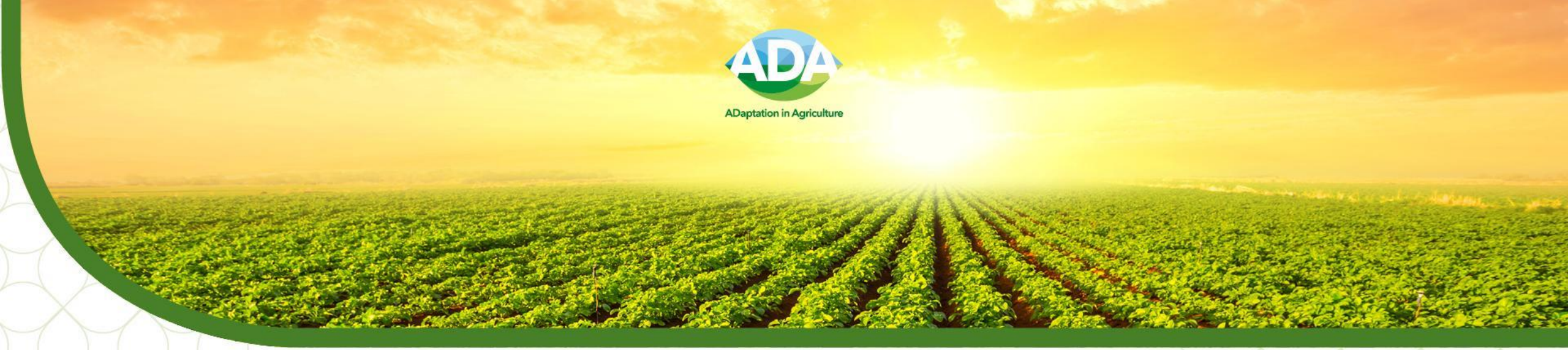


Impatti dei cambiamenti climatici in agricoltura

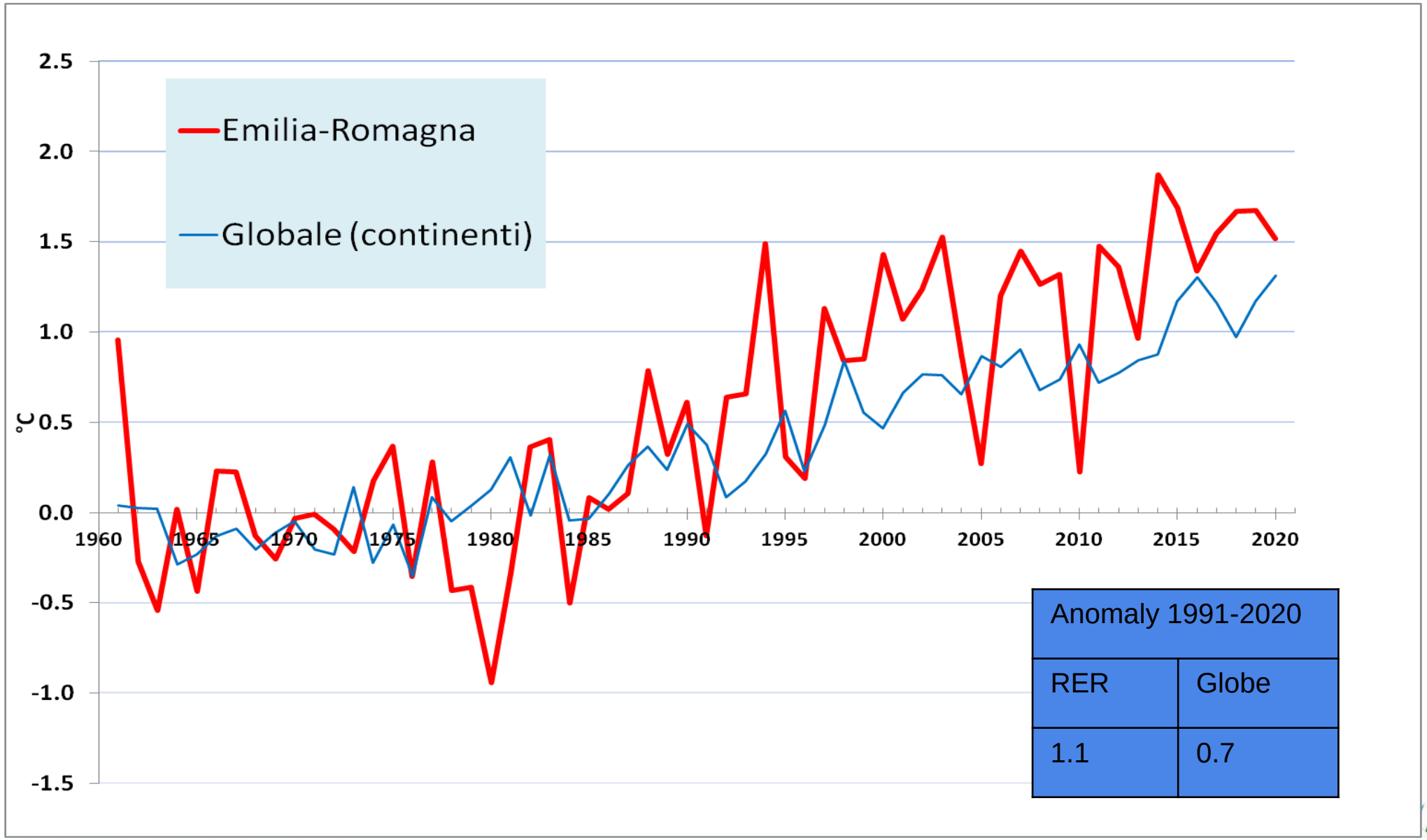
Giulia Villani - ARPAE SIMC

25 gennaio 2023

I Partner. Insieme per aumentare la resilienza del settore agricolo | www.lifeada.eu |

