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Bologna 12-15 June 2012

SPECIAL SESSION
"NATURAL RESOURCES AND RISKS IN THE MEDITERRANEAN"

12 June 2012

IMPACTS OF LAND AND SOIL RESOURCES ON FUTURE DEVELOPMENT OF THE MEDITERRANEAN REGION

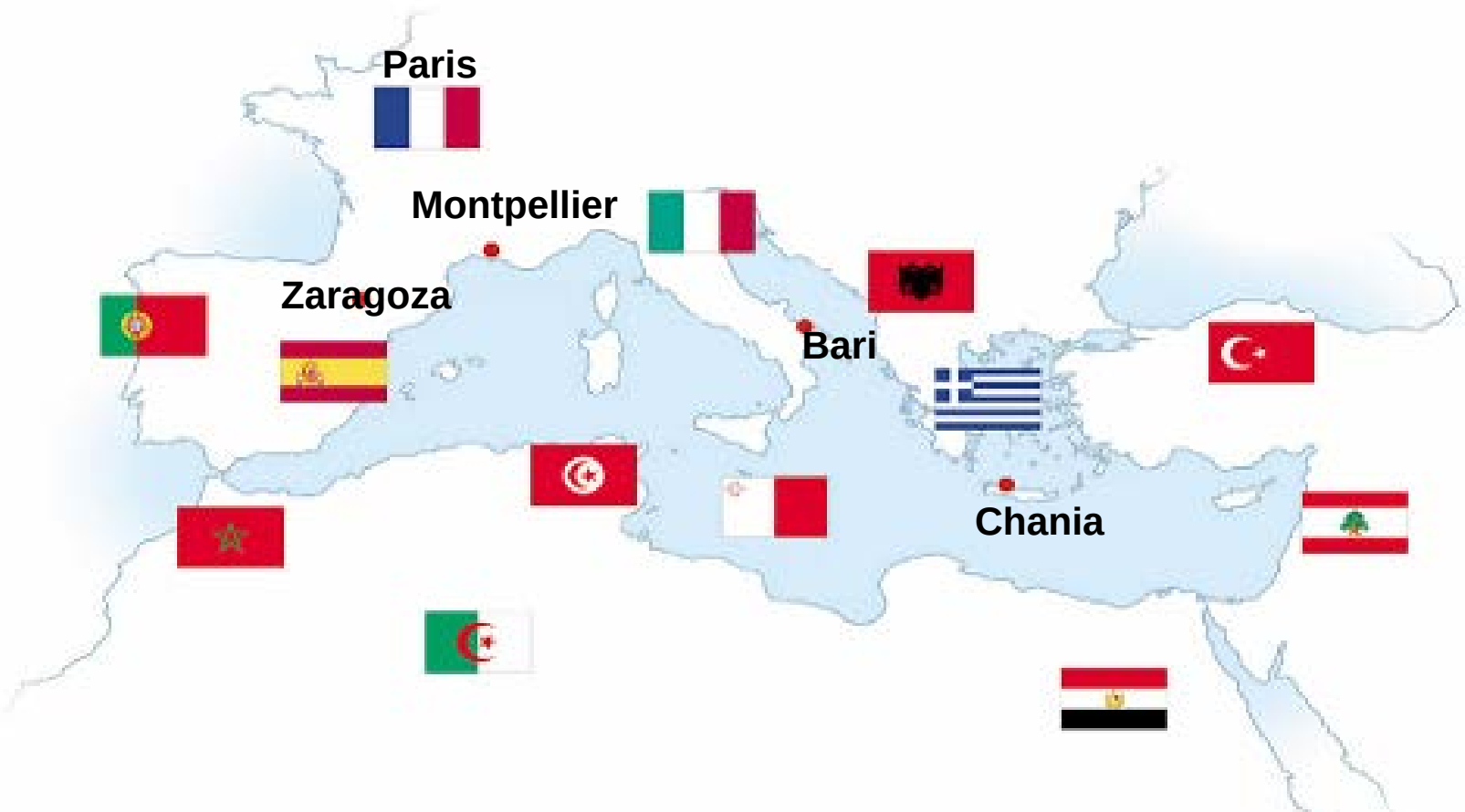
Prof. Dr. Pandi Zdruli

CIHEAM Mediterranean Agronomic Institute of Bari, Italy

CIHEAM

Was established in 1962 under the auspices of OECD and the Council of Europe with original membership of France, Greece, Italy, Spain, Portugal, Turkey and ex-Yugoslavia.

At present CIHEAM brings together 13 member states Albania, Algeria, Egypt, Lebanon, Malta, Morocco, Tunisia in addition to France, Greece, Italy, Spain, Portugal, Turkey



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Istituto Agronomico Mediterraneo di Bari

