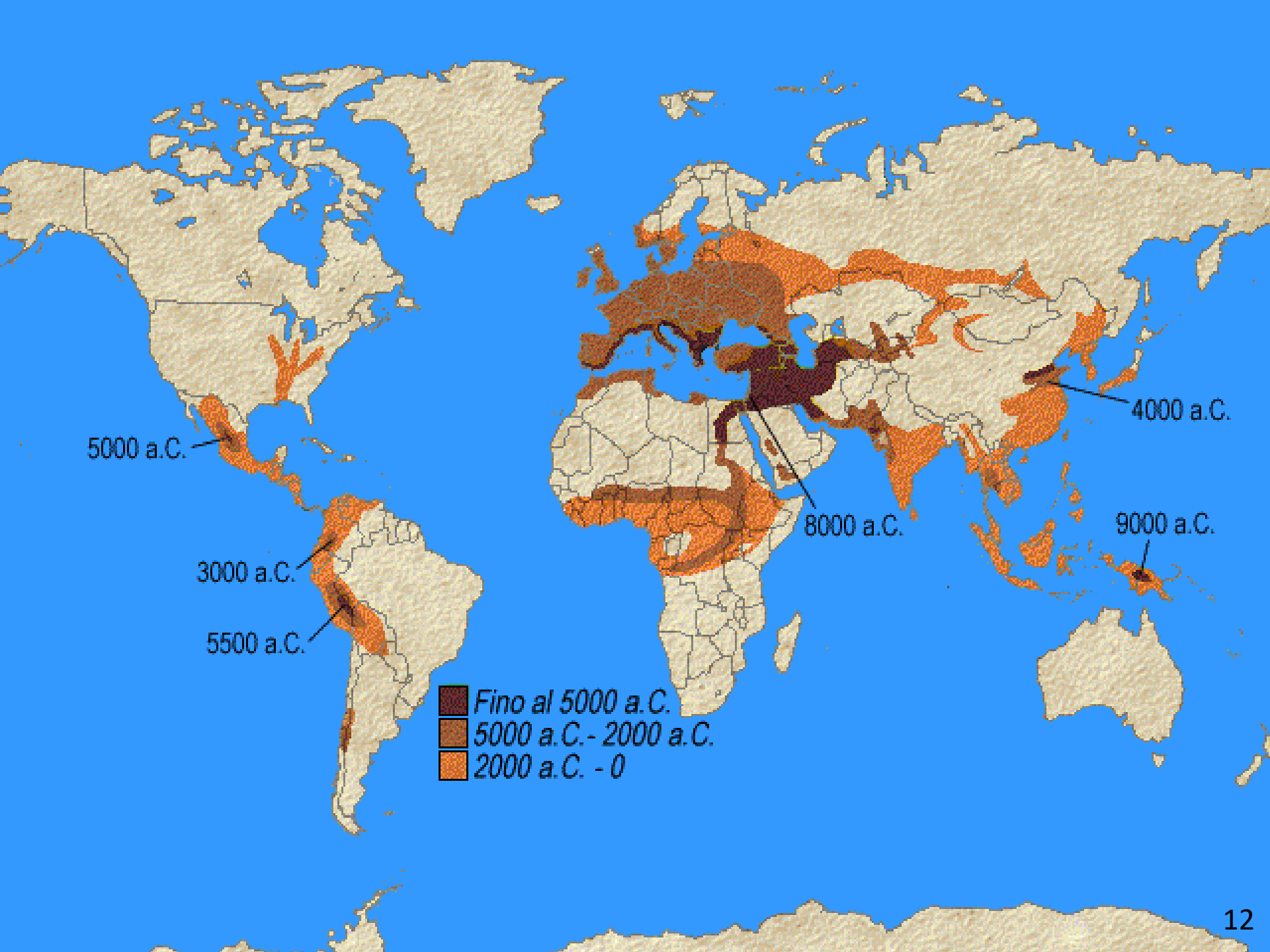
GIAHS Definition

"Remarkable land use systems and landscapes which are rich in biological diversity evolving from the co-adaptation of a rural community with its environment and its needs and aspirations for sustainable development (FAO, 2002)"

The agricultural heritage of the world: time and space



"The cultural landscape is fashioned from a natural landscape by a culture group. Culture is the agent, the natural area the medium, the cultural landscape the result"
Carl Sauer 1926


5000 a.C.
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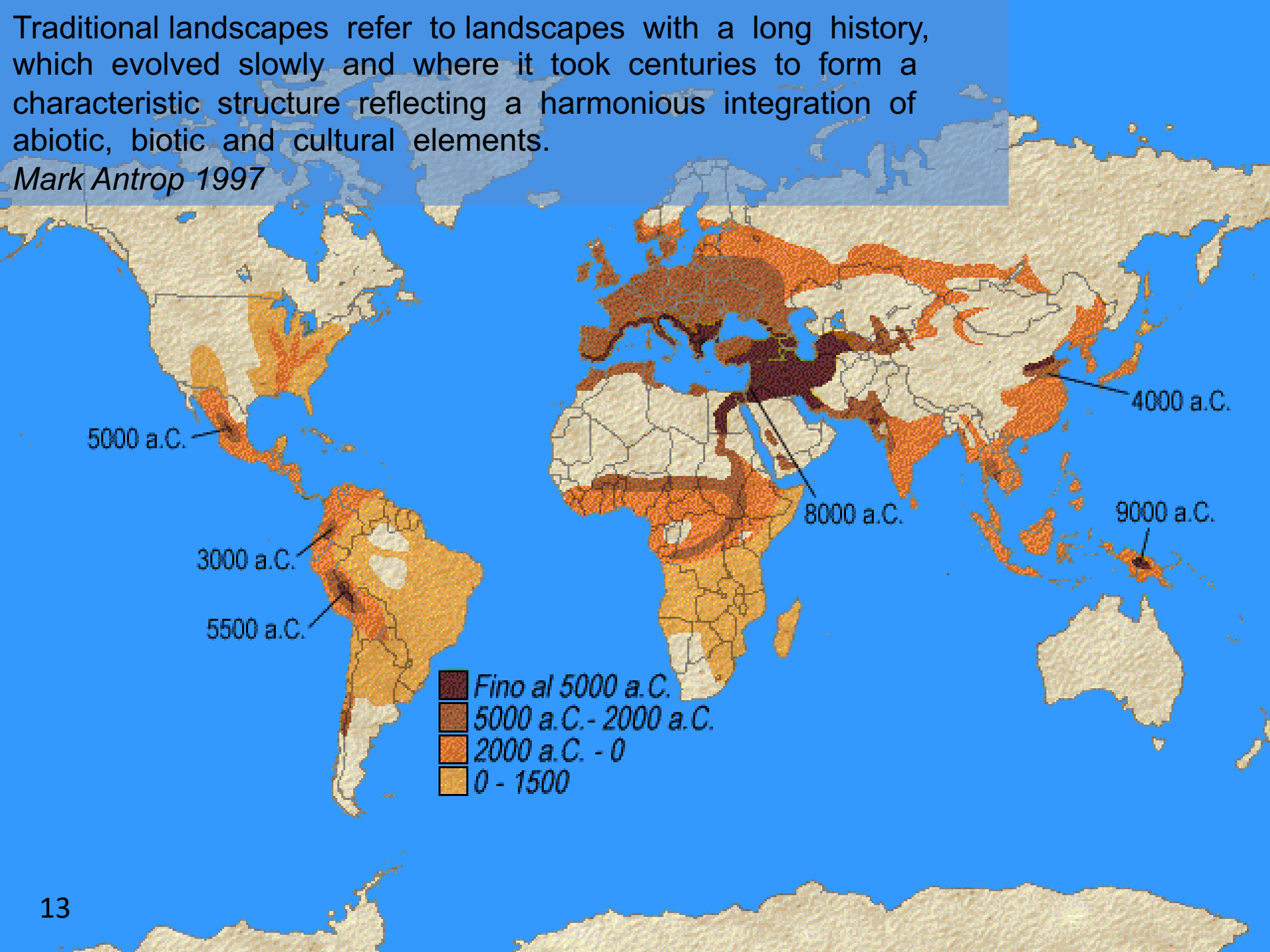
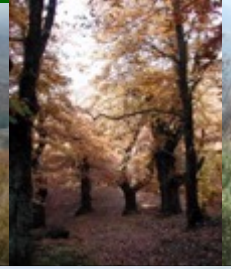
9000 a.C.
Fino al 5000 a.C.
5000 a.C.- 2000 a.C.
2000 a.C. - 0

Traditional landscapes refer to landscapes with a long history, which evolved slowly and where it took centuries to form a characteristic structure reflecting a harmonious integration of abiotic, biotic and cultural elements.