Con il contributo di LIFE, uno strumento finanziario dell'Unione Europea LIFE: LIFE19CCA/IT/001257

Temperature globali e locali



Anomaly 1991-2020	
RER	Globe
1.1	0.7

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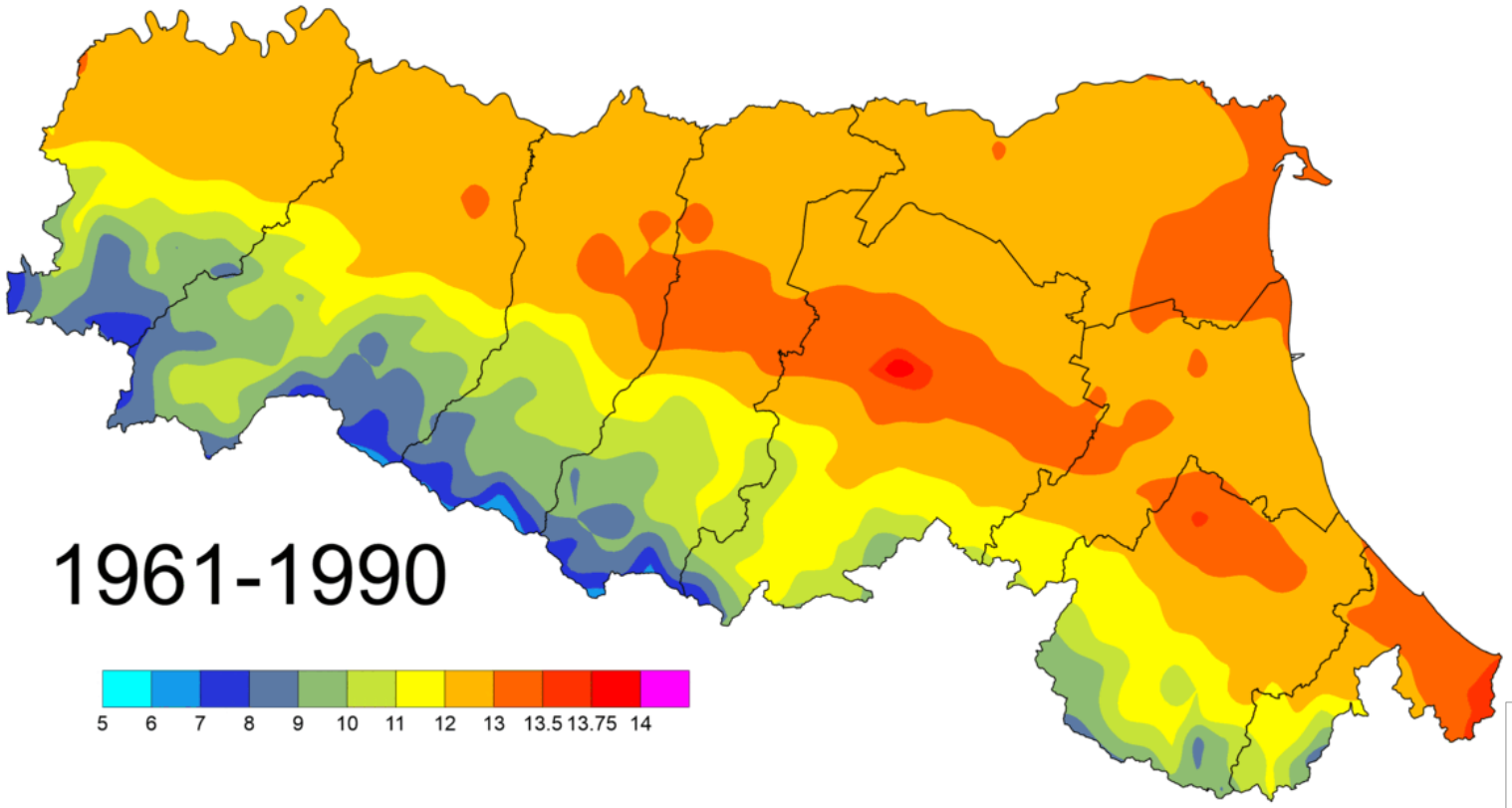
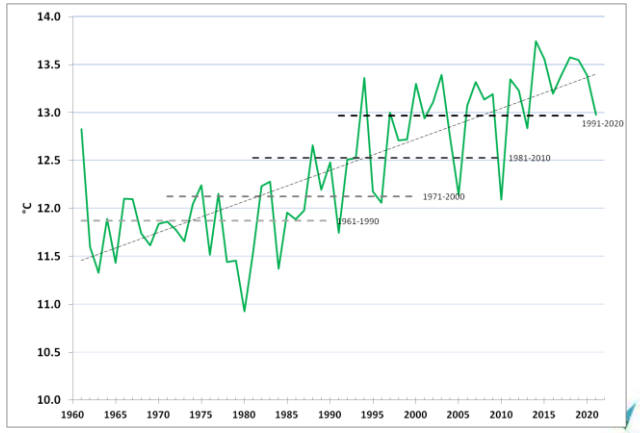
Temperature medie annue