Main activities of CIHEAM

- Training
- Research
- Cooperation
- Knowledge Dissemination

IAMB: areas of scientific excellence

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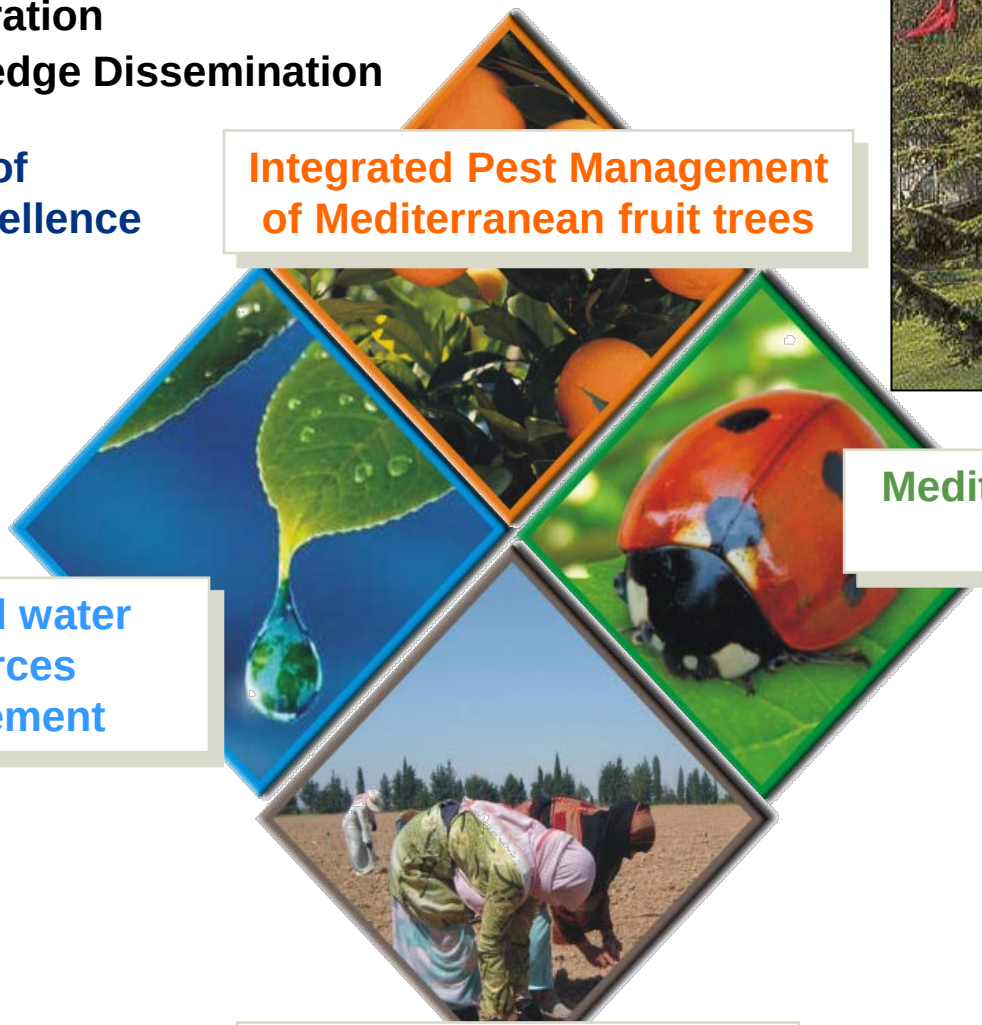
Integrated Pest Management of Mediterranean fruit trees



Mediterranean Organic Agriculture

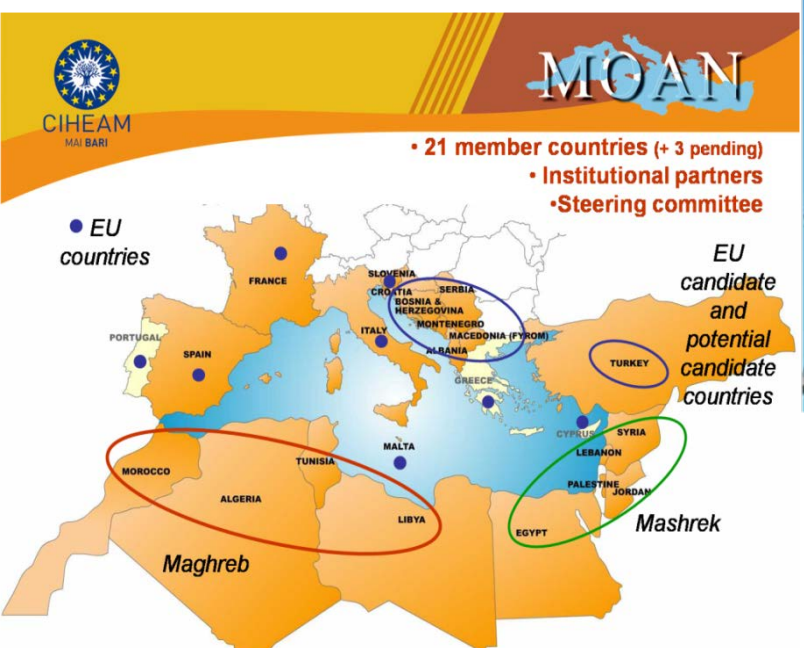
Land and water resources management

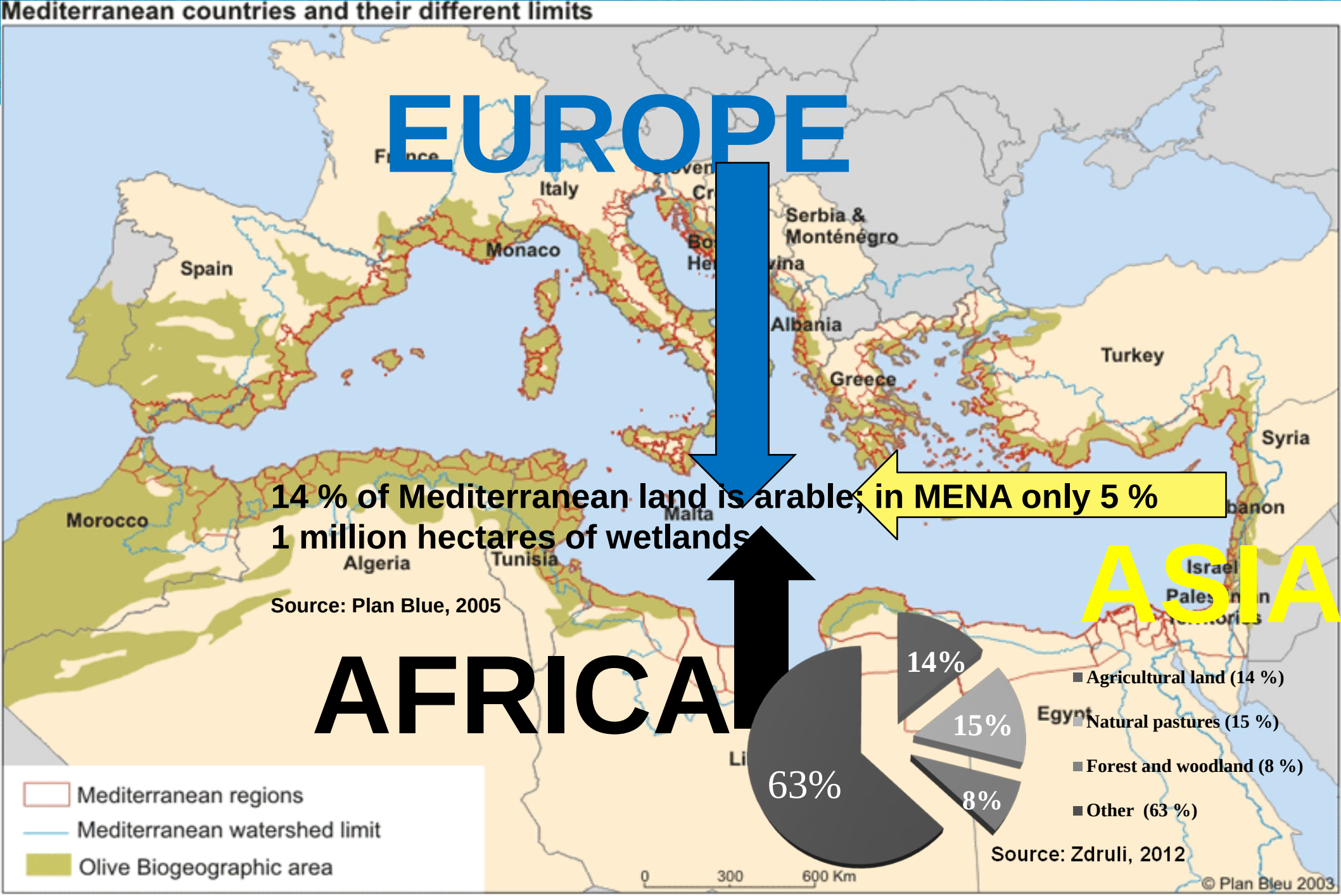
Sustainable agriculture and rural development

