Academia Română
Institutul de Geografie

Cercetări geografice interdisciplinare asupra impactului schimbărilor climatice în agricultură

Interdisciplinary geographical research on climate change impacts in agriculture

Dezbatere: Schimbările climatice și impactul lor în economie

Aula Academiei de Științe Agricole și Silvice

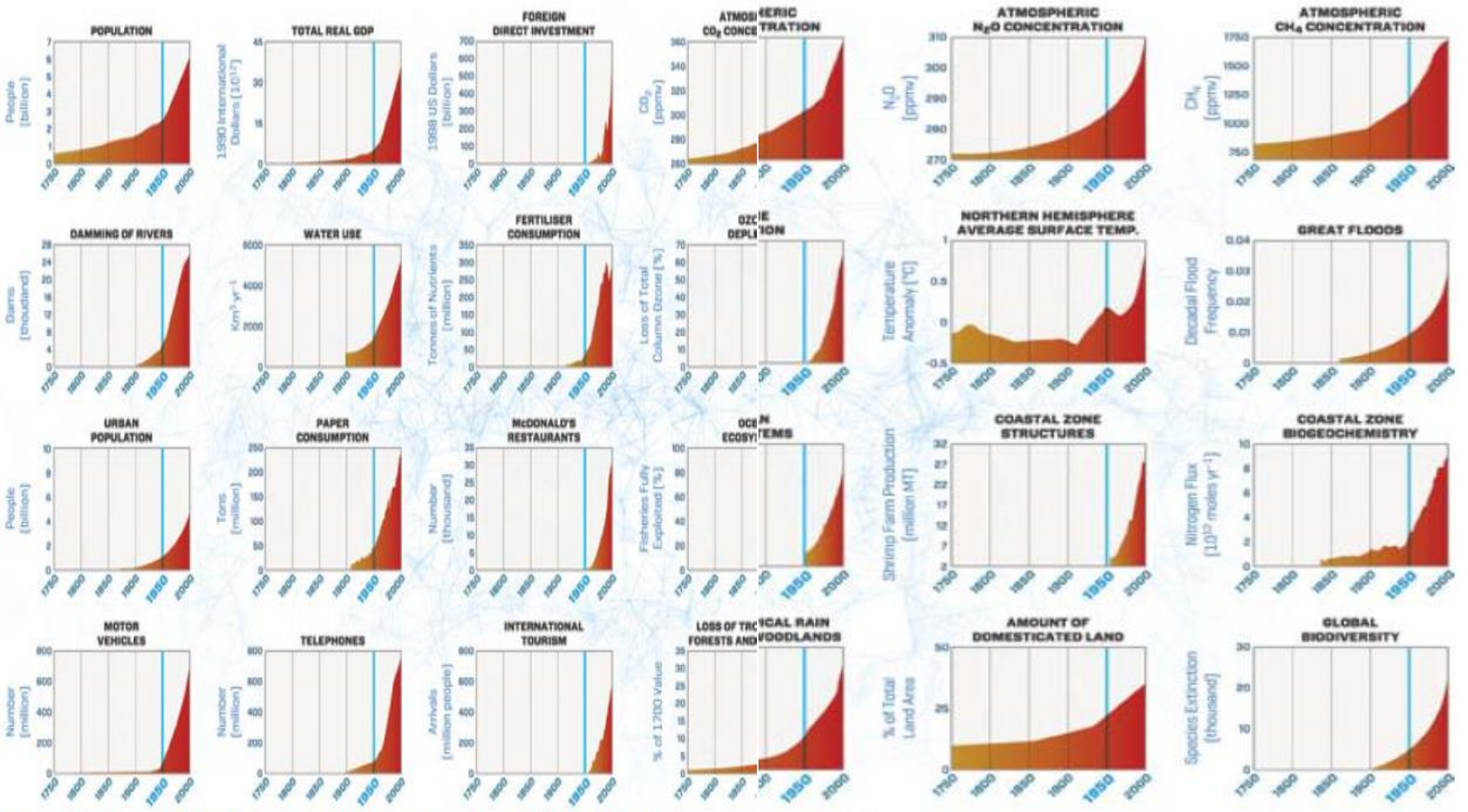
București
8 octombrie 2019

The Great Acceleration

(Second half of the last Century)

PLANET UNDER PRESSURE 2012 MARCH 26-29 LONDON

RIO+20 POLICY BRIEF



The Great Acceleration. The graphs above illustrate how the post-World War 2 socio-economic boom, mainly in Europe and North America but now gathering pace elsewhere, has affected components of the Earth system.

Source: Steffen et al. (2004).

Anthropocene

- marked anthropogenic perturbations of the cycles of elements such as carbon,nitrogen,metane etc

- environmental changes generated by these perturbations, including global warming, sea-level rise, ocean acidification and spreading oceanic ”dead zone”

- rapid changes in the biosphere both on land and in the sea

- proliferation and global dispersion of many new ”minerals” and ”rocks” including concrete, fly ash and plastics, and the myriad ”technofossils”.