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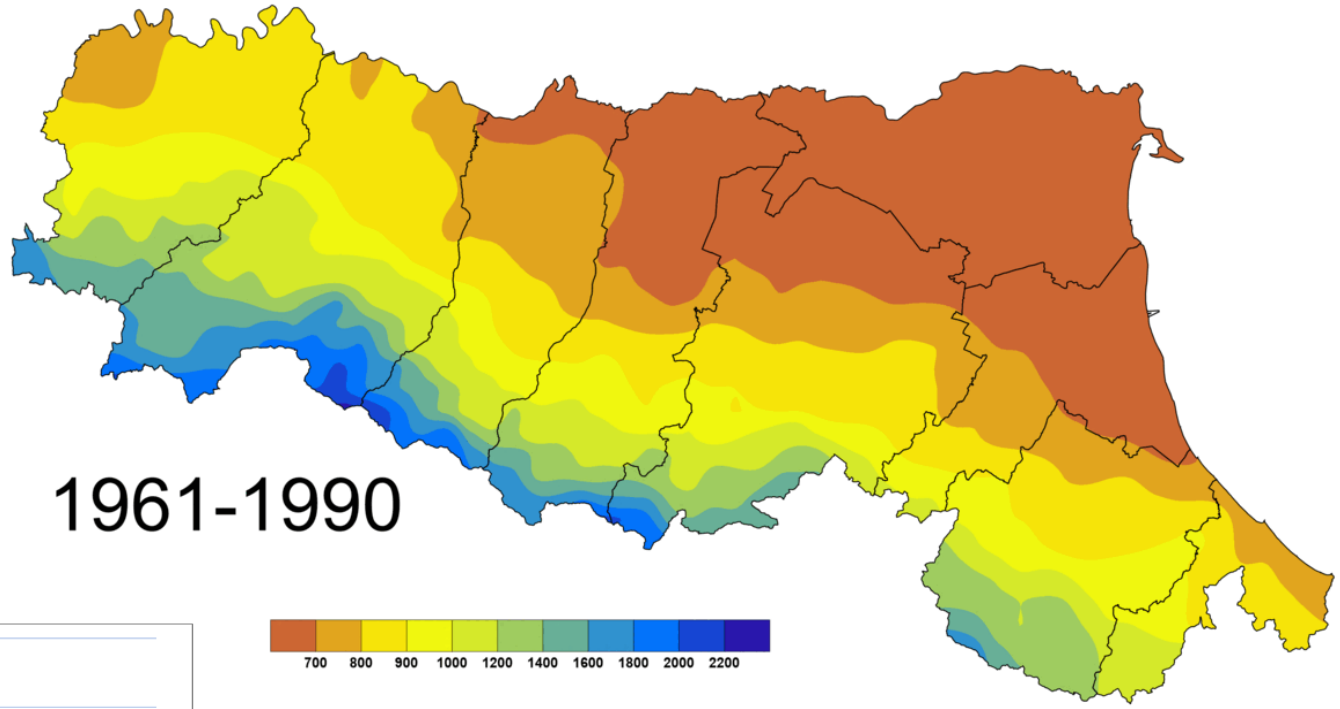
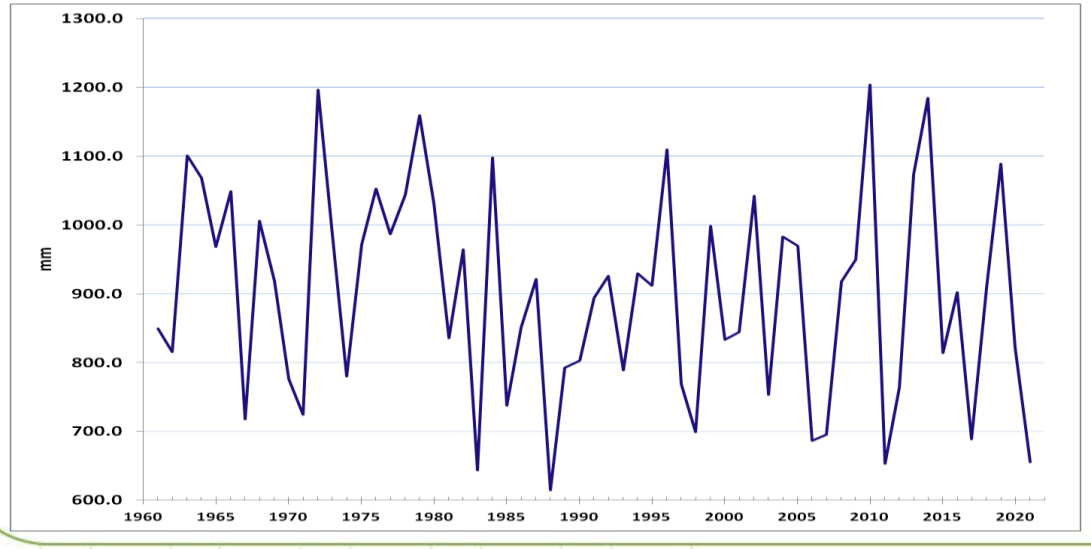
Precipitazioni