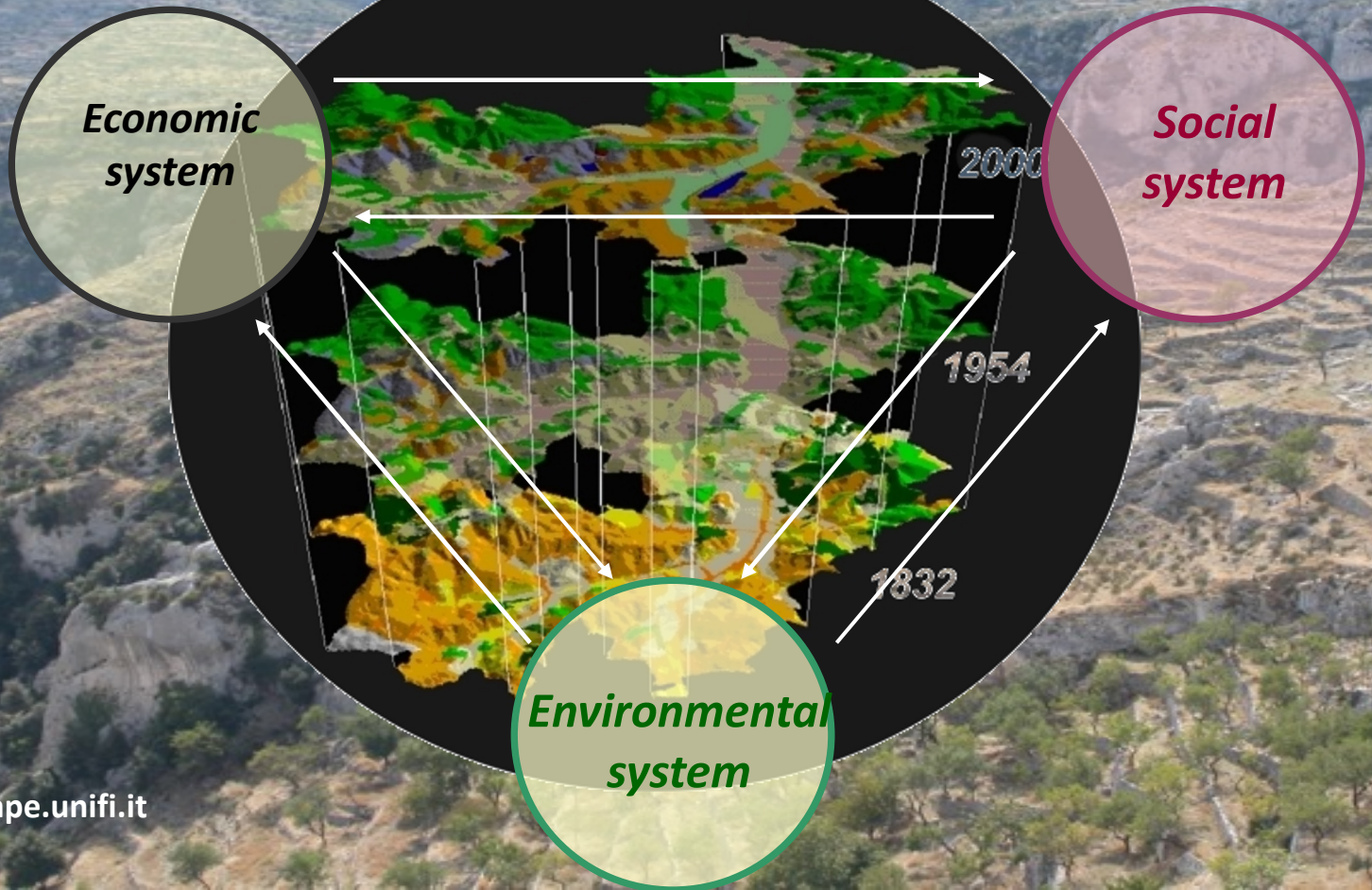
Mark Antrop 1997



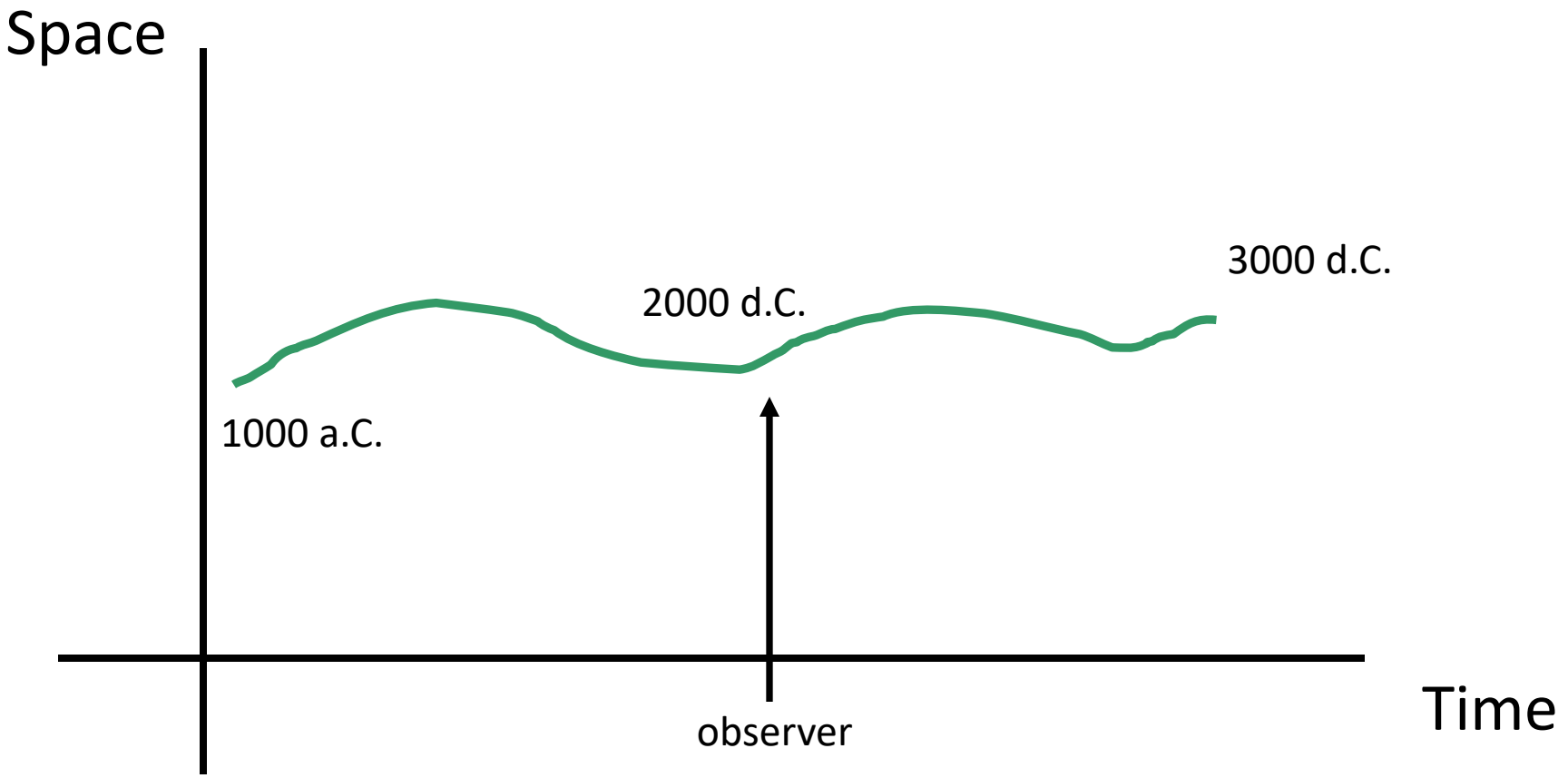


The landscape as the integration among systems

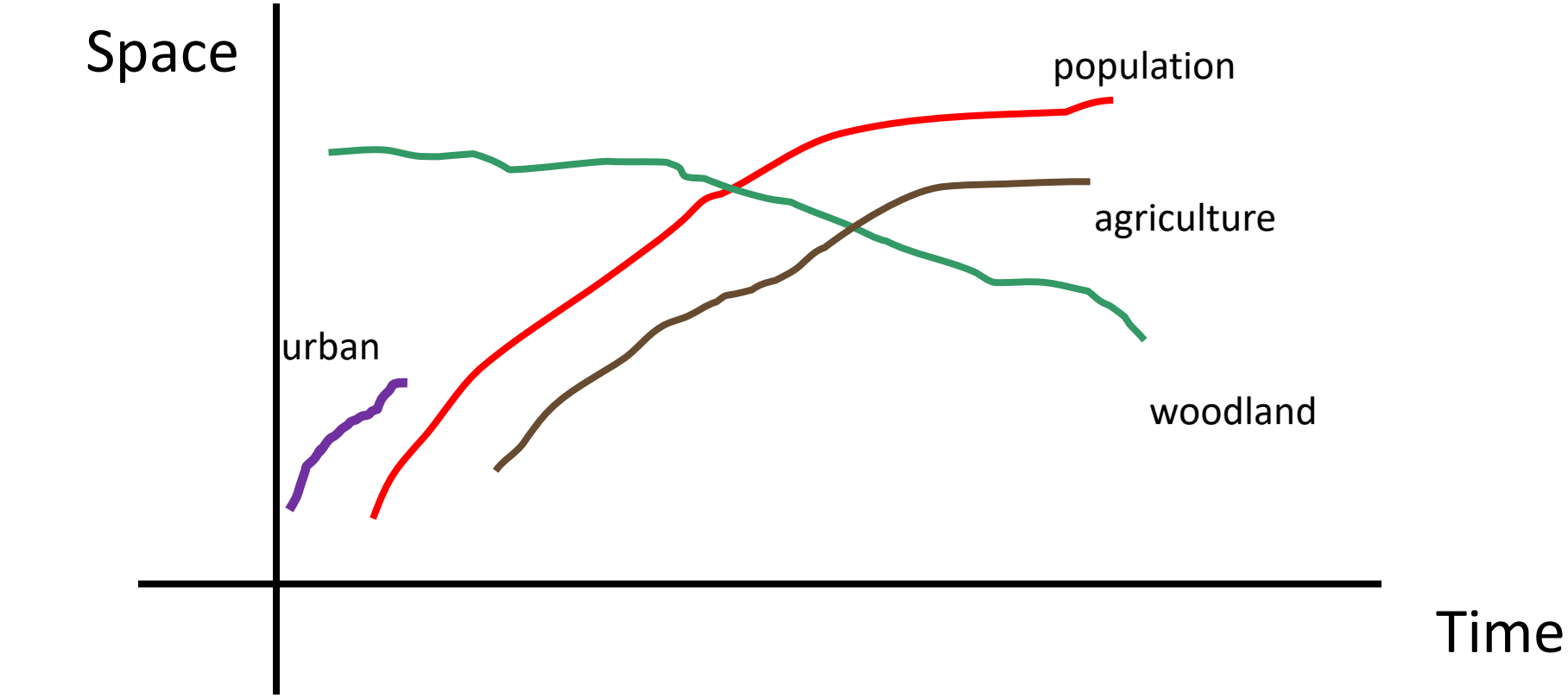
in space and time



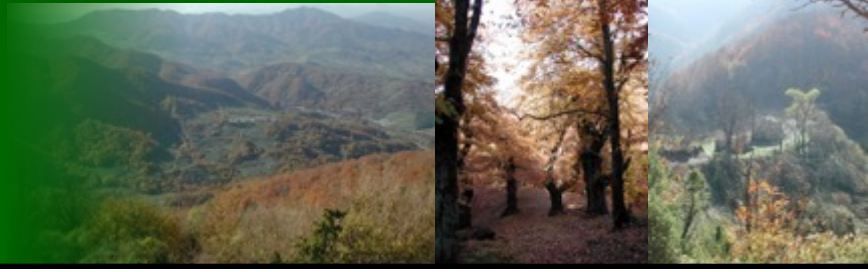
Time and space

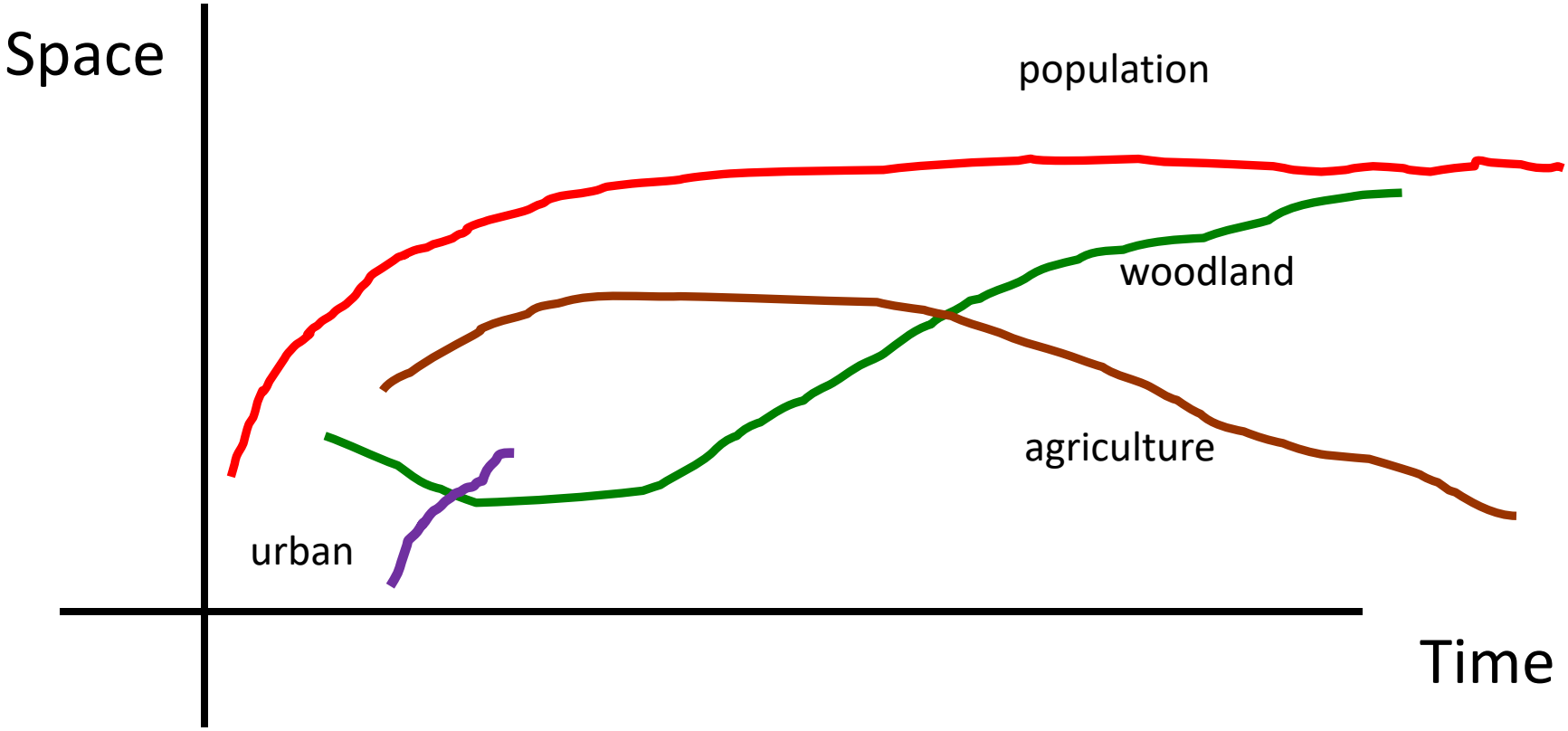


developing countries

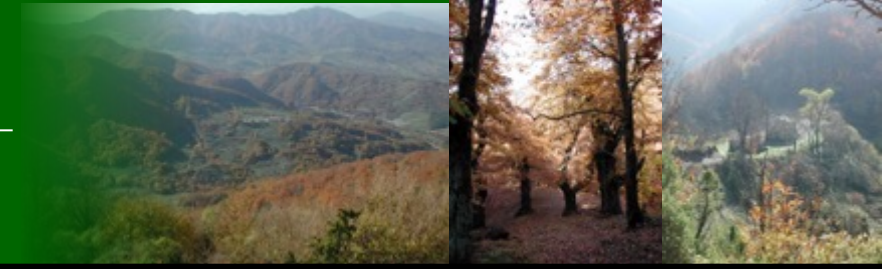


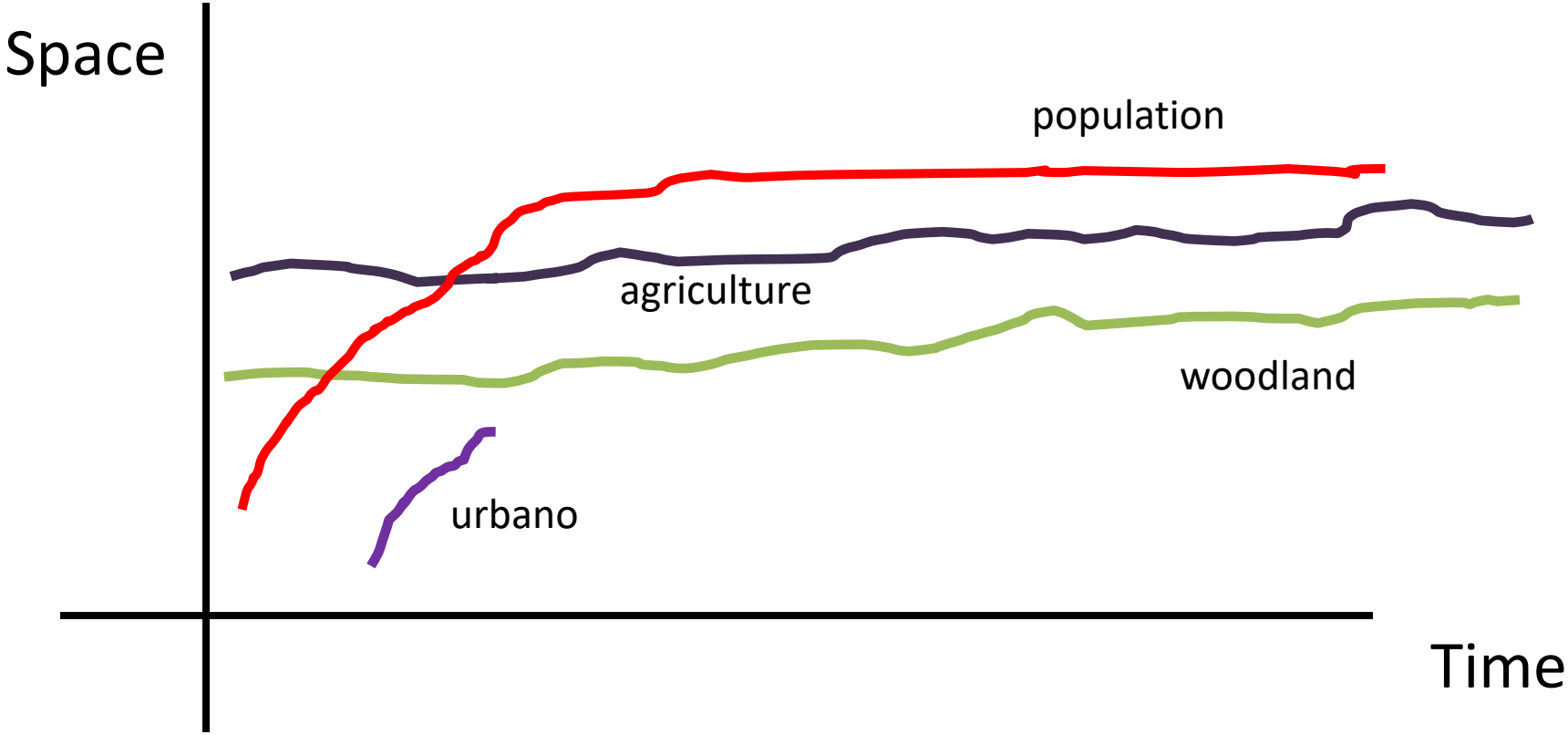
developed countries





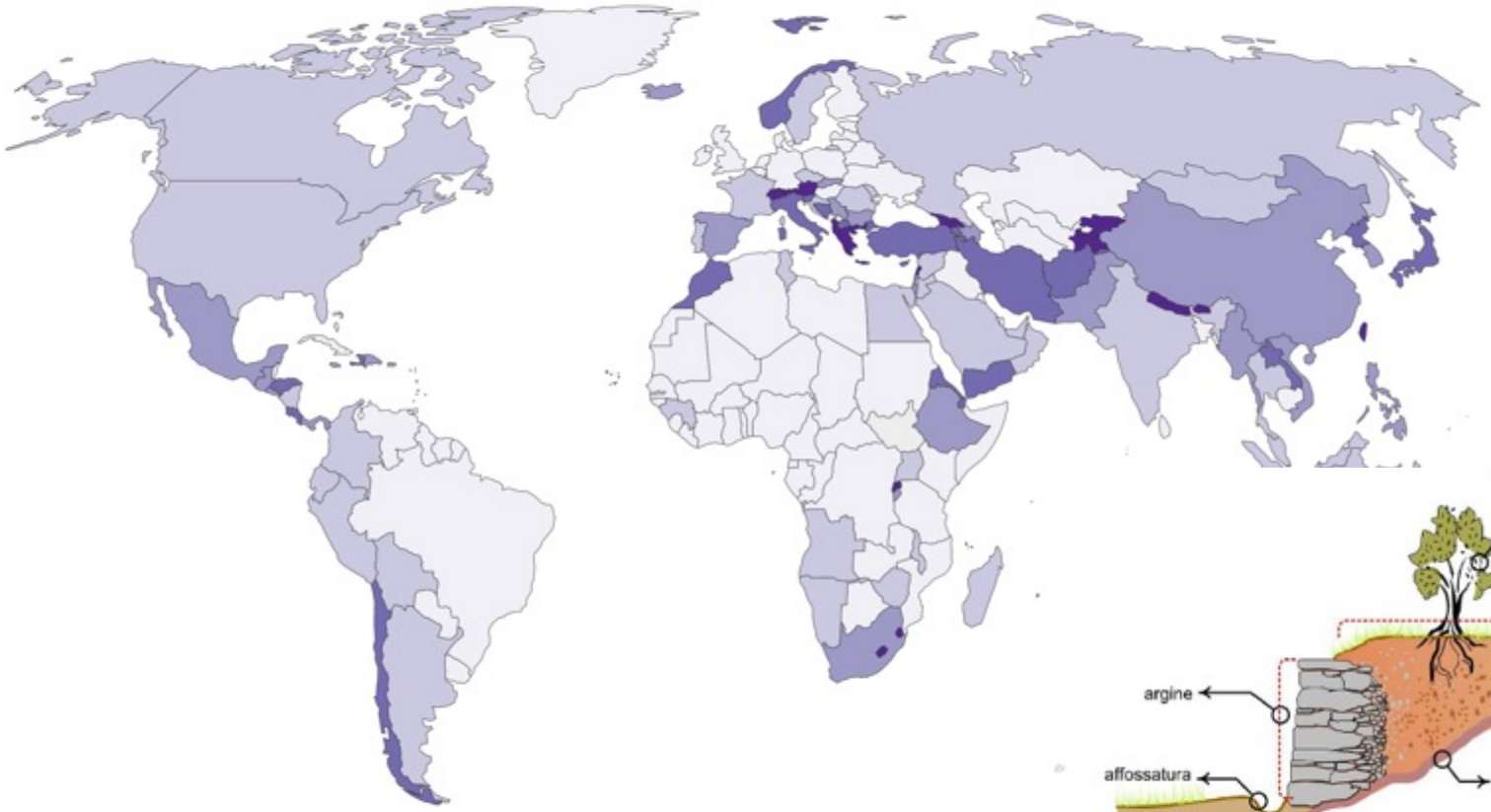
resilient landscapes

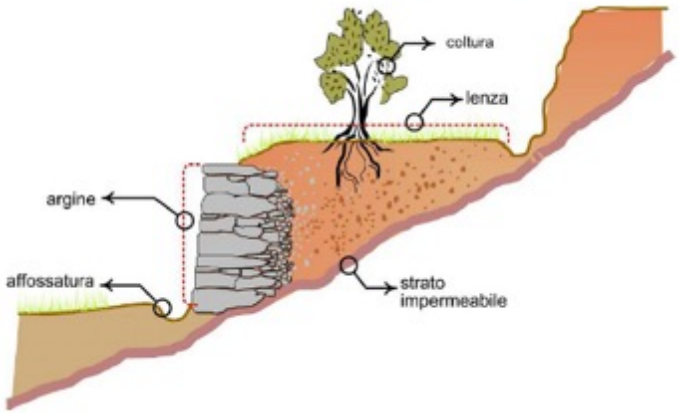