- Source :IGSU Working Group on Anthropocene,2019

Future Earth: building from the GEC programmes

Global Environmental Change Programmes and Projects

Source: Future Earth – Research for Global Sustainability, 2019

"DISASTER RISK EVALUATION AT NATIONAL LEVEL (RO-RISK)"

Project co-funded: European Social Fund through the Operational Programme Administrative Capacity (POCA)

Coordinating centre: IGSU (General Inspectorate for Emergency Situations, Romania) (Min. of Internal Affairs)

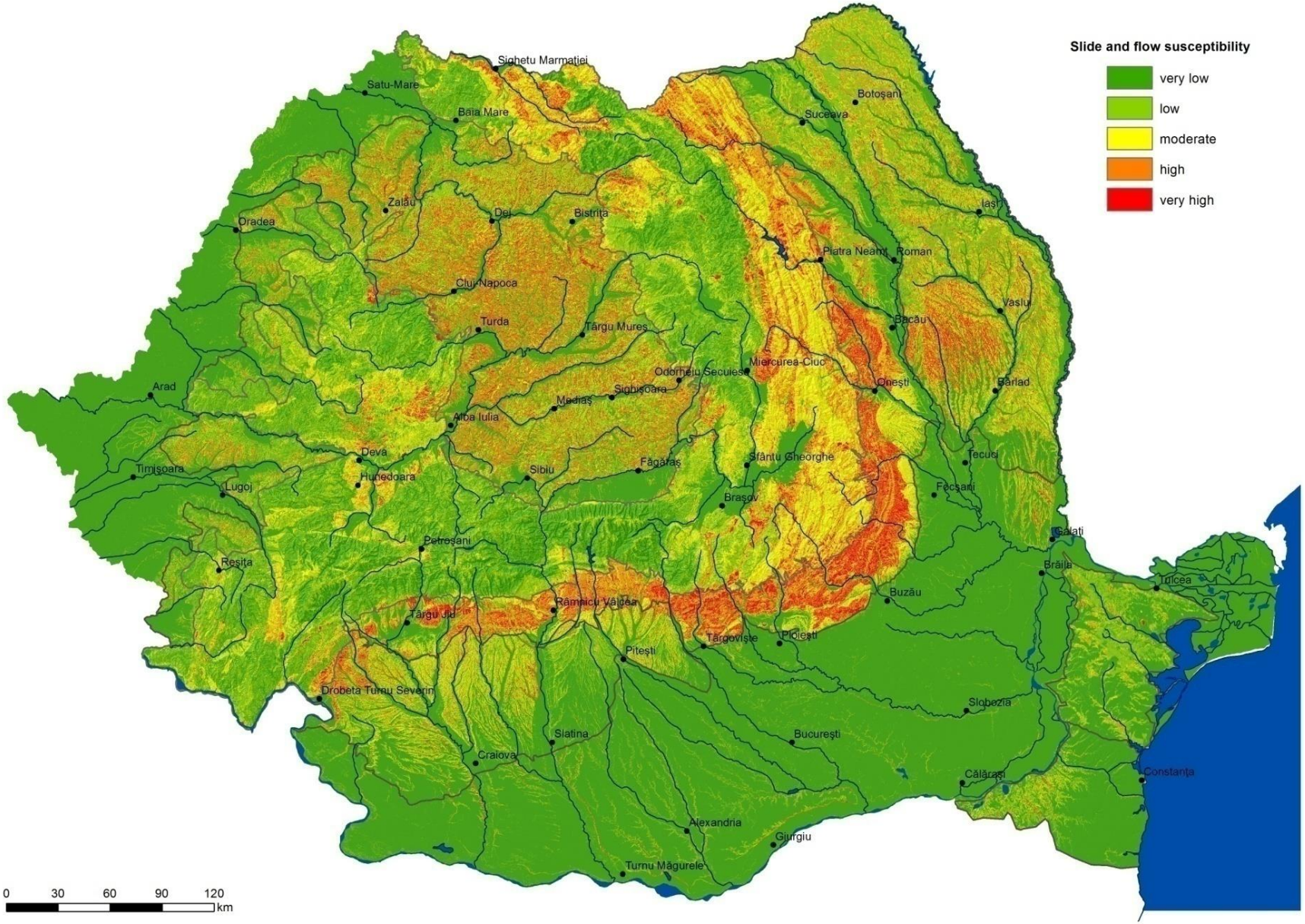
Objective: Fulfillment of the ex-ante conditionality (Risks Prevention and Management)

Evaluation of the main risks affecting Romania: **FLOODS, DROUGHTS, FOREST FIRES, EARTHQUAKES, LANDSLIDES, SEVESO SITES ON MAJOR ACCIDENTS CAUSED BY DANGEROUS SUBSTANCES, NUCLEAR RISK, TRANSPORT OF HAZARDOUS MATERIALS, BIOLOGICAL HAZARDS AND RISKS**