Precipitazioni annue (mm)

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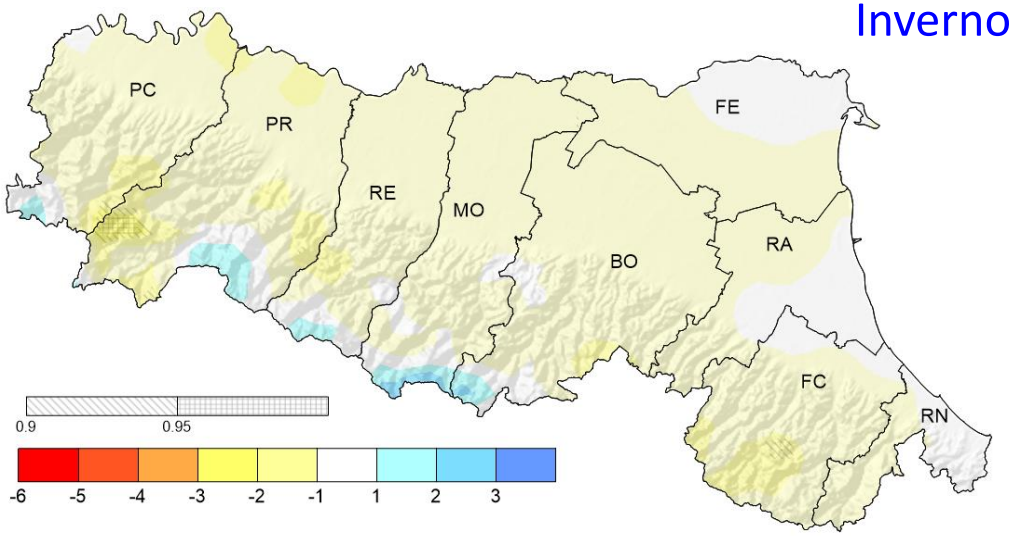
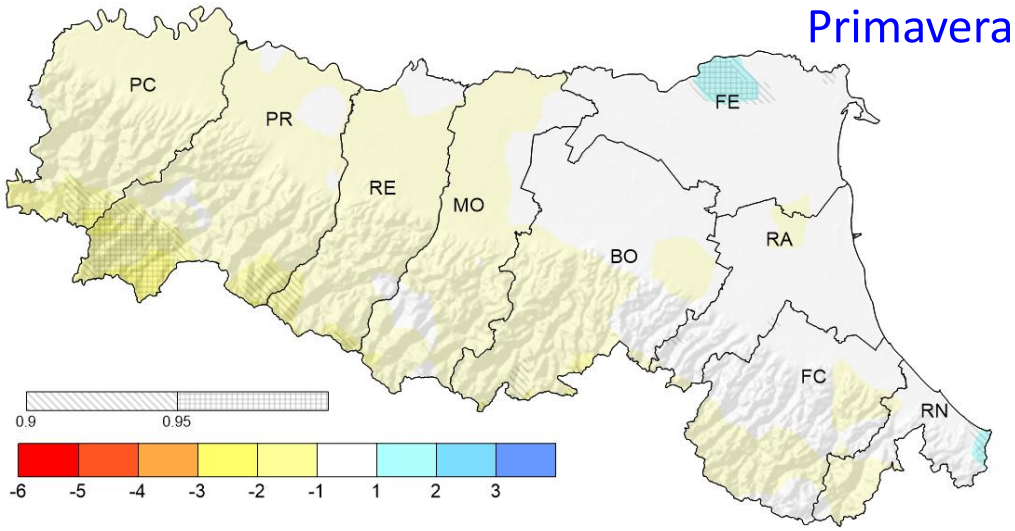
Trend nelle precipitazioni stagionali