Terrain Ruggedness Index

Indicates how jagged or flat the terrain of a country is on average. Ruggedness is measured in metres of elevation difference for grid points 30 arc-seconds (926 metres on the equator or any meridian) apart.





Source: Nunn and Puga (2012)

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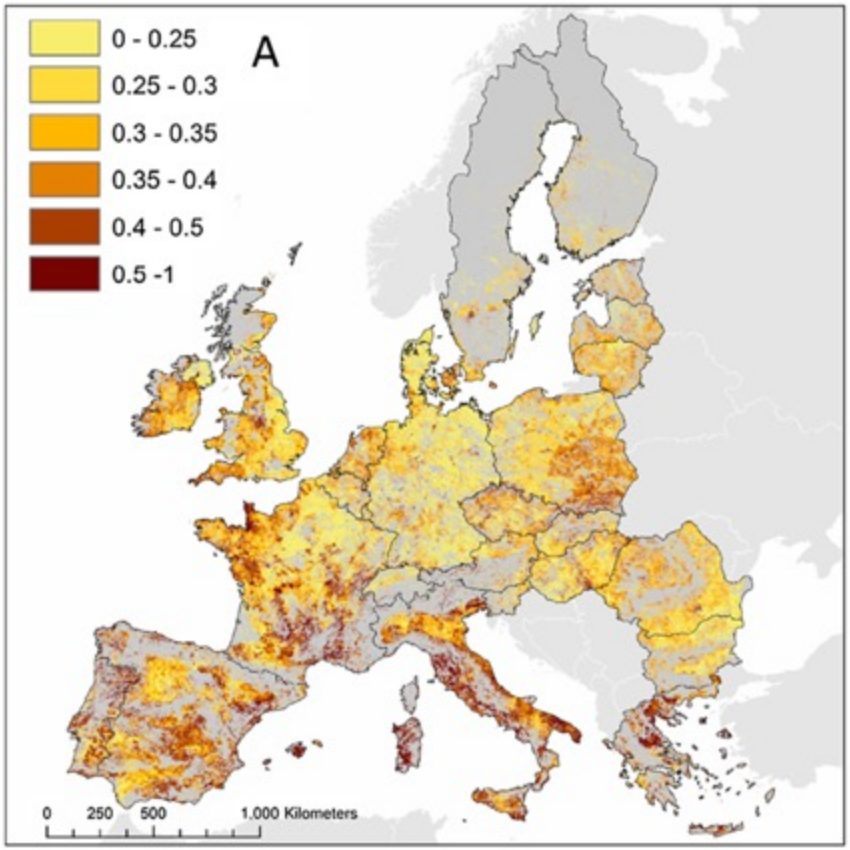
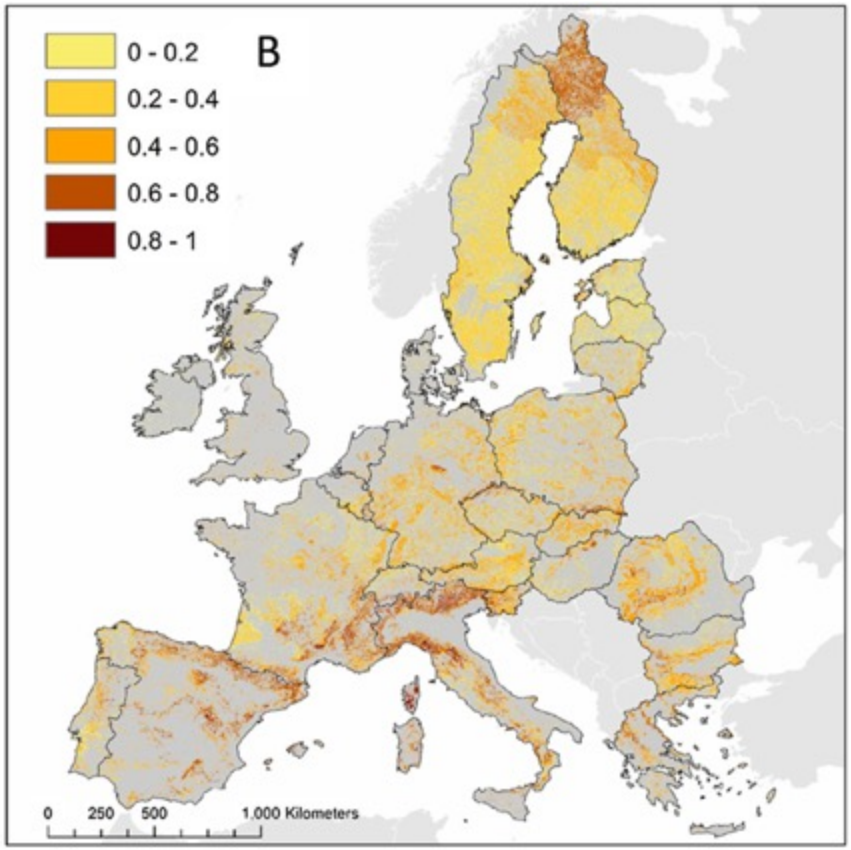
Cultural Landscape Index (CLI) of European (A) agricultural land and (B) forest
(Tieskens et. Al. 2017)