Basis: a methodology for a unitary evaluation of all risks (scenario development, different impacts – physical, economic, social and psychological, risk matrix)

RO-RISK PROJECT - LANDSLIDE SUSCEPTIBILITY MAP

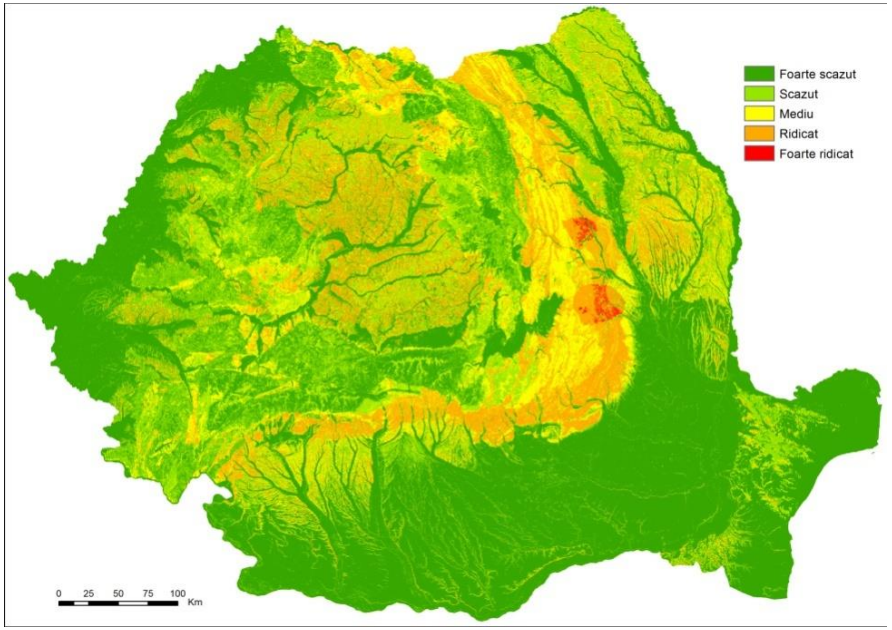
2016 version (RO-RISK PROJECT)



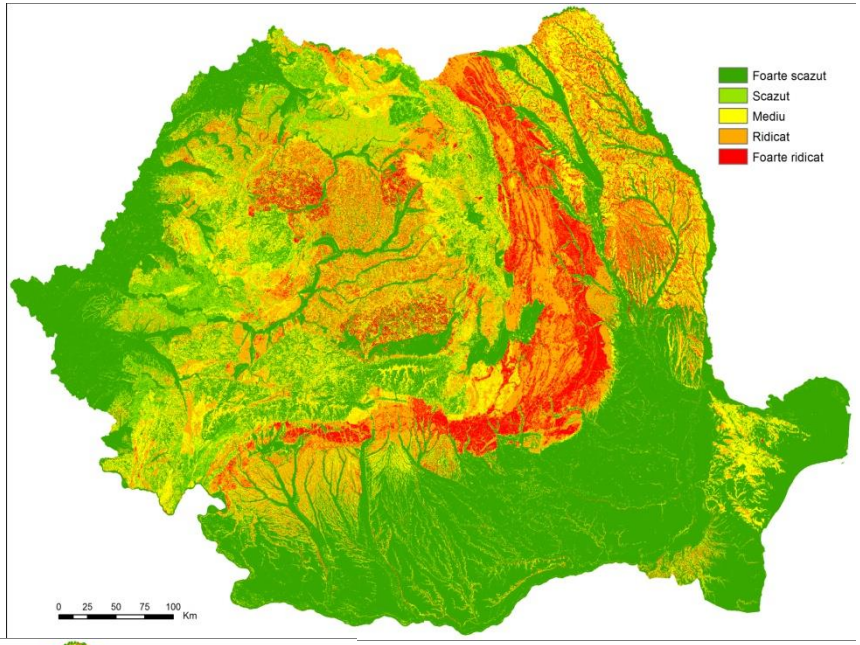
(Bălteanu et al., in prep.)