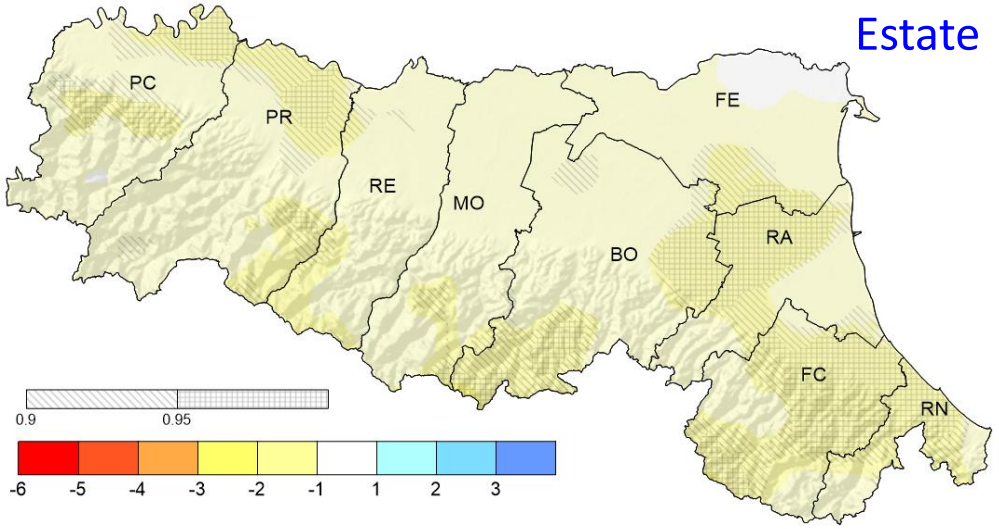
Inverno



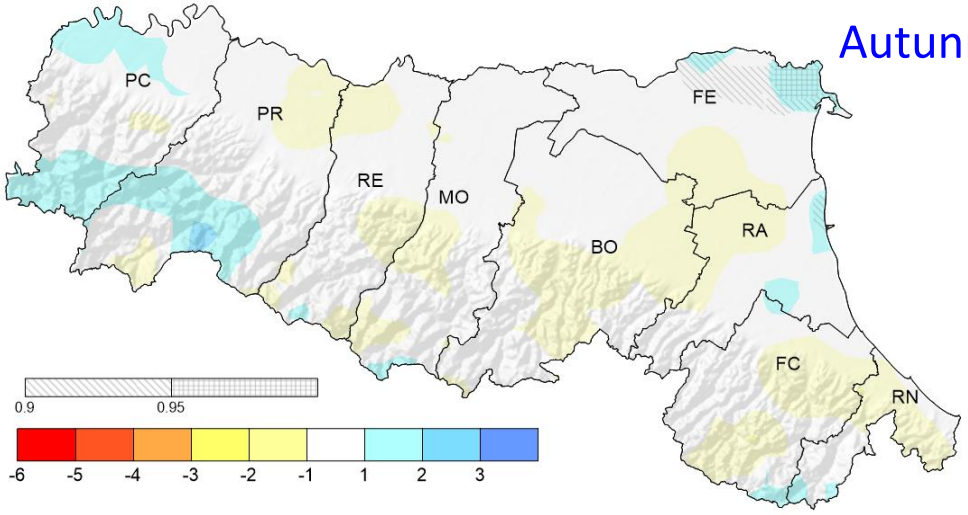
Primavera



Estate



Autunno



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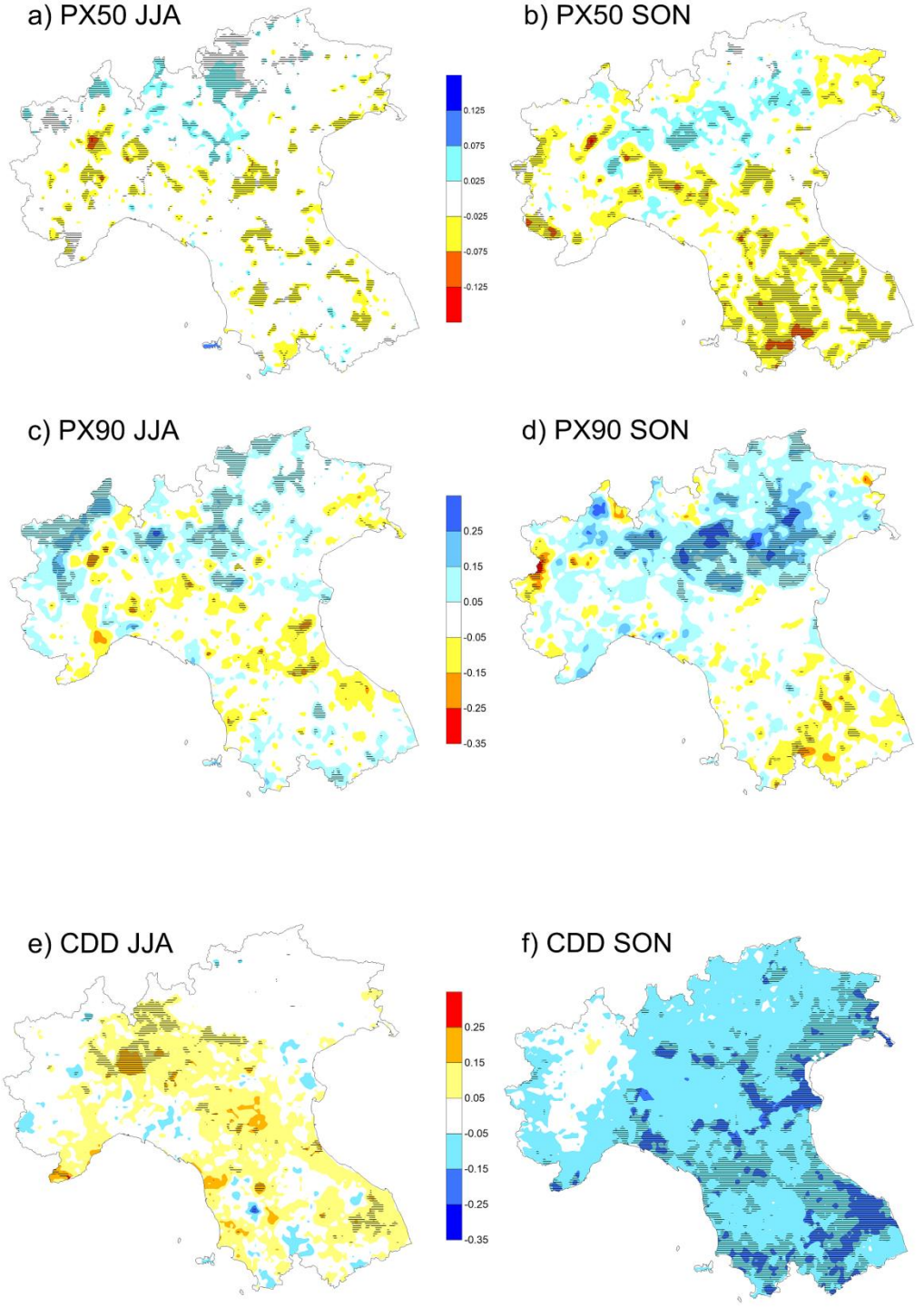
Precipitazioni centro Nord

Tendenze diverse a seconda della stagione e dell'area considerata:

- Aumento siccità estiva
- Piogge più frequenti e localmente più intense in autunno.