NETWORKING AND RESEARCH

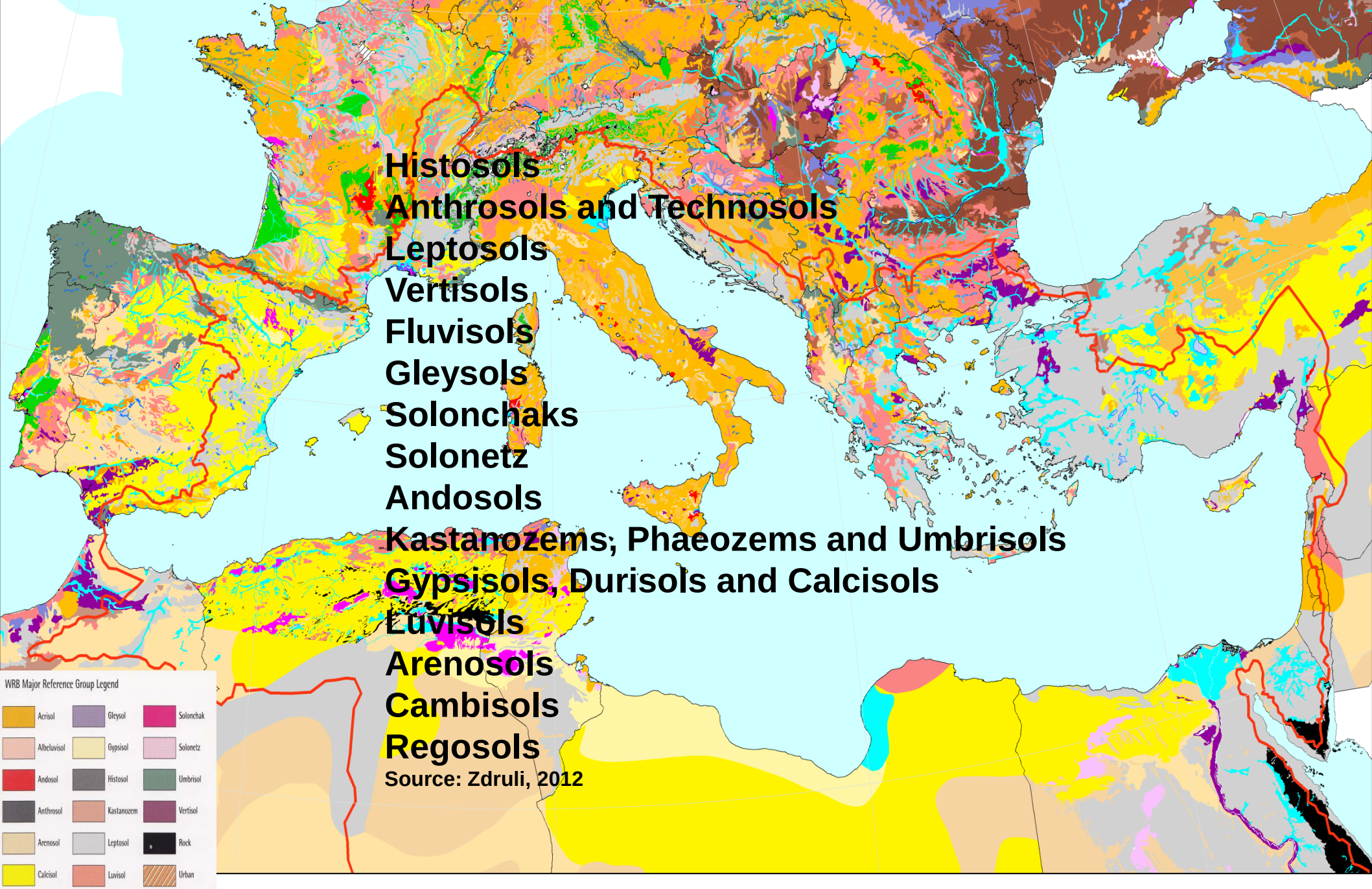
In 2012:

90 projects!!!!





Source : Gaussen & De Philippis - FAO



WRB Soil Map of the Mediterranean at 1:1,000,000 scale


Pollution has no political borders
Volcanic eruption ashes of Etna in Sicily covering the Maltese islands
Slide prepared by Prof. Louis F. Cassar, International Environment Institute of Malta

Where are much of the Technosols in the Mediterranean?