MAXIMUM SEASONAL PRECIPITATION-INDUCED HAZARD MAPS

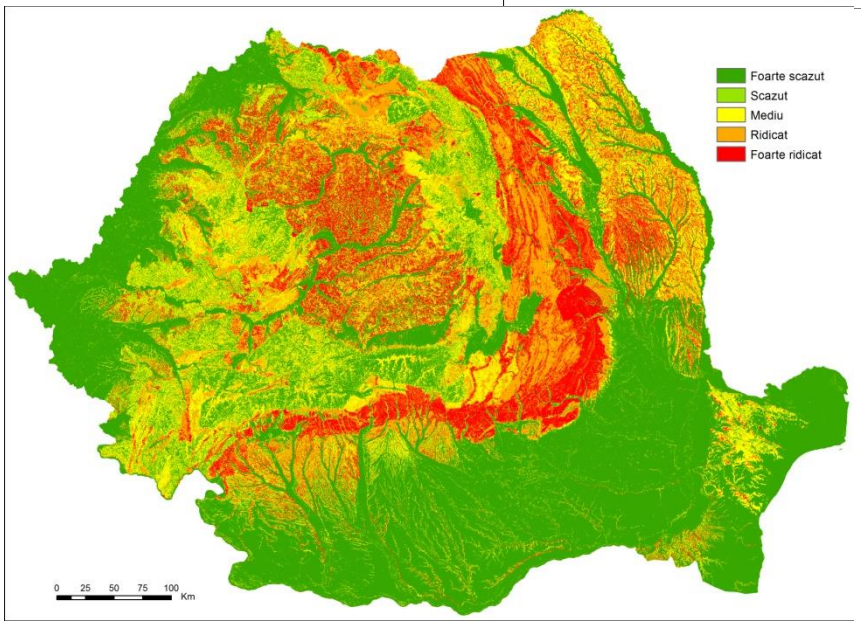
10-year return period



100-year return period

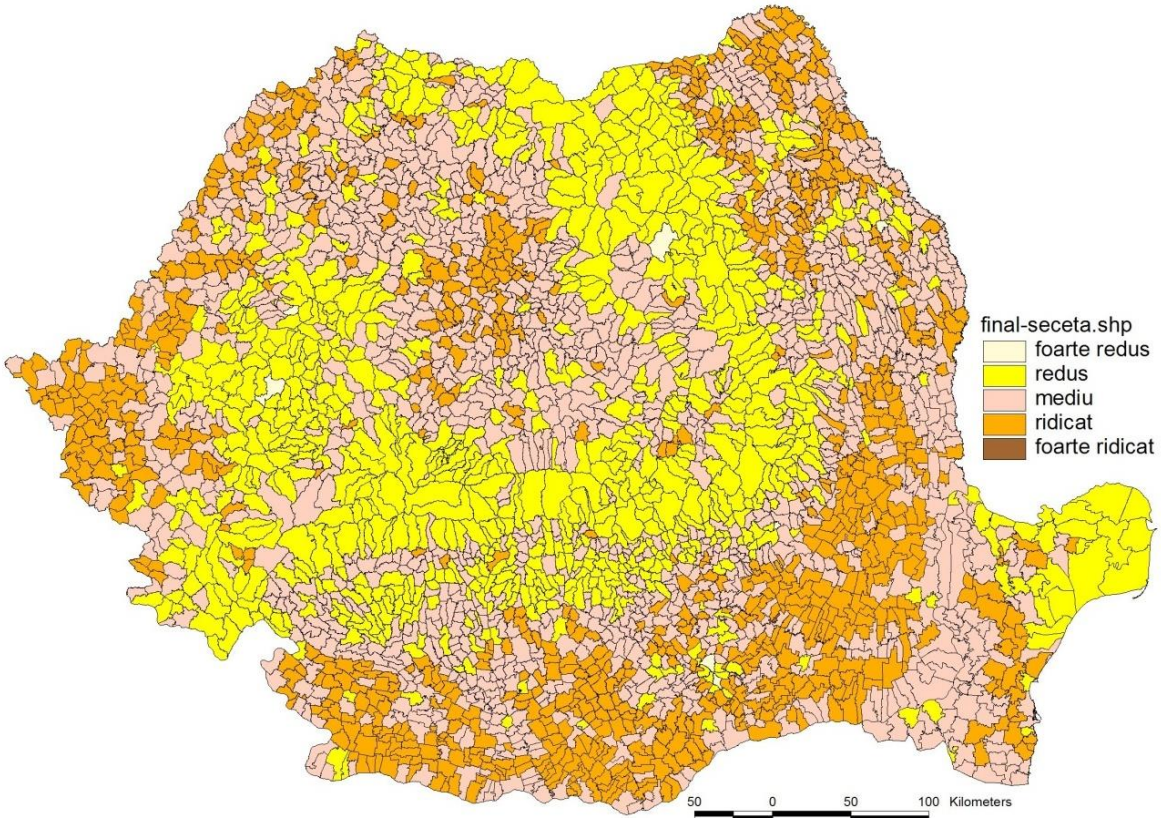


1000-year return period



Jurchescu et al., in prep.