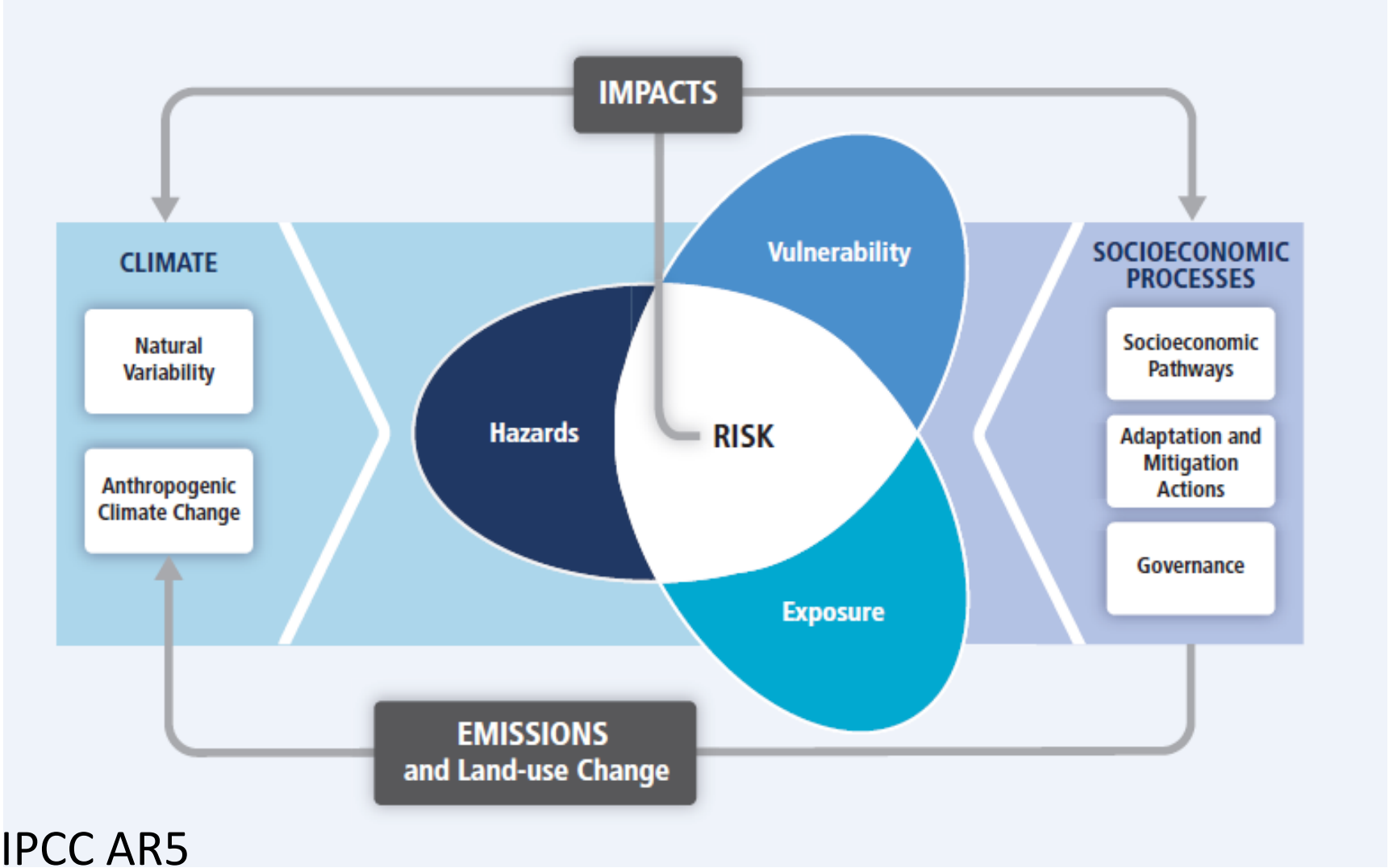
Definizioni

Cambiamento climatico: è un cambiamento dello stato del clima che può essere identificato (es. attraverso metodi statistici) e che persiste per un periodo lungo (almeno alcuni decenni). Può essere causato da forzanti esterne naturali (es. cicli solari, attività vulcaniche) o dalle attività umane (es. modifica della composizione dell'atmosfera o dell'uso del suolo).

Rischio climatico: potenzialità (di un soggetto, entità, gruppo, ecosistema, servizio…) di essere impattato negativamente da un evento o tendenza climatica. Deriva dalla interazione di vulnerabilità, esposizione e pericolo.

Impatto: effetto del cambiamento climatico sui sistemi naturali e antropici.