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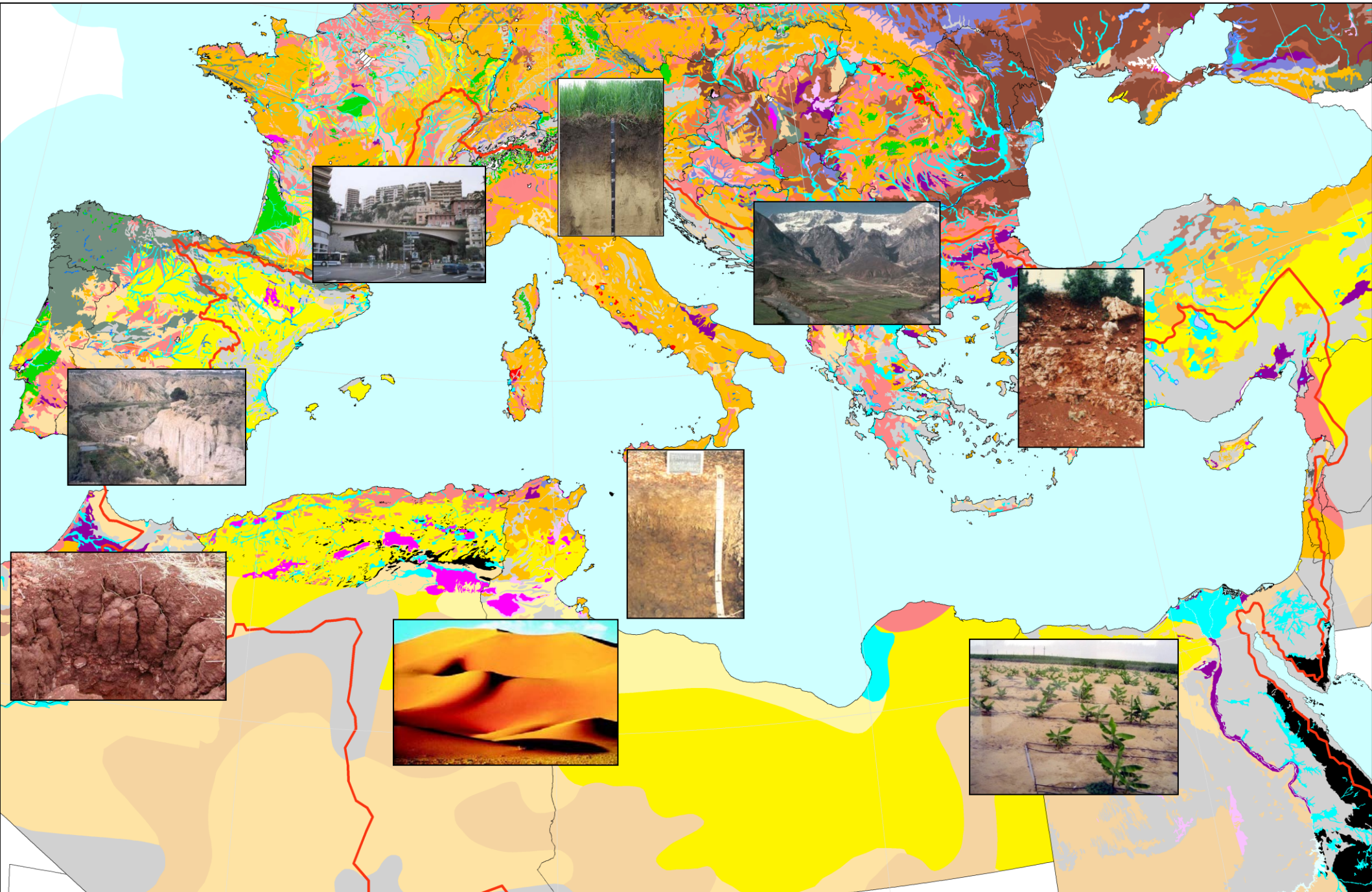
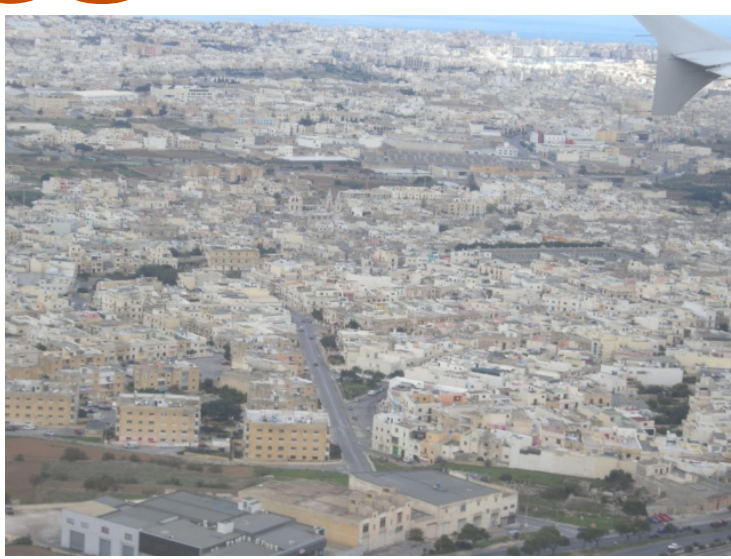



The CATENA process
Bare rock
Leptosol
erosion
Regosol
Forest fires
Luvisol
Vertisol
deposition
Gully erosion
Cambisol
Rill and sheet erosion
Fluvisol
River bank erosion
Gleysol
Nutrient mining
Soil sealing

The quest for land and competing interests



The quest for land

Natural shallow soil under natural pasture

Man made soil (Anthrosol)

Some 20,000 ha of natural pastures are converted to agriculture use in Apulia region alone