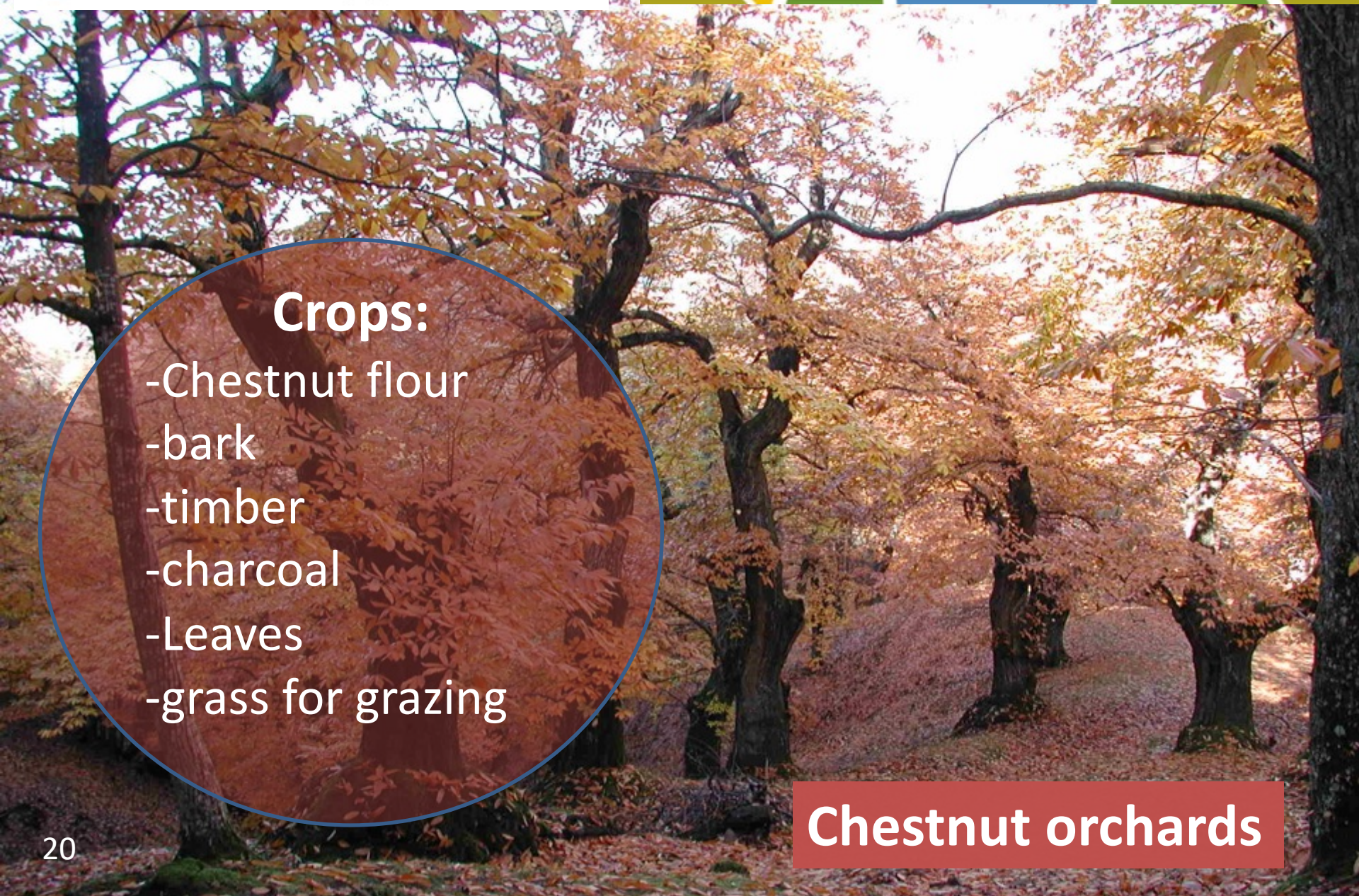




Adaptation to environmental disasters

Food and Agriculture Organization of the United Nations

Globally Important AGRICULTURAL HERITAGE Systems



Crops:

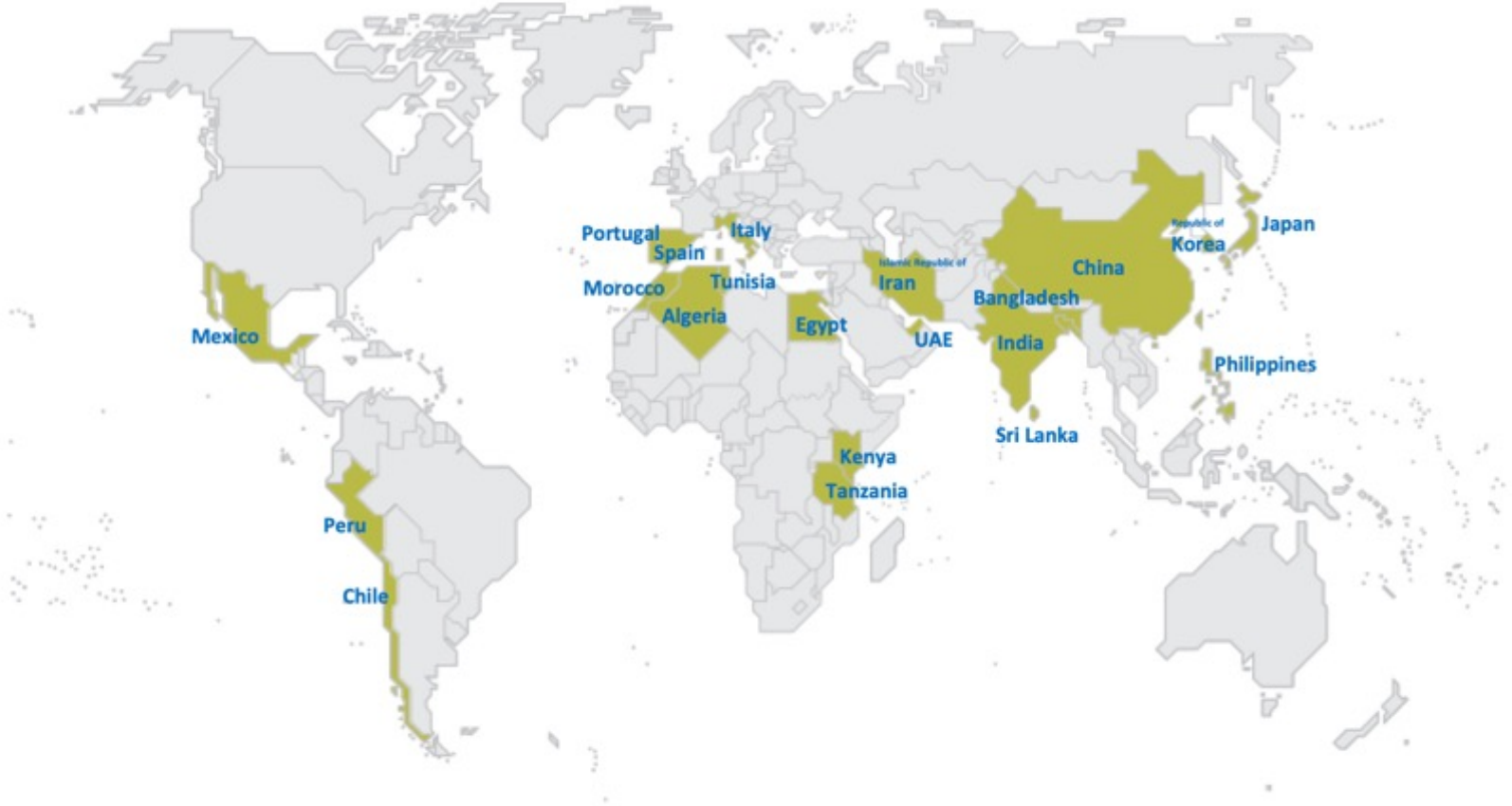
-Chestnut flour
-bark
-timber
-charcoal
-Leaves
-grass for grazing

Chestnut orchards

Food and Agriculture Organization of the United Nations

Globally Important AGRICULTURAL HERITAGE Systems

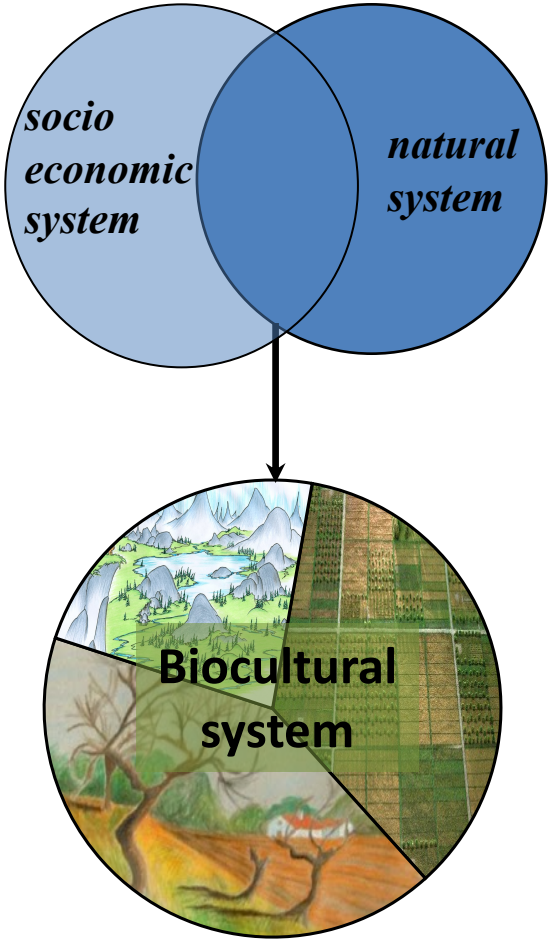
62 GIAHS sites in 21 countries: In situ conservation accredited by FAO