COMPLEX INDEX OF POPULATION VULNERABILITY TO DROUGHT (IPV)



Very low vulnerability - 5 LAU → 13,297 inh.; 1 small town (Nucet, Bihor county) → 16% of total population; LAU have a low sensibility, high value of coping capacity and high adaptive capacity

Low vulnerability - 782 LAU → 7,450,581 loc.; 641 rural LAU (27% of total population); 141 urban LAU, 6 big towns and Bucharest Municipality; 101 are small towns; LAU have a low and medium sensibility, high value of coping capacity and medium and high adaptive capacity

- Carpathian Mountains, Subcarpathians, Danube Delta

Medium vulnerability - 1499 LAU → 1352 rural LAU; 147 urban LAU (13 big cities, 96 small towns and 38 medium); LAU have a very low, low and medium sensibility, medium and high value of coping capacity (67 LAU2 have no coping capacity) and very high and high adaptive capacity

- Romanian Plain, Moldavian Plateau, Transylvanian Plain, Crisana and Banat Plain

High vulnerability - 894 LAU (862 communes and 32 towns); → 3,437,251 inh. LAU have a very low and low sensibility, medium and high value of coping capacity (41 LAU have no coping capacity) and medium adaptive capacity

- Romanian Plain, Moldavian Plateau, Transylvanian Plain, Crisana and Banat Plain

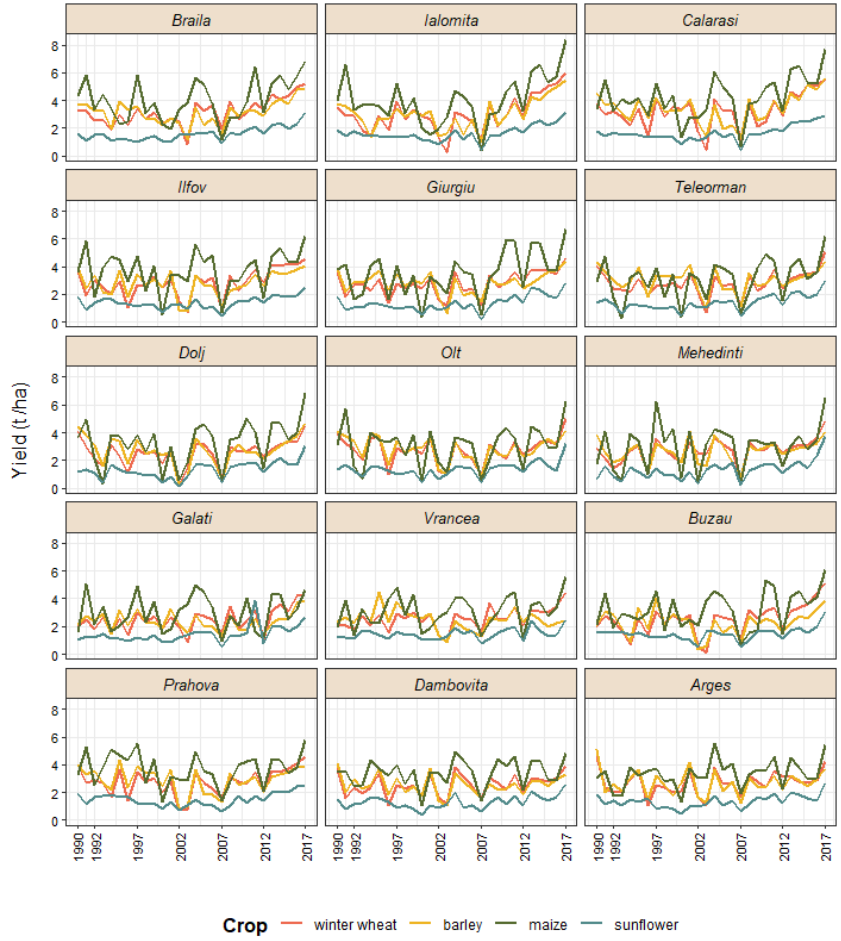
Very high vulnerability -1 LAU, in Bărăgan Plain, Ialomiţa county, Barbulesti; very high sensibility, lack of coping capacity and very low adaptive capacity