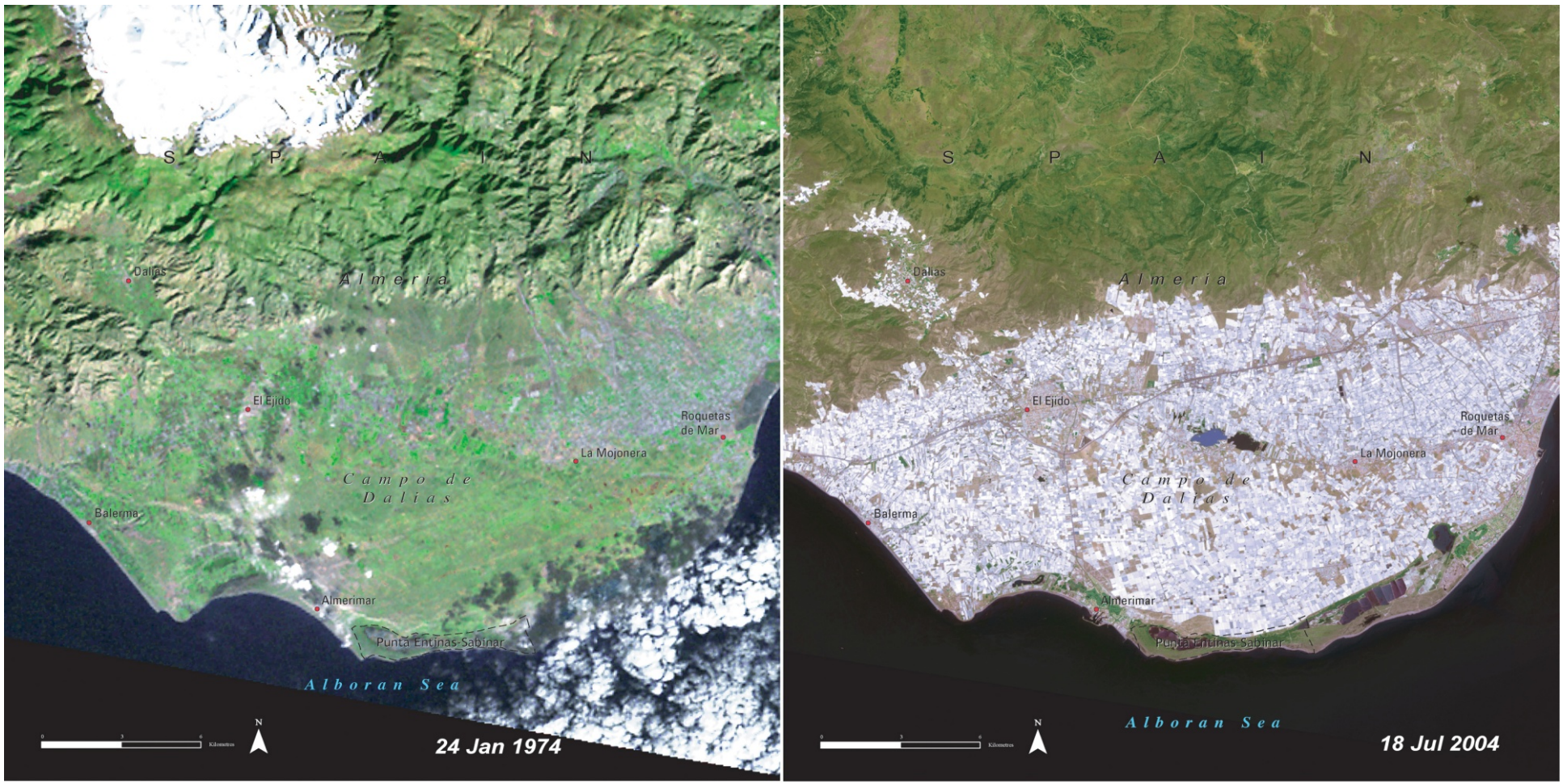
Rocky soil

Man made soil (Anthrosol)

Grape cultivation in man made soils (Anthrosols) of Apulia, southern Italy

Human induced pressures in coastal zones: agriculture impacts and land use changes in the region of Andalusia, Spain between 1956 and 2004

Source: P.I.C. INTERREG IIIB Western Mediterranean, DesertNet Project



Drastic land use changes in the Campo de Dalias in Andalusia, Spain over a 30 years period show expansion of greenhouses at the expense of grazing and rain-fed agriculture. The process has been followed by extensive groundwater pumping to meet irrigation water needs

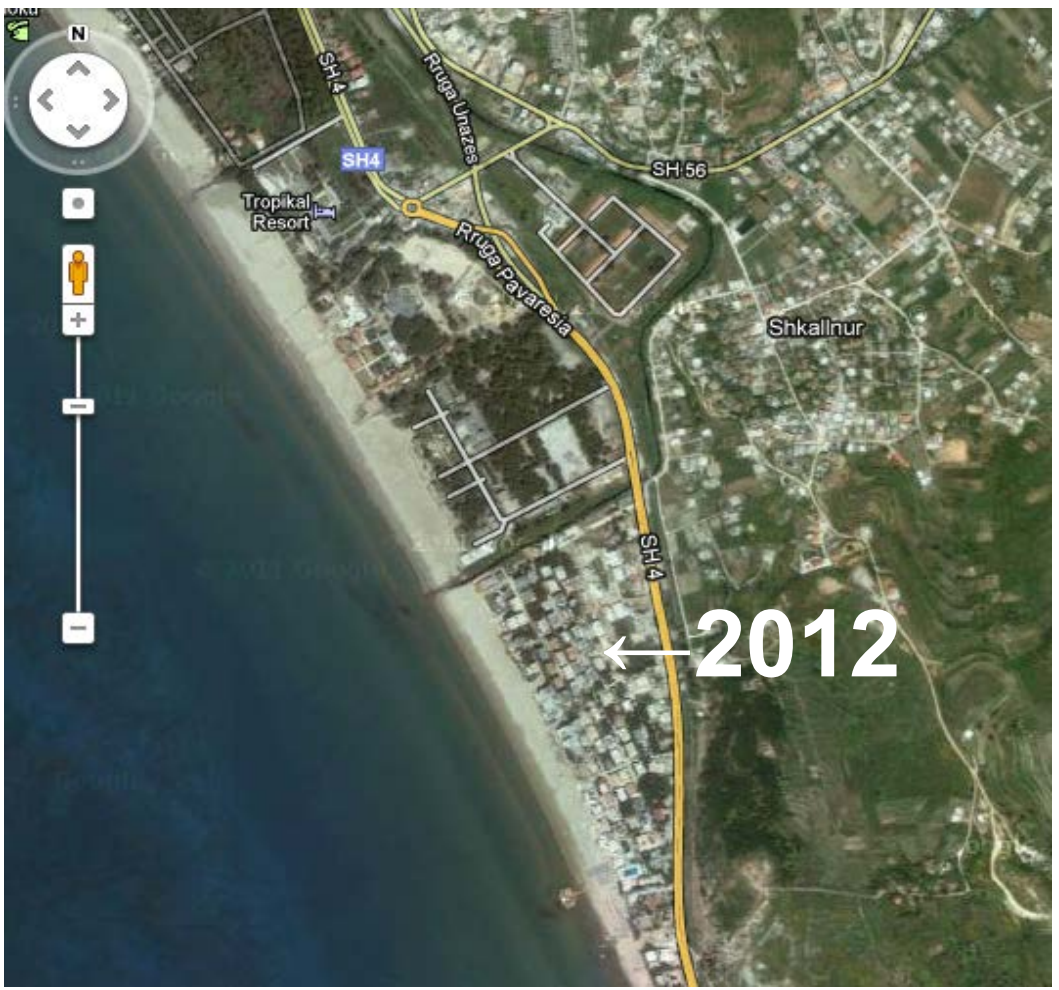
Spain is the largest exporter in the EU for fresh fruits and vegetables