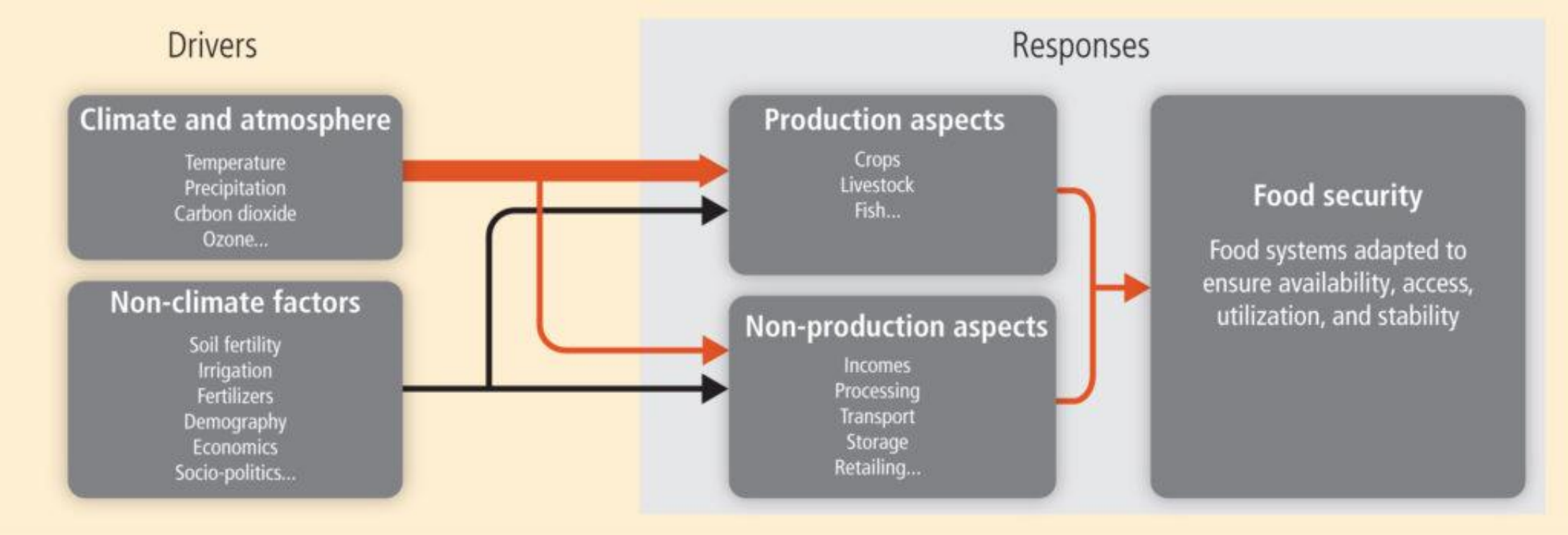
Il rischio climatico



IPCC AR5

IPCC, 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change

Cambiamenti climatici e sistema alimentare



IPCC AR5

IPCC, 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change

Impatti dei cambiamenti climatici sull'agricoltura in Europa

Coastal zones
Sea level rise
Intrusion of saltwater

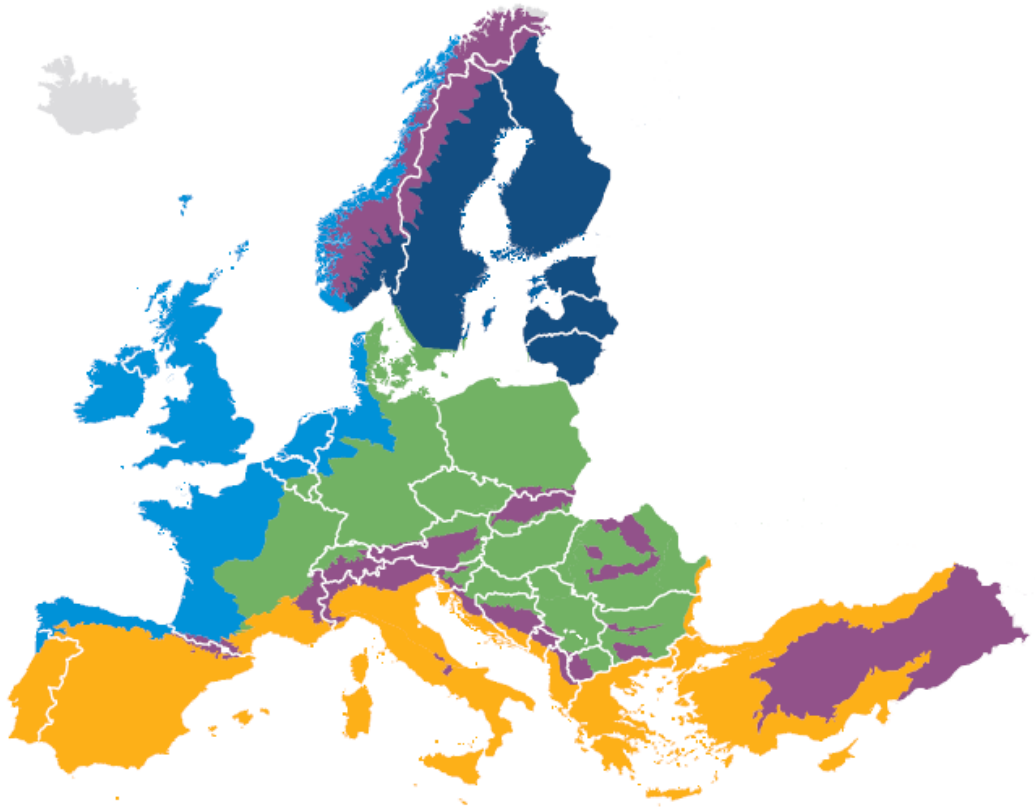
Mediterranean region
Large increase in heat extremes
Decrease in precipitation
Increasing risk of droughts
Increasing risk of biodiversity loss
Increasing water demand for agriculture
Decrease in crop yields
Increasing risks for livestock production
Agriculture negatively affected by spillover effects of climate change from outside Europe

Boreal region
Increase in heavy precipitation events
Increase in precipitation
Increasing damage risk from winter storms
Increase in crop yields

Atlantic region
Increase in heavy precipitation events
Increasing risk of river and coastal flooding
Increasing damage risk from winter storms

Continental region
Increase in heat extremes
Decrease in summer precipitation
Increasing risk of river floods

Mountain regions
Temperature rise larger than European average
Upward shift of plant and animal species
Risk of hail
Risk of frost
Increasing risk from rock falls and landslides



Climate change adaptation in the agricultural sector in Europe (EEA, 2019)

ADaptation in Agriculture

Impatti dei cambiamenti climatici sull'agricoltura in Europa

	What is already happening	What could happen
Climate impacts on socio-economic systems and human health		
Agriculture		