Contextual issues of agricultural productivity

ViWA Virtual Water Values

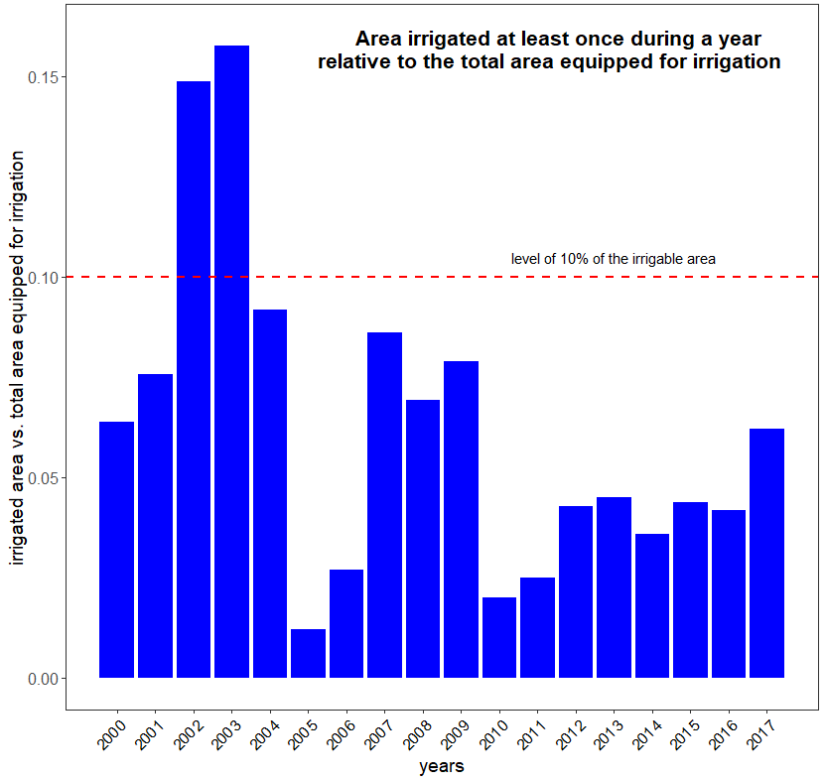
NATURAL

- Climate variability and change
- Extreme events (e.g. droughts, floods, pests)
- Soil types and characteristics
- Types of cultivars



SOCIOECONOMIC

- Land use changes and land management
- Farming practices, technology, innovation
- Crop-yield markets and land market
- Demographic and socioeconomic context



Source of data: National Institute of Statistics, http://statistici.insse.ro:8077/tempo-online/#/pages/tables/insse-table

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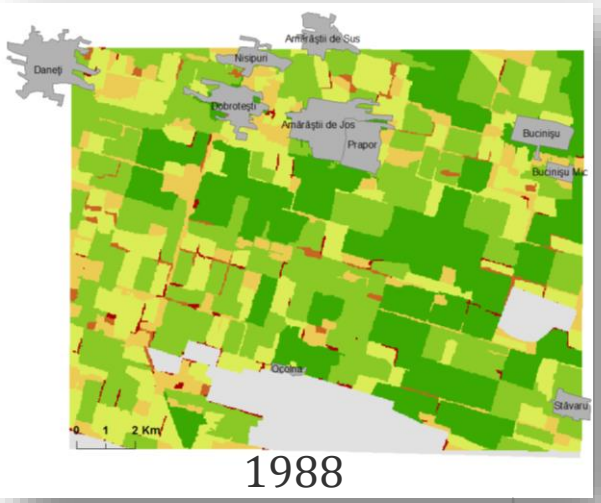
ViWA Virtual Water Values

Multiscale Monitoring of Global Water Resources and Options for their Efficient and Sustainable Use 2017 - 2020

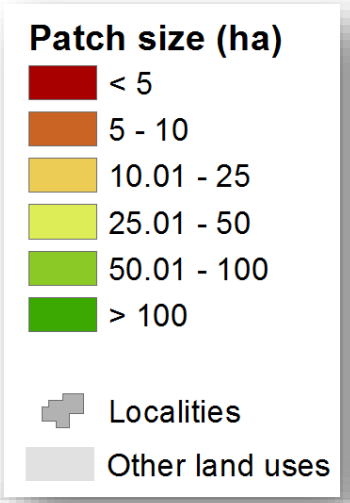
https://viwa.geographie-muenchen.de/

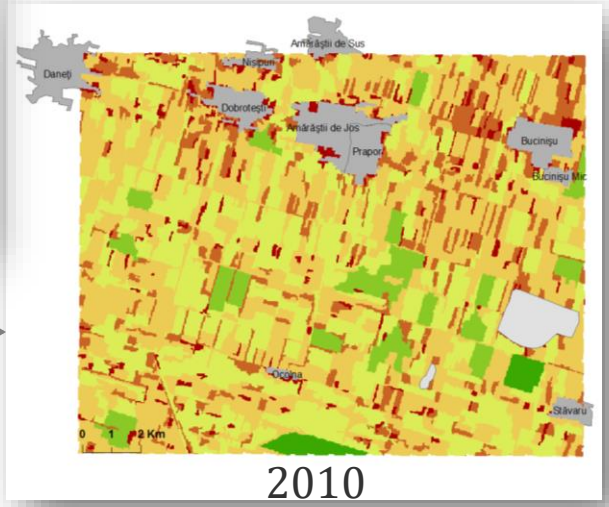
Spatiotemporal dynamics of agricultural land fragmentation over the last 3 decades