Photo source: UNEP, *Atlas of our changing environment 2005*

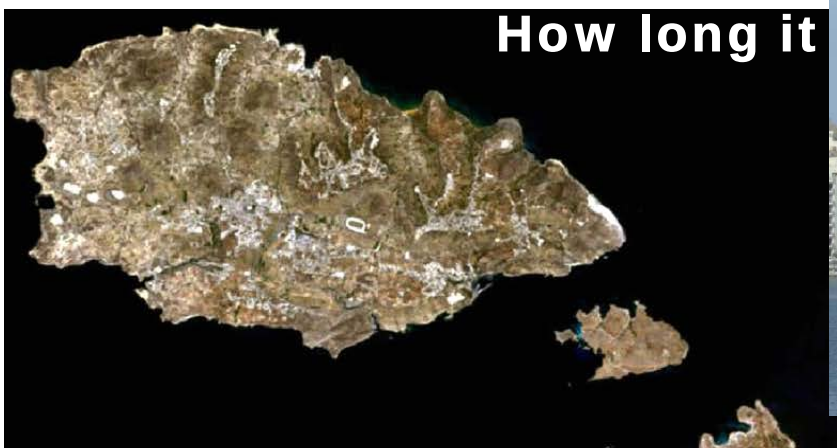
MOST CRITICAL LAND DEGRADATION PROCESSES

- Soil sealing
- Erosion (water and wind)
- Salinisation/Alkalinisation
- OM and soil fertility decline

Loosing arable land to urbanisation in Albania (Technosols)



How long it will take to “cement” Malta?



Technosols of Malta

Less than half million people welcome 1.2 million tourists annually!!!

Soil sealing in the Mediterranean: a new form appears

Some facts:

40 % of the Mediterranean cost is sealed, by 2050 will be 50 %

Every 3 seconds the EU losses to sealing an area equal to one football field size or 275 ha per day. Greater Cairo area today (20M people) is ten times bigger than in 1950. 140,000 ha of fertile lands in Algiers were sealed until 2001.

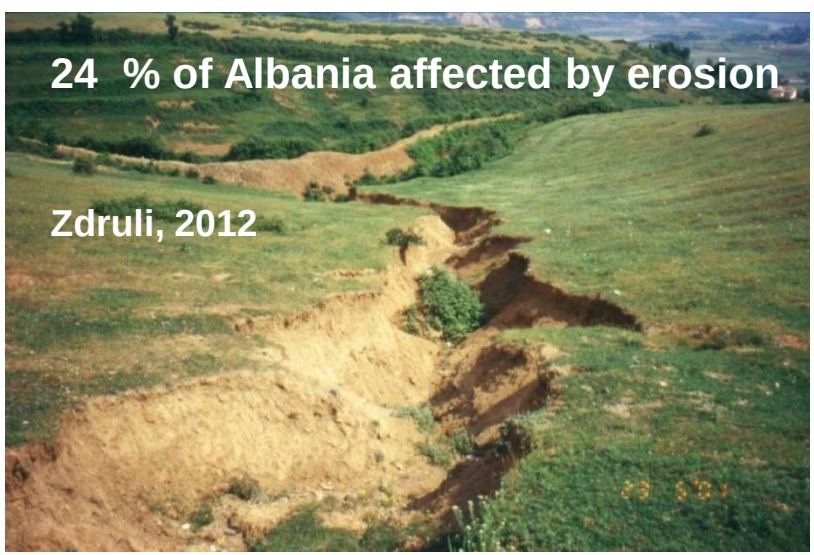
For the period 2000-2010 Italy lost to sealing more than 300,000 ha, Lebanon 30,800 ha and Turkey 827,007 ha.

Solar panels replacing millenary olives in the Apulia Region, Southern Italy!!!!!!!

Erosion: a natural and human-induced process

Natural historical geological erosion in Eastern Turkey

Reservoir sedimentation in Tunisia



Gully erosion in Spain and Albania

Natural gully erosion in Calabria, Italy locally described as “calanchi”

Consequences of the earthquake in Emilia Romagna, Italy 29 May 2012

Salinity extend in the Mediterranean

Egypt: 1 million ha

Morocco: 350,000 ha

Algeria: 1 million ha

Tunisia: >150,000 ha

Libya: > 1,5 million ha

Syria: 125,000 ha

Turkey: 2 million

Greece: 600,000

Albania: 15,000 ha

Italy: >1 million ha

Spain: 3,4 million ha

TOTAL: ~10,140,000 ha

Zdruli, 2012

The quest for water

Climate change will worsen the situation!!!