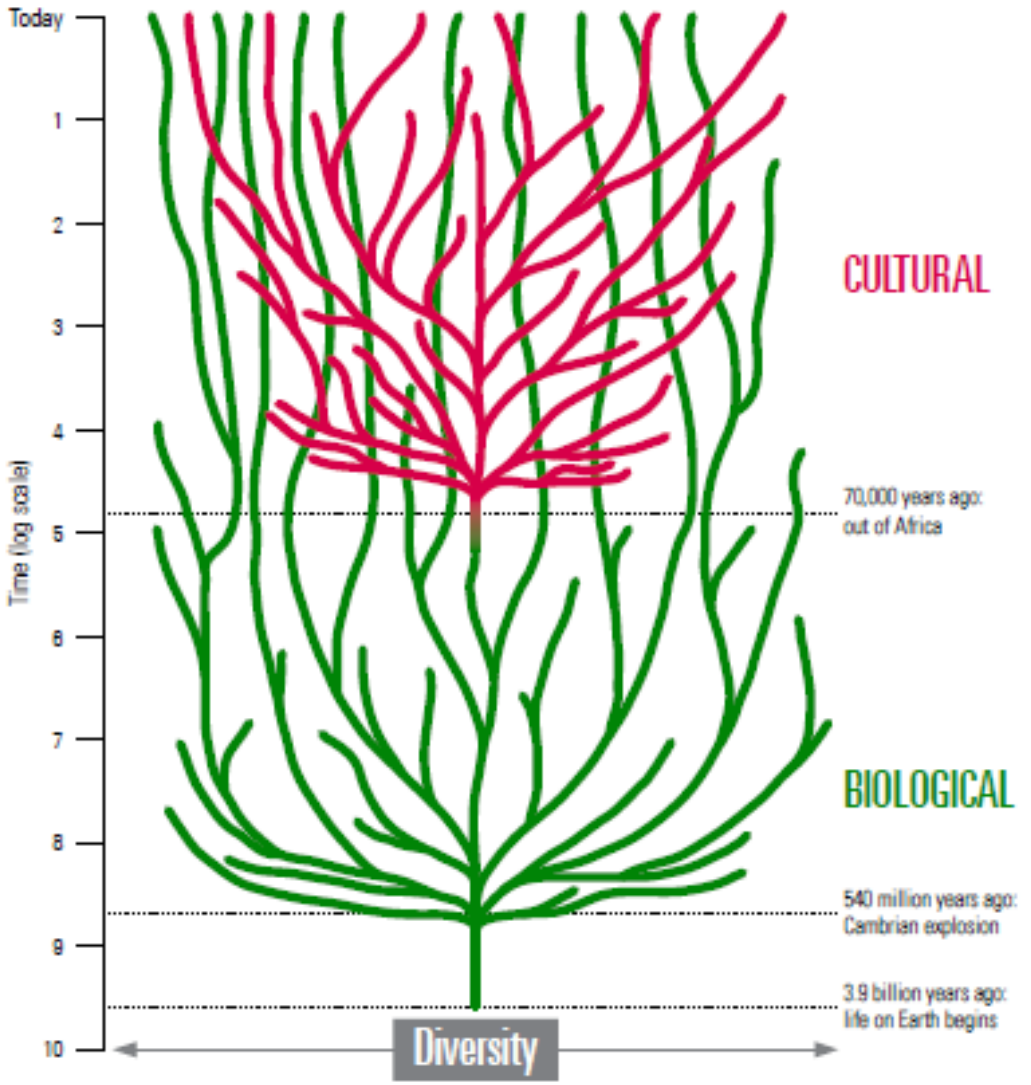


Agricultural heritage systems and the environment

Biodiversity

A





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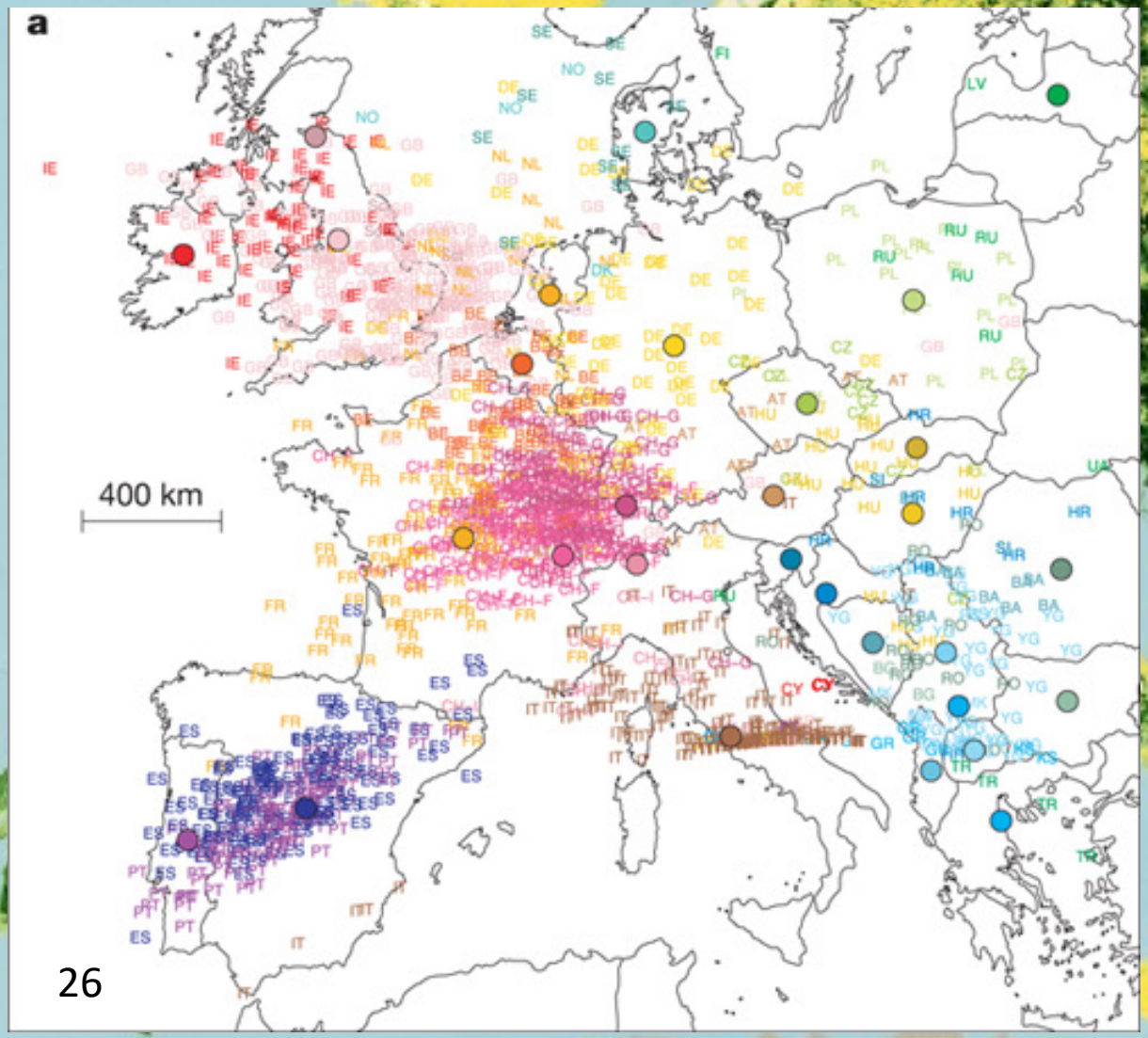
Globally Important AGRICULTURAL HERITAGE Systems



Europe:

High correlation between human genetic diversity and geographic diversity

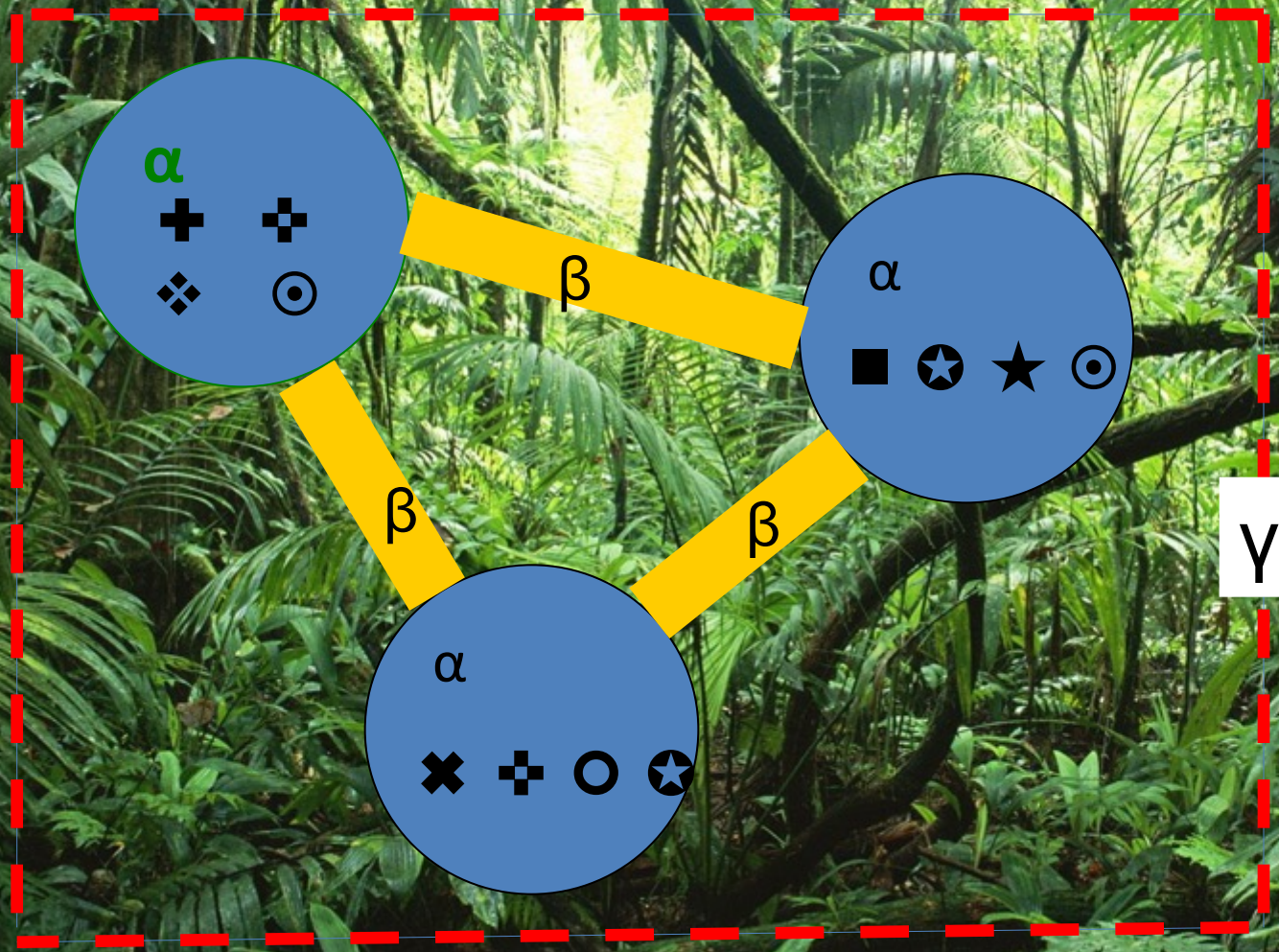
(Neils et al. 2009)

Biodiversità

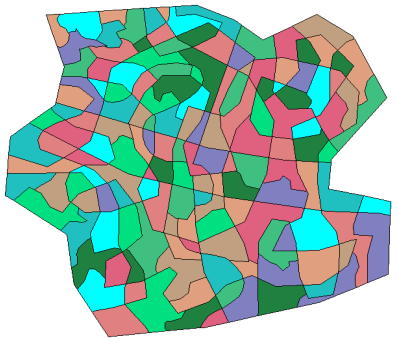
α diversity: number of species within a given area