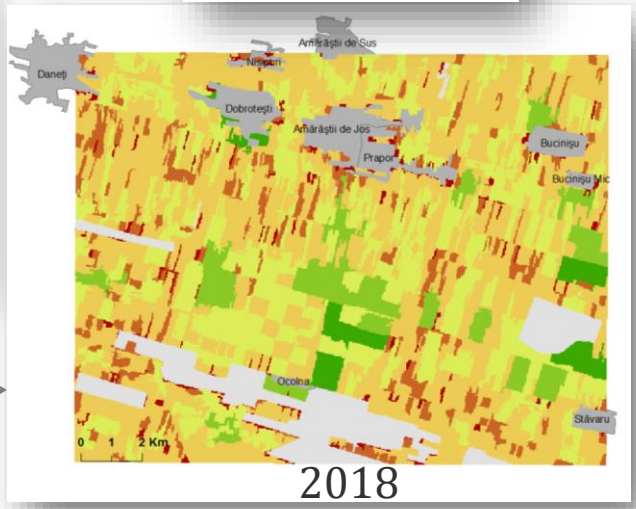
1988

Patch size area





2010

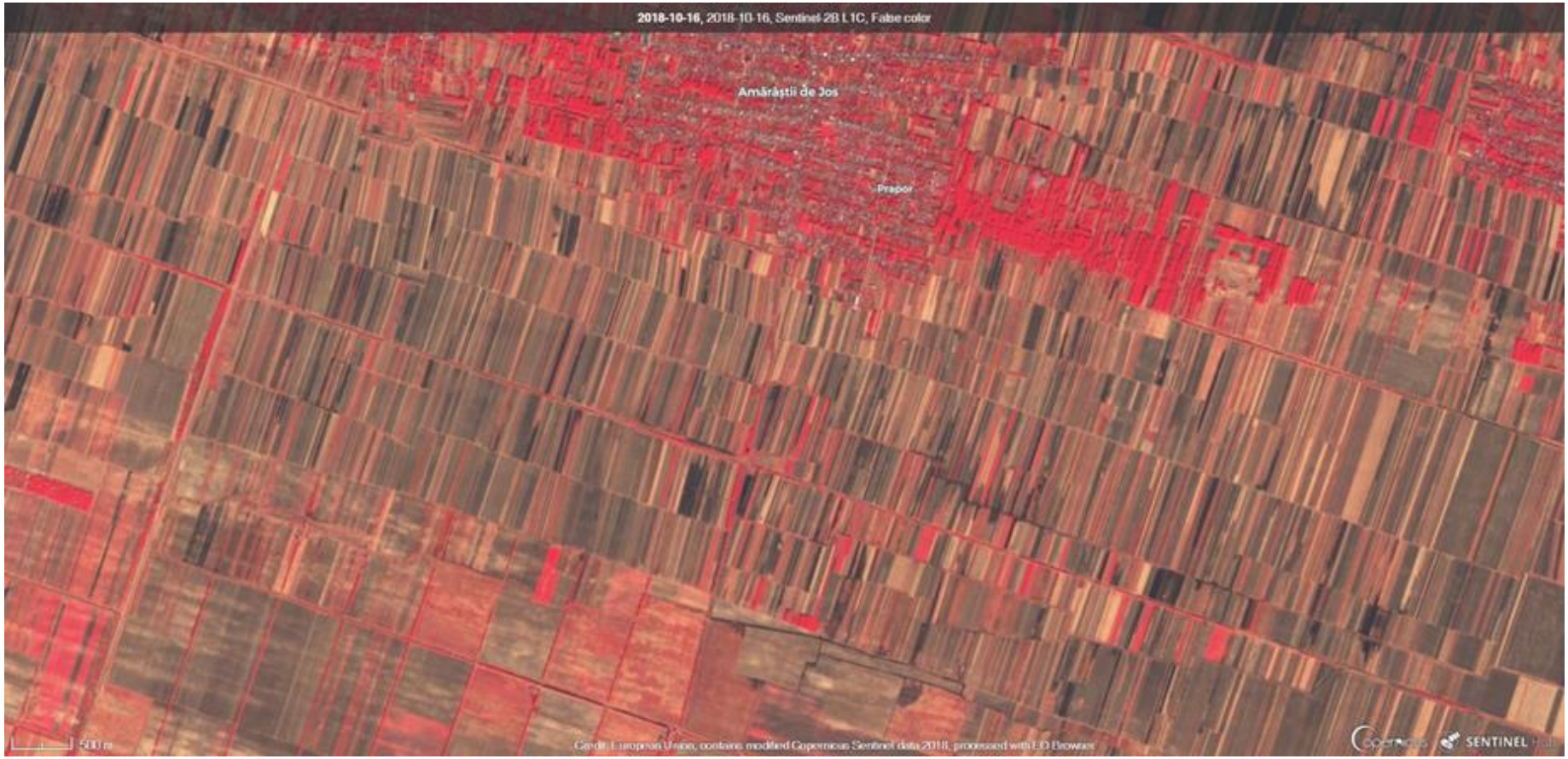


2018

Sample area 1 (Oltenia Plain)

Source: Dogaru, D., Balteanu, D., Sima, M., Angearu, C., Lupu, L.; presentation held at IGU LULC Thematic Conference, Koper, SI, 23-28.09.2019

Agricultural land fragmentation – local challenges



Excessive agricultural land fragmentation in the Oltenia Plain (Amarastii de Jos – Dabuleni). Farms under 10 ha have the land spread discontinuously in ~ 8 to 10 parcels.