Mediterranean has 60 % of water scarce population countries in the world with less than 1,000m^3/person/year

(Plan Blue 2008)

64 % of water region wide is used by agriculture,
82 % in Southern and Eastern countries and above 50 % in the Northern countries

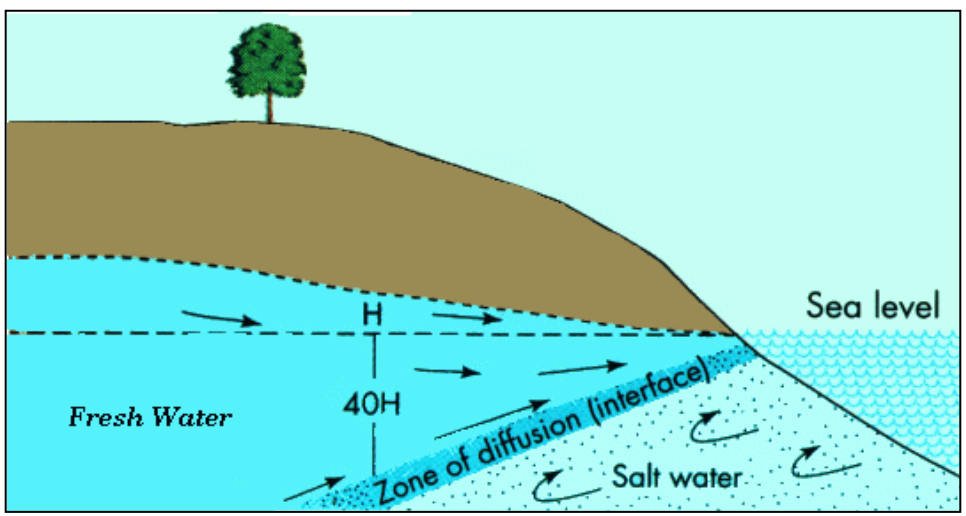
13 % of water is used by tourism industry (300 M visitors/year)

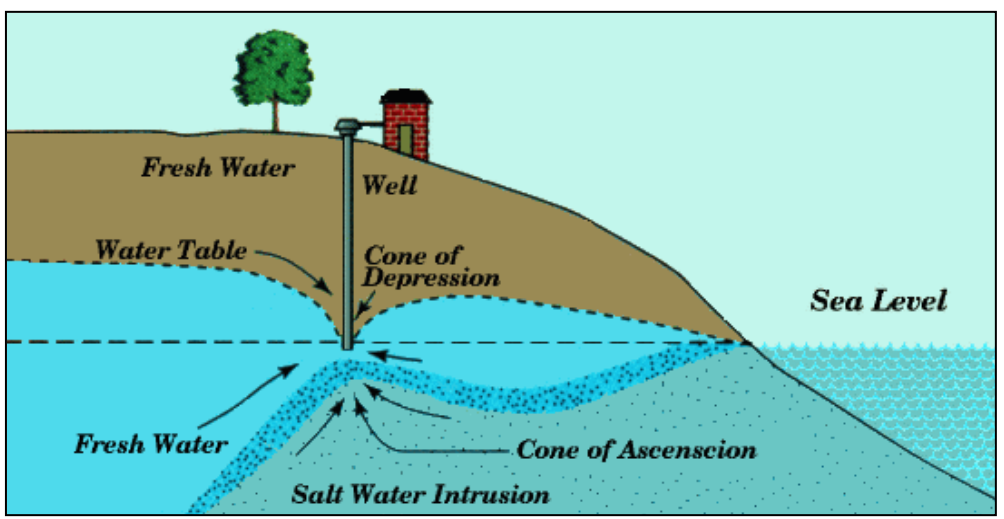
56 % of water needs in Malta derive from desalinisation (similar for Cyprus and Israel)

Food chain increase the use of virtual water

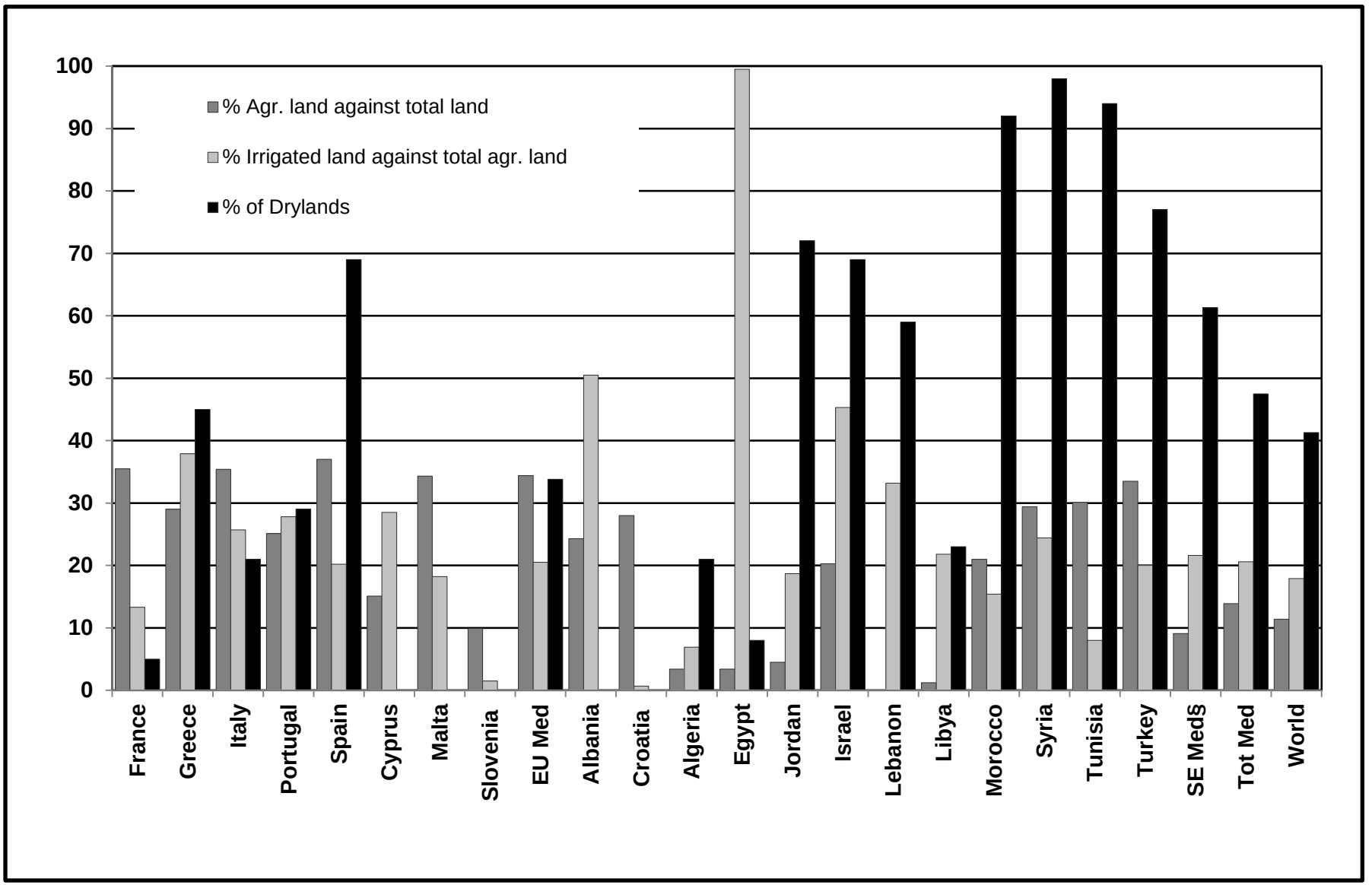
The quest for water: where is it?