β diversity: relation species diversity and habitat diversity

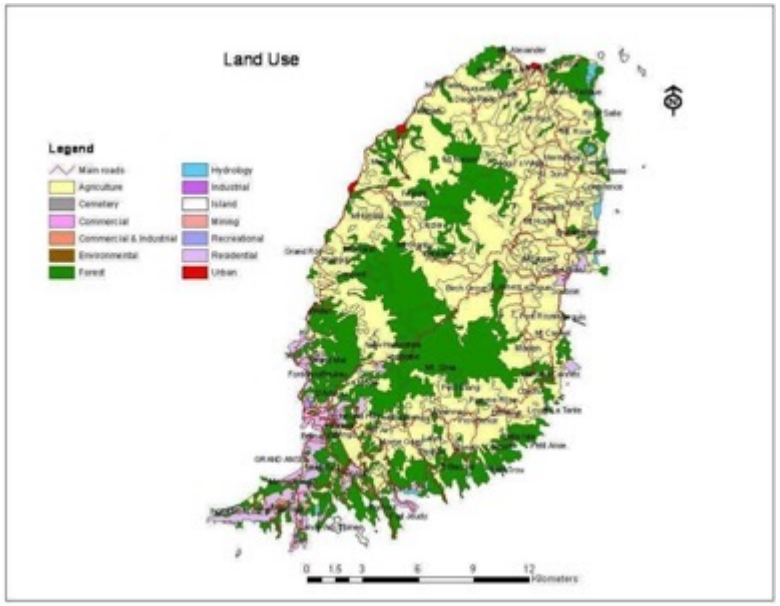
γ diversity: geographical (measured at large scale)



mosaic

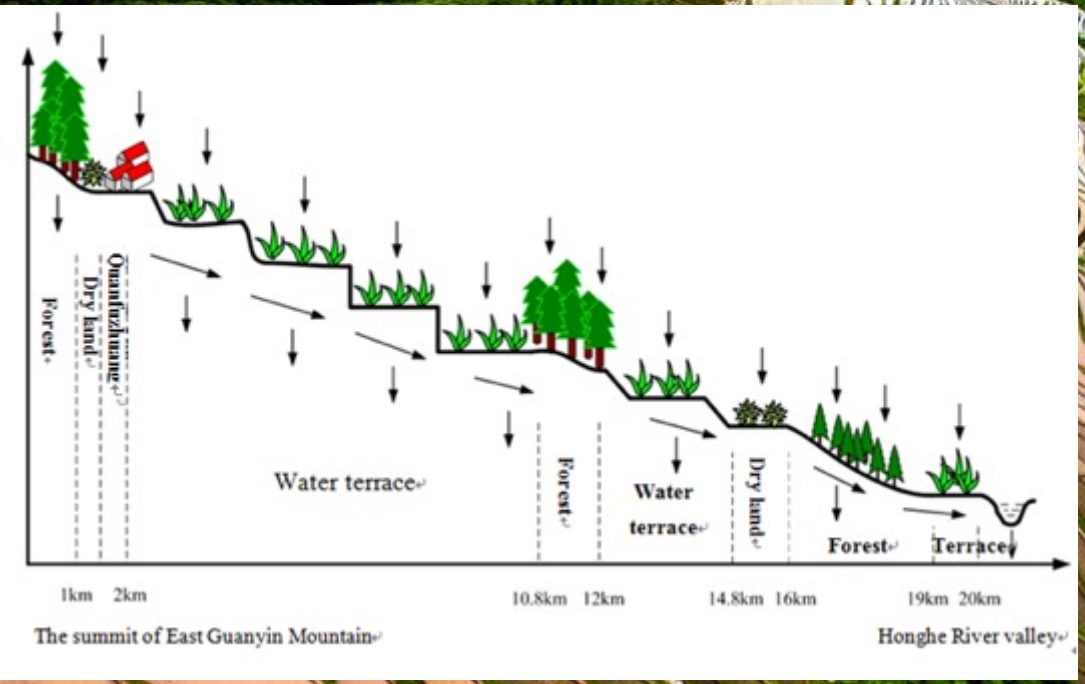


biodiversity $\alpha\beta\gamma$



Longshen-Lonji Rice terraces China

- Forests providing water to rice paddy fields helping dry season threatened area
- Locally adapted rice varieties



Adaptation to harsh dry season and mountainous areas into highly productive and sustainable production system

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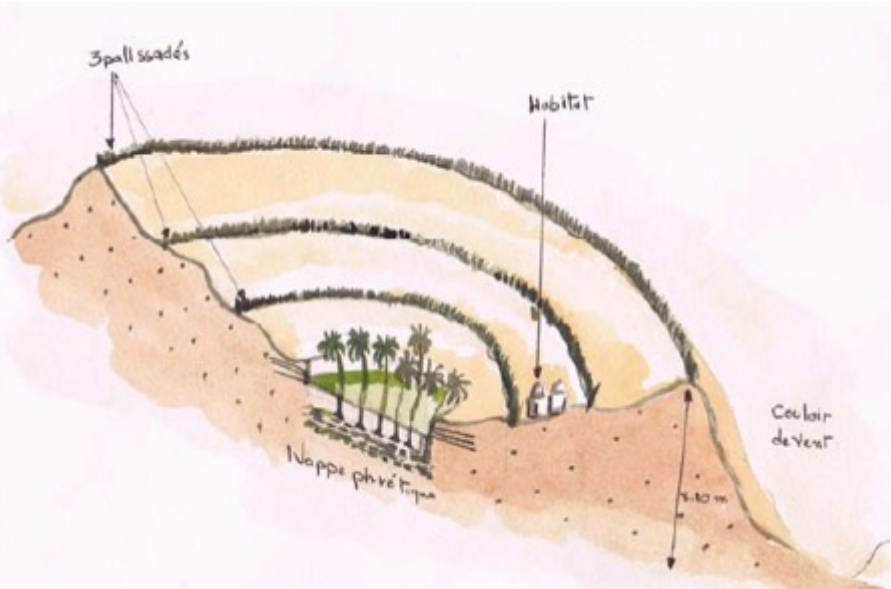
Globally Important AGRICULTURAL HERITAGE Systems

Zhejiang Huzhou Mulberry-dyke & Fish-pond System

- Mulberry leaves are fed to beneficial worms (silk worms).
- Worm faeces is fed to fish.
- Mud in the pond including fish faeces become fertilizer for mulberry trees.
- Four types of fishes farmed in same system, silk, nuts.

Oases systems in Maghreb region

- No irrigation system in the desert
- No need to use large machineries
- Multi-cropped system complying all the organic requirements
- Adapted to the Saharian desert



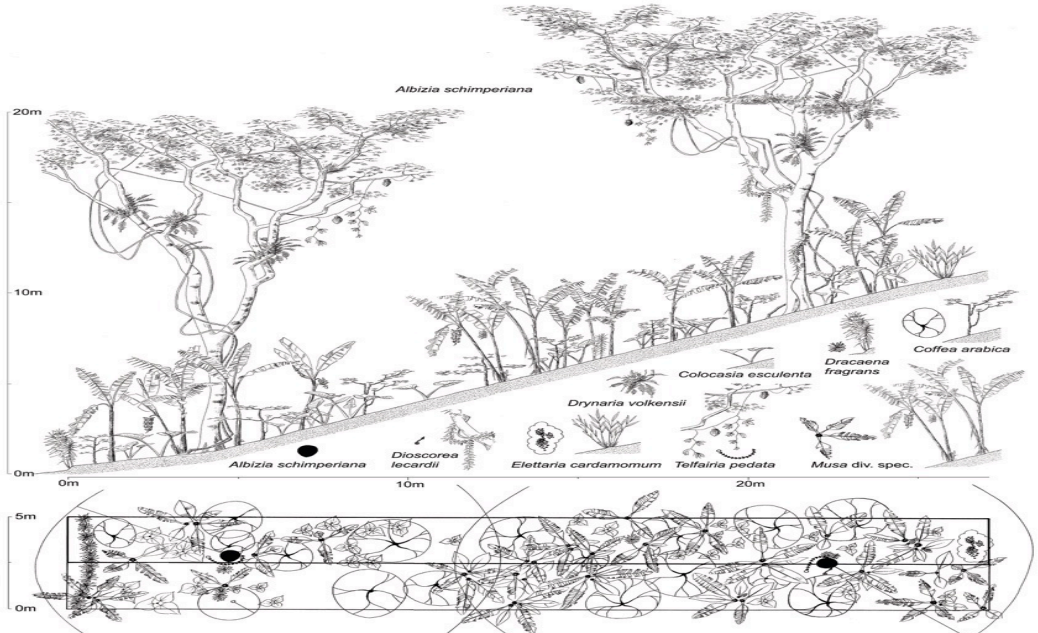
The Etruscan mixed cultivations (7° cent. b.C.)

Moslty in humid areas
vines are trained on trees and sent closer to the sun.
5 crops: wheat, grapes, leaves, wood, vegetables

Agroforestry on the slope of Mt. Kilimanjaro (Tanzania)

- Mix cropping system featured with several layers of vegetation
  - Endemic timbers, banana, coffee/fruit trees as well as staple crops

Provide natural sun shades and micro-climate for favourable conditions to all crop production and soil management



Source: Hemp, A., Biodiverse Conserve (2006) 15 : "The banana forests of Kilimanjaro Biodiversity and Conservation of the agroforestry system of the Chagga Home garden

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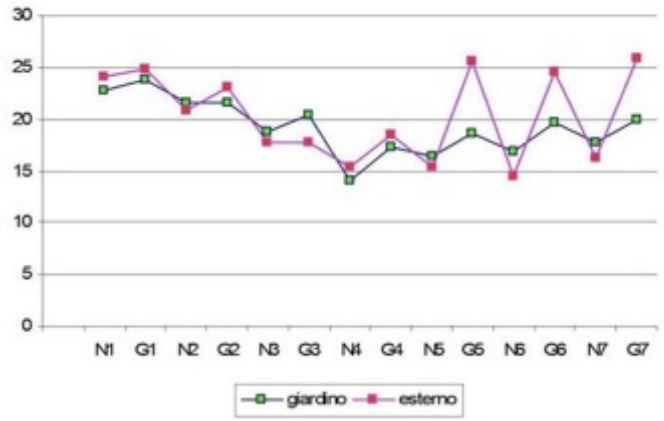
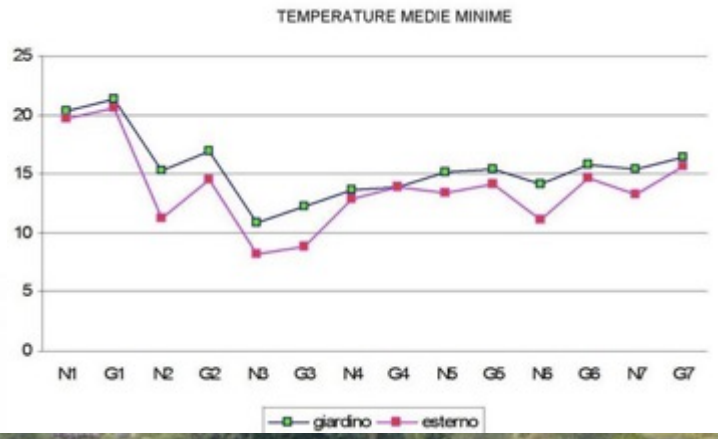
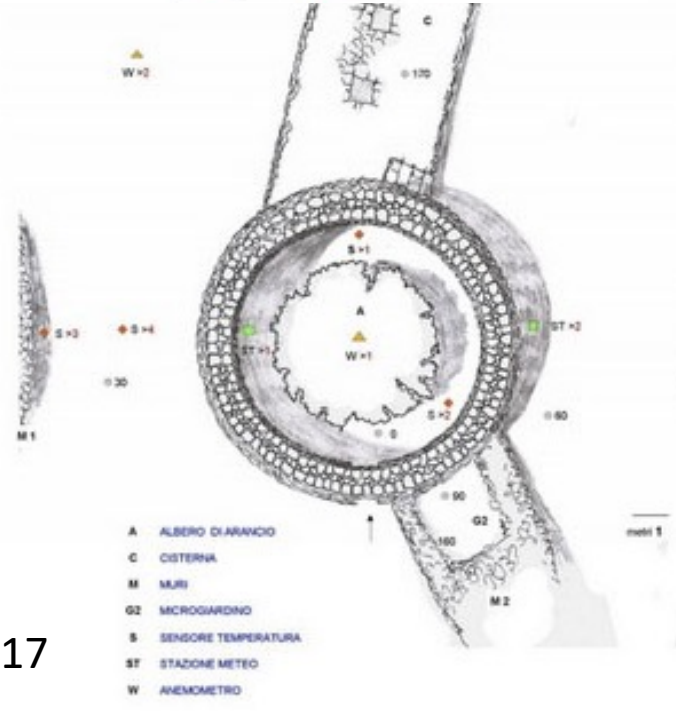
Globally Important AGRICULTURAL HERITAGE Systems