Source: COPERNICUS Sentinel Hub Sentinel 2B L 2A, false color (843), October 2018

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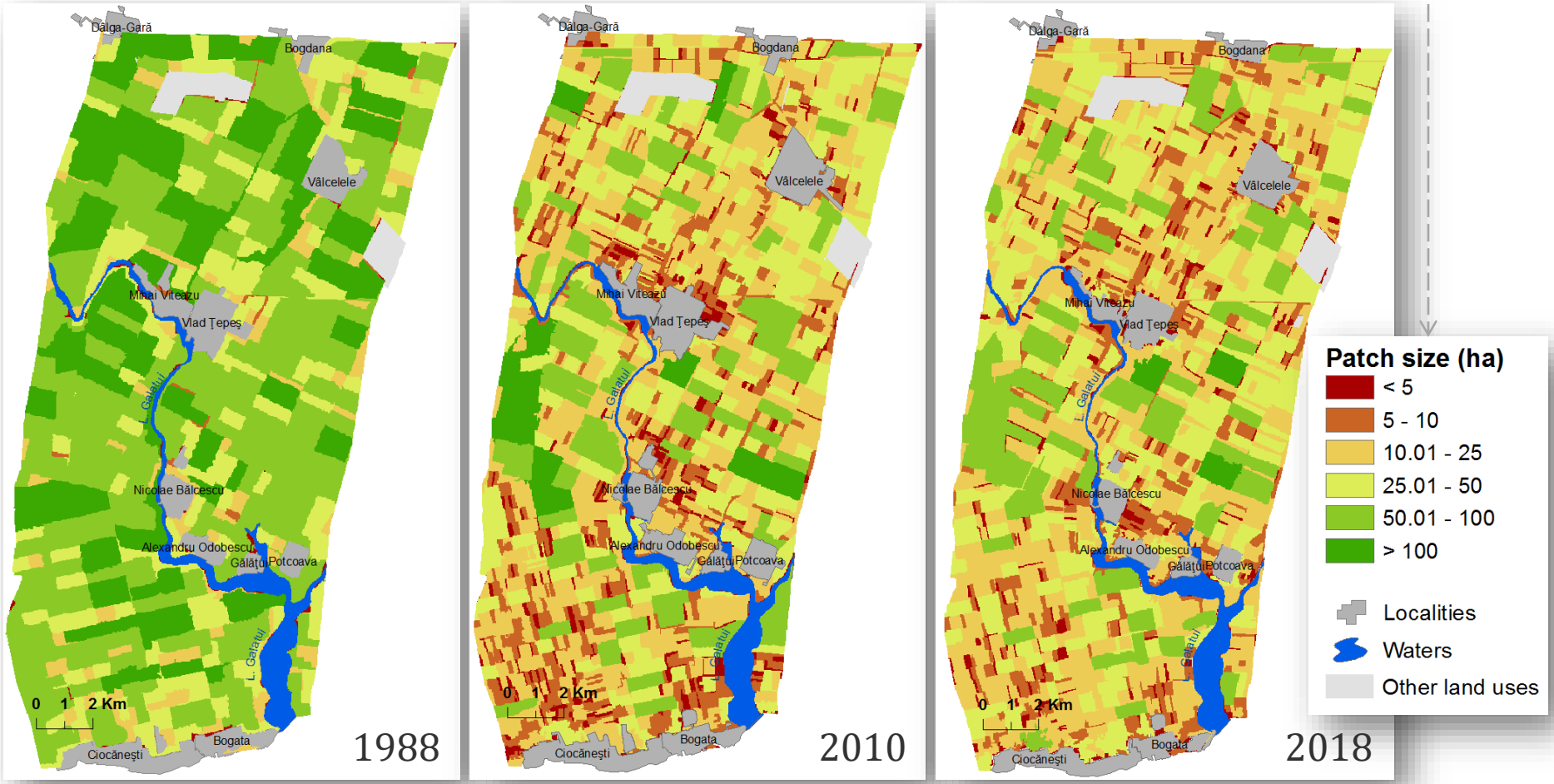
ViWA Virtual Water Values

Multiscale Monitoring of Global Water Resources and Options for their Efficient and Sustainable Use 2017 - 2020

https://viwa.geographie-muenchen.de/

Sample area 2 (Baragan Plain)



Drivers of land fragmentation and degradation

- ***Successive land restitution laws***, leading to the division of former large state farms;
- ***Land property rights*** were passed to multiple heirs from elderly owners, thus increasing fragmentation;
- In many cases, land had to be restituted on different locations than the initial one due to ***land use structural changes***;
- ***Confusion about property rights and conflicts*** prolonged the clarification of the size and location of the plots;

- ***Degradation of the irrigation system and the new context related to climate change*** were among the biggest causes of land use structure change and low agricultural productivity;

- ***Increased discontinuity in land inheritance*** due to lack of interest from heirs, while the role of national and EU subsidies give, especially in the case of small-farm owners, a sense of financial stability, both aspects inducing various land use dynamics;

- Increasing drought events requires a series of new land management activities based on ***new transdisciplinary research projects***.