Groundwater over-pumping in the coastal zone brigs to seawater intrusion and salinity built up in the soil surface as it is evident in the coasts of Italy, Spain, Greece, Albania, Egypt, Turkey and elsewhere





Distribution of arable land, irrigated areas and drylands in the Mediterranean



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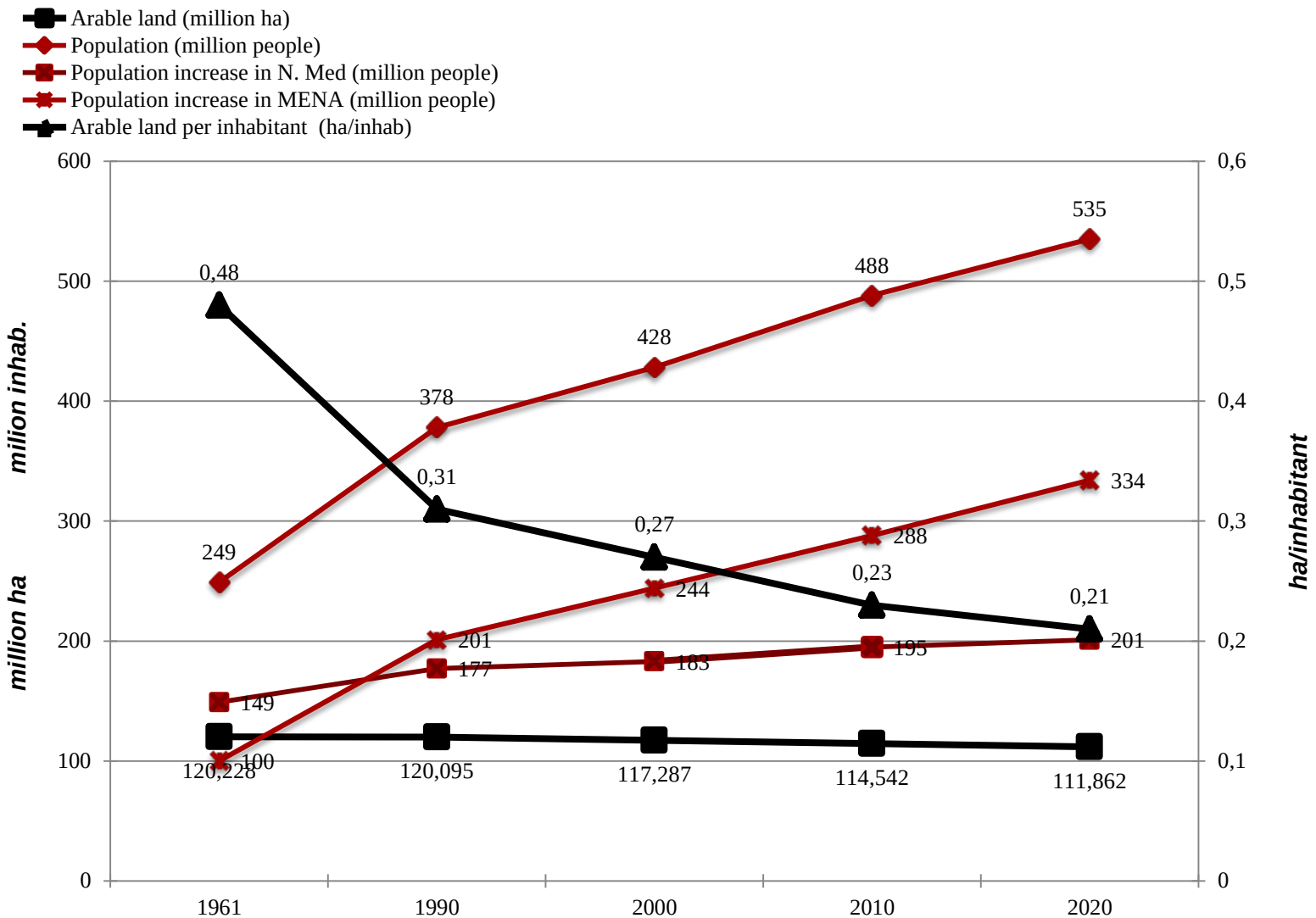
What future for the Mediterranean region?



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Is there hope?

Terraces in Syria, Morocco and Albania

The “power” of fence
Three forms of soil management in one single place. Sardinia, Italy, 2011

Endorse Sustainable Land/Soil Management

SLM can increase productivity
Improve water use efficiency
Optimize nutrient cycles
Increase SOM
Mitigate climate change
Enhance vegetation cover
Increase food security

Healthy soils produce healthy food and promote a healthy environment

Halophyte crops : Artiplex

Strip contour farming

Cover crops

Conservation agriculture and no-till

Thank you!
pandi@iamb.it

There are 10,000 funnel shaped hollows called “zocos” in Lanzarote, the Canaries Islands, of Spain, each of them containing a grapewine that grows on rich vulcanic lava derived nutrients. A horseshoe shaped wall protect the grapes from the winds while volcanic granules absorbs moisture during the night to feed the plants