Average maximum temperatures



Average minum temperatures





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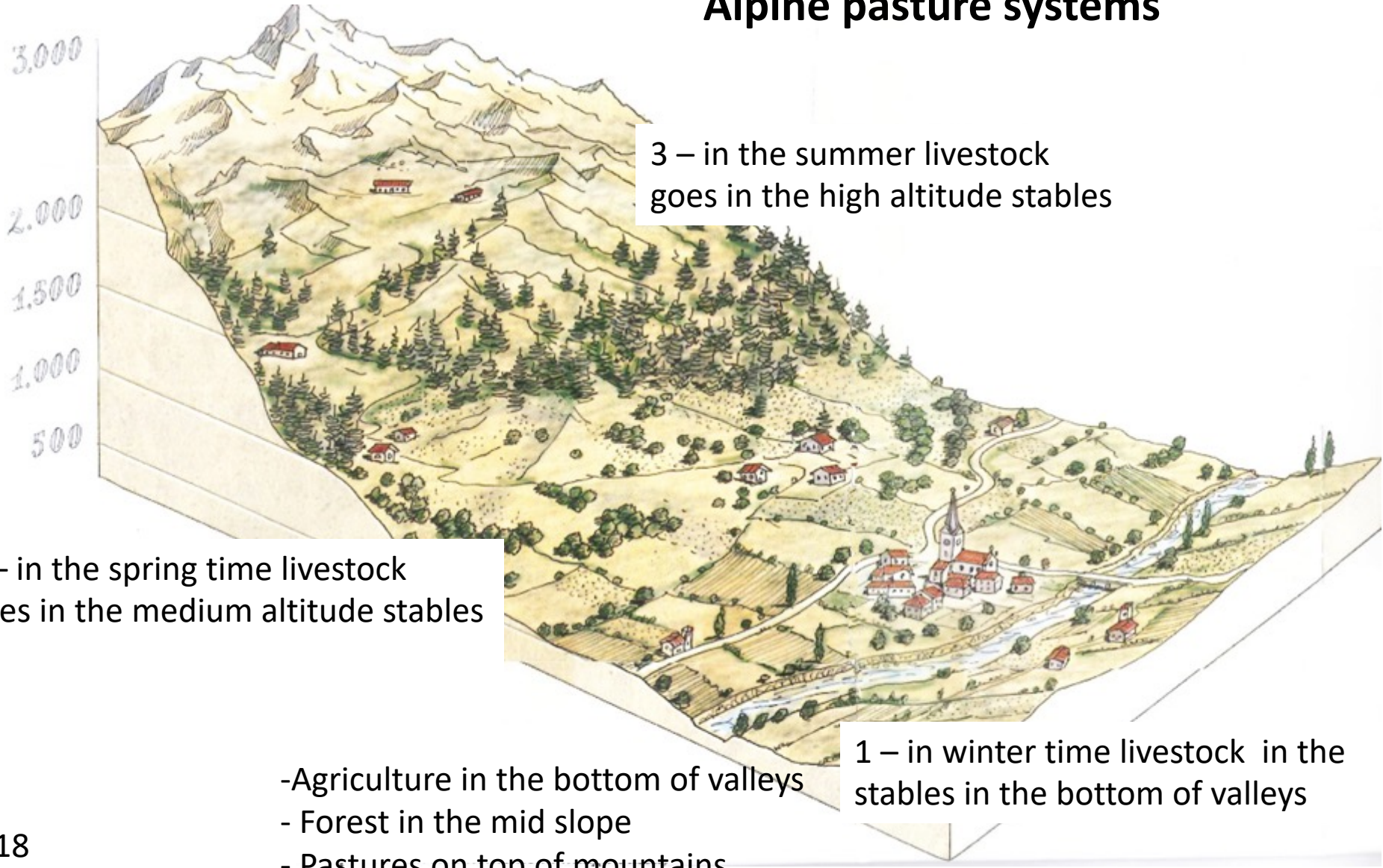
Alpine pasture systems



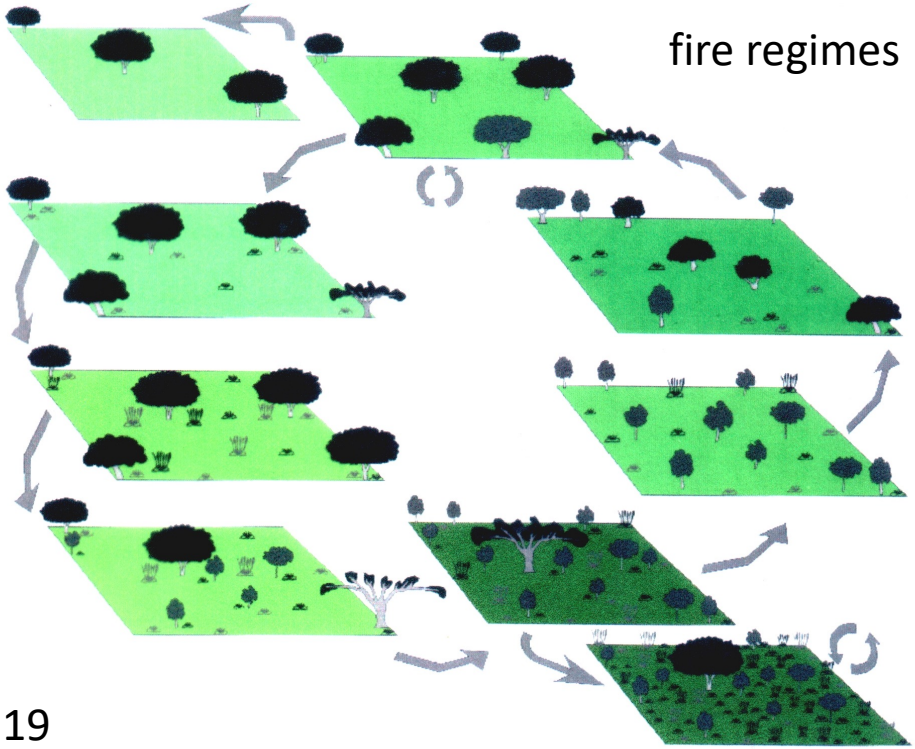
3 – in the summer livestock goes in the high altitude stables

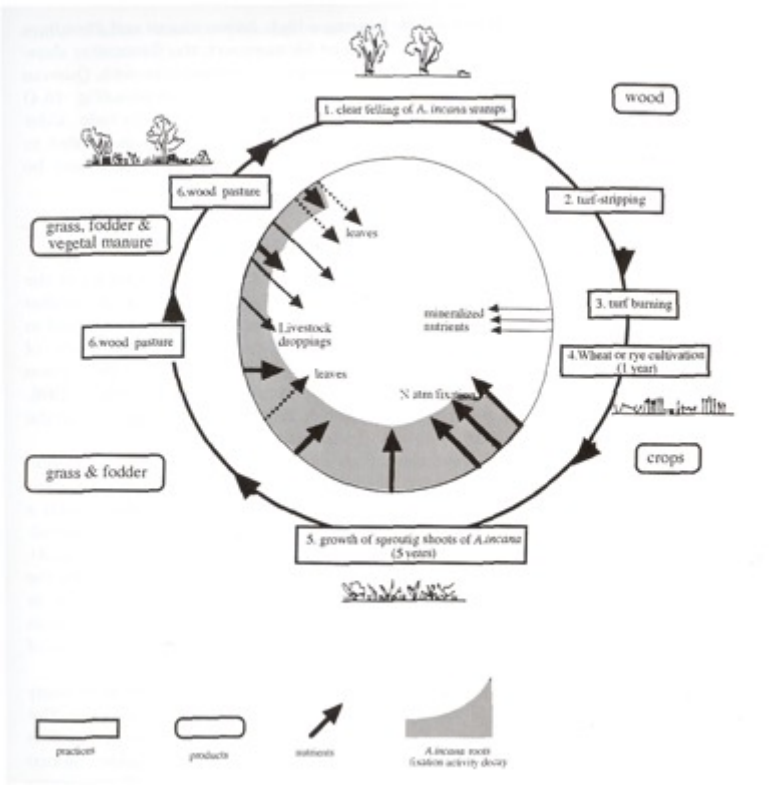
2 – in the spring time livestock goes in the medium altitude stables

1 – in winter time livestock in the stables in the bottom of valleys

-Agriculture in the bottom of valleys
- Forest in the mid slope
- Pastures on top of mountains

fire regimes





Economic benefits

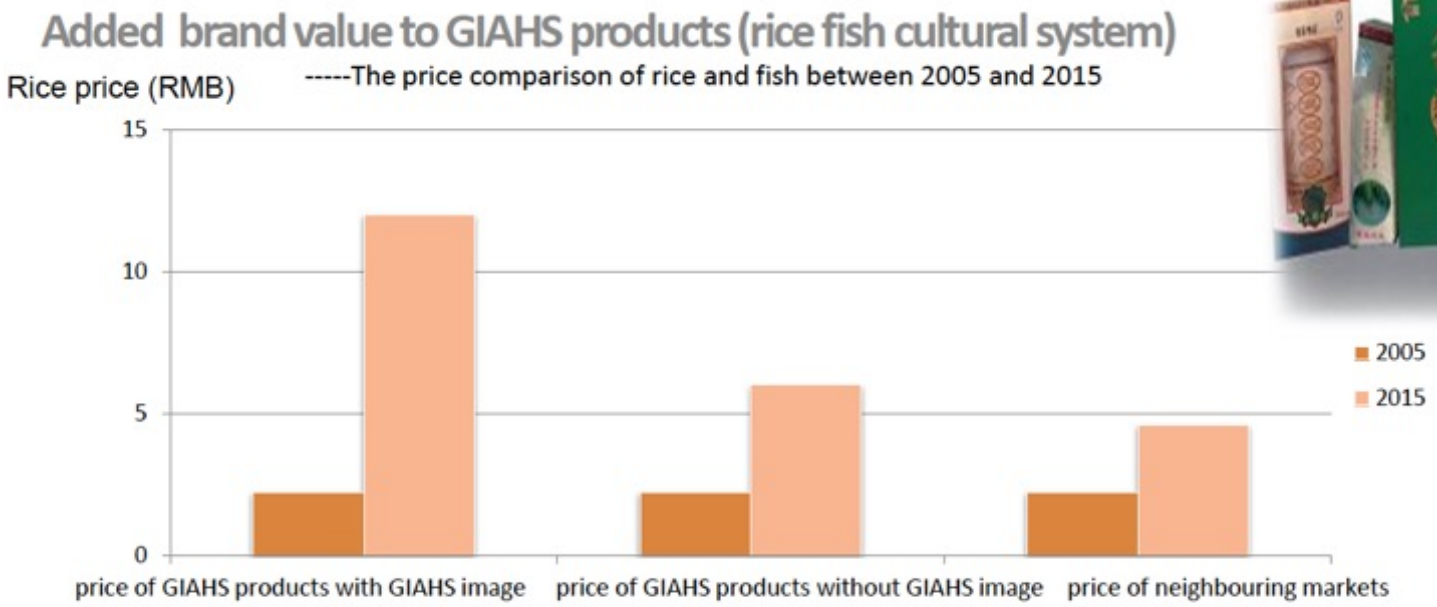


Figure 1. The prices of rice of GIAHS site and non-GIAHS site in 2005 and 2015

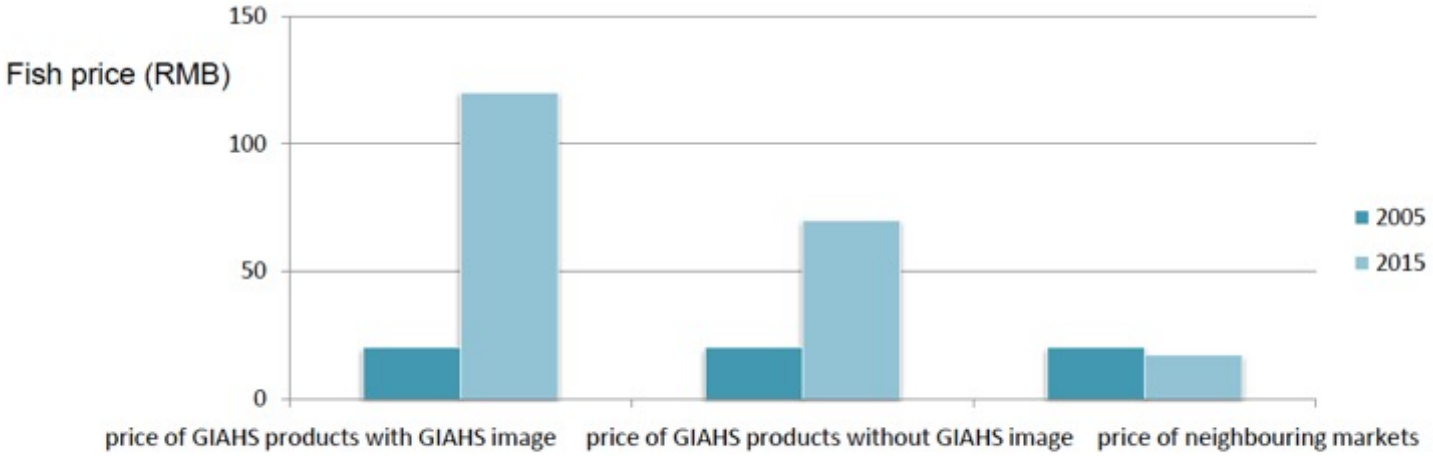


Figure 2. The prices of fish of GIAHS site and non-GIAHS site in 2005 and 2015 (Source: Beijing Union University)

Comparing UNESCO WHL and FAO GIAHS criteria

United Nations Educational, Scientific and Cultural Organization

World Heritage Convention

Food and Agriculture Organization of the United Nations

Globally Important AGRICULTURAL HERITAGE Systems

Authenticity ***(attributes – integrity)***

-form and design;

-materials and substance;

-use and function;

-traditions, techniques and management - systems;

-location and setting;

-language, and other forms of intangible heritage;

-spirit and feeling; and
her internal and external factors.

Criteria

- Food and livelyhood security
- Agrobiodiversity (biocultural d.)
- Local and traditional knowledge systems
- Cultures, value sysem and social organization
- Landscape and seascapes

2012:
National Observatory for Rural Landscapes

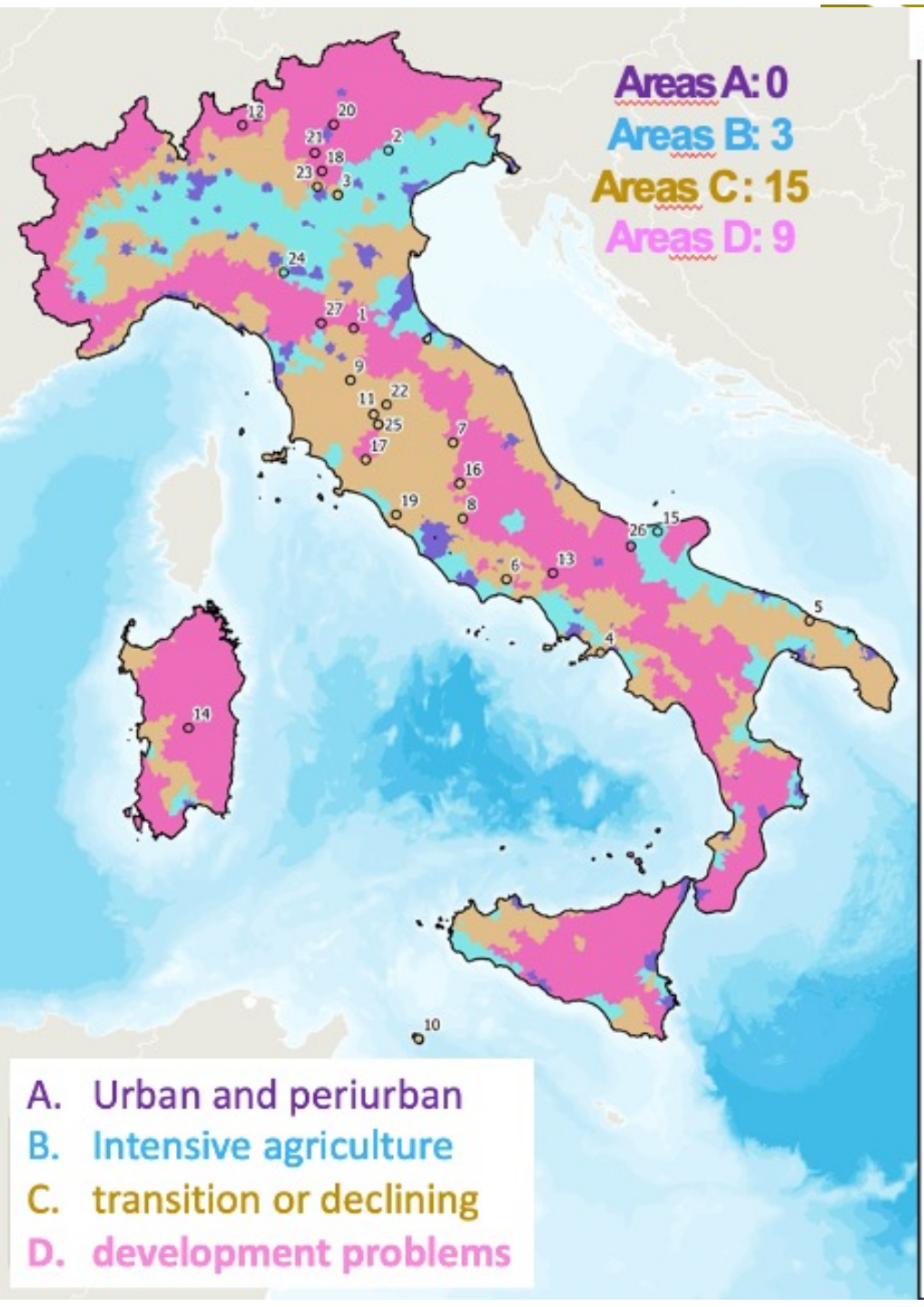
mipaaf
ministero delle politiche agricole alimentari e forestali

National Register of Historical Rural landscapes

27 sites in 12 regions

1 - I paesaggi silvo-pastorali di Moscheta
2 - le colline di Conegliano Valdobbiadene: paesaggio del Prosecco Superiore
3 - Colline vitate del Soave
4 - Limoneti, vigneti e boschi nel territorio del Comune di Amalfi
5 - Il paesaggio agrario della Piana degli oliveti monumentali di Puglia
6 - Oliveti terrazzati di Vallecorsa
7 - Fascia pedemontana olivata Assisi Spoleto
8 - Gli uliveti a terrazze e lunette dei Monti Lucretili
9 - Il paesaggio rurale storico di Lamole
10 - Il paesaggio della pietra a secco dell Isola di Pantelleria
11 - Il paesaggio policolturale di Trequanda
12 - Vigneti Terrazzati del Versante Retico della Valtellina
13 - Parco regionale Storico agricolo dell'olivo di Venafro
14 - Vigneti del Mandrolisai
15 - Paesaggio agrario di olivastri storici del Feudo di Belvedere
16 - Paesaggio della bonifica romana e dei campi allagati della piana di Rieti
17 - Paesaggio Policolturale di Fibbianello - Comune di Semproniano
18 - Alti pascoli della Lessinia
19 - Il paesaggio agro-silvo-pastorale del territorio di Tolfa
20 - Il paesaggio rurale dei Vigneti terrazzati della Valle di Cembra
21 - Il sistema agricolo terrazzato della Val di Gresta
22 - Paesaggio storico della Bonifica Leopoldina in Valdichiana
23 - Le colline terrazzate della Valpolicella
24 - I prati stabili polifiti irrigui della Val d'Enza
25 - Paesaggio policolturale collinare di Pienza e Montepulciano
26 - Il paesaggio del grano - l'area cerealicola di Melanico
27 - La corona di Matilde - alto Reno terra di castagni

UNESCO sites
GIAHS sites



Areas listed into the national register

- 1 - I paesaggi silvo-pastorali di Moscheta
- 2 - le colline di Conegliano Valdobbiadene: paesaggio del Prosecco Superiore
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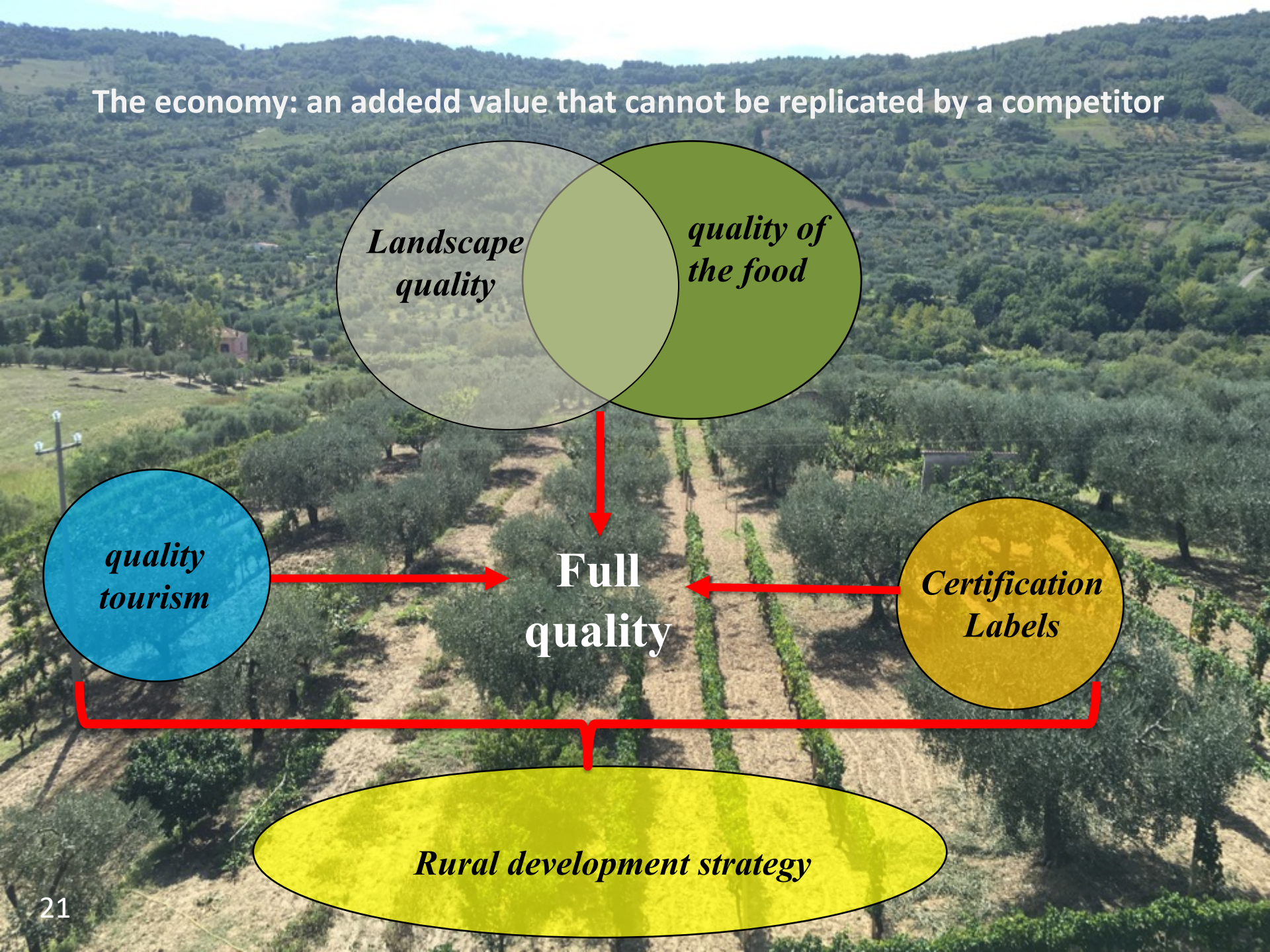
The economy: an addedd value that cannot be replicated by a competitor



Food and Agriculture Organization of the United Nations

Globally Important AGRICULTURAL HERITAGE Systems

FAO GIAHS – Italy - MOU

GIAHS – Capacity Building Project 2018-2021

(Asia, Africa, South America)

Coordinator: Laboratory for Landscape and cultural heritage
School of Agriculture University of Florence

Objectives:

1 - University Master Course on GIAHS

2 - Identification of Potential Giahs Sites

www.agriculturalheritage.com

Thank-you