Growing season for agricultural crops (C)	The thermal growing season of a number of agricultural crops in Europe has lengthened by 11.4 days on average from 1992 to 2008. The delay in the end of the growing season was more pronounced than the advance of its start.	The growing season is projected to increase further throughout most of Europe which would allow a northward expansion of warm-season crops to areas that are currently not suitable.
Agrophenology (C)	Flowering of several perennial crops has advanced by about two days per decade in recent decades. These changes are affecting crop production and the relative performance of different crop species and varieties.	The shortening of crop growth phases in many crops is expected to continue. The shortening of the grain filling phase of cereals and oilseed crops can be particularly detrimental to yield.
Water-limited crop productivity (N)	Yields of several crops (e.g. wheat) are stagnating and yields of other crops (e.g. maize in northern Europe) are increasing, partly due to climate change. Extreme climatic events, including droughts and heat waves, have negatively affected crop productivity during the first decade of the 21st century.	Future climate change can lead to yield decreases or increases, depending on crop type and with considerable regional differences across Europe. Yield variability is expected to further increase under projected future climate change (including increased intensity and frequency of extreme events).
Irrigation water requirement (C)	In Italy and the Iberian Peninsula, an increase in the volume of water required for irrigation from 1975 to 2010 has been estimated, whereas parts of south-eastern Europe have recorded a decrease.	In southern Europe suitability for rain-fed agriculture is projected to decrease and irrigation requirements are projected to increase under future climate change.

Climate change, impacts and vulnerability in Europe (EEA, 2012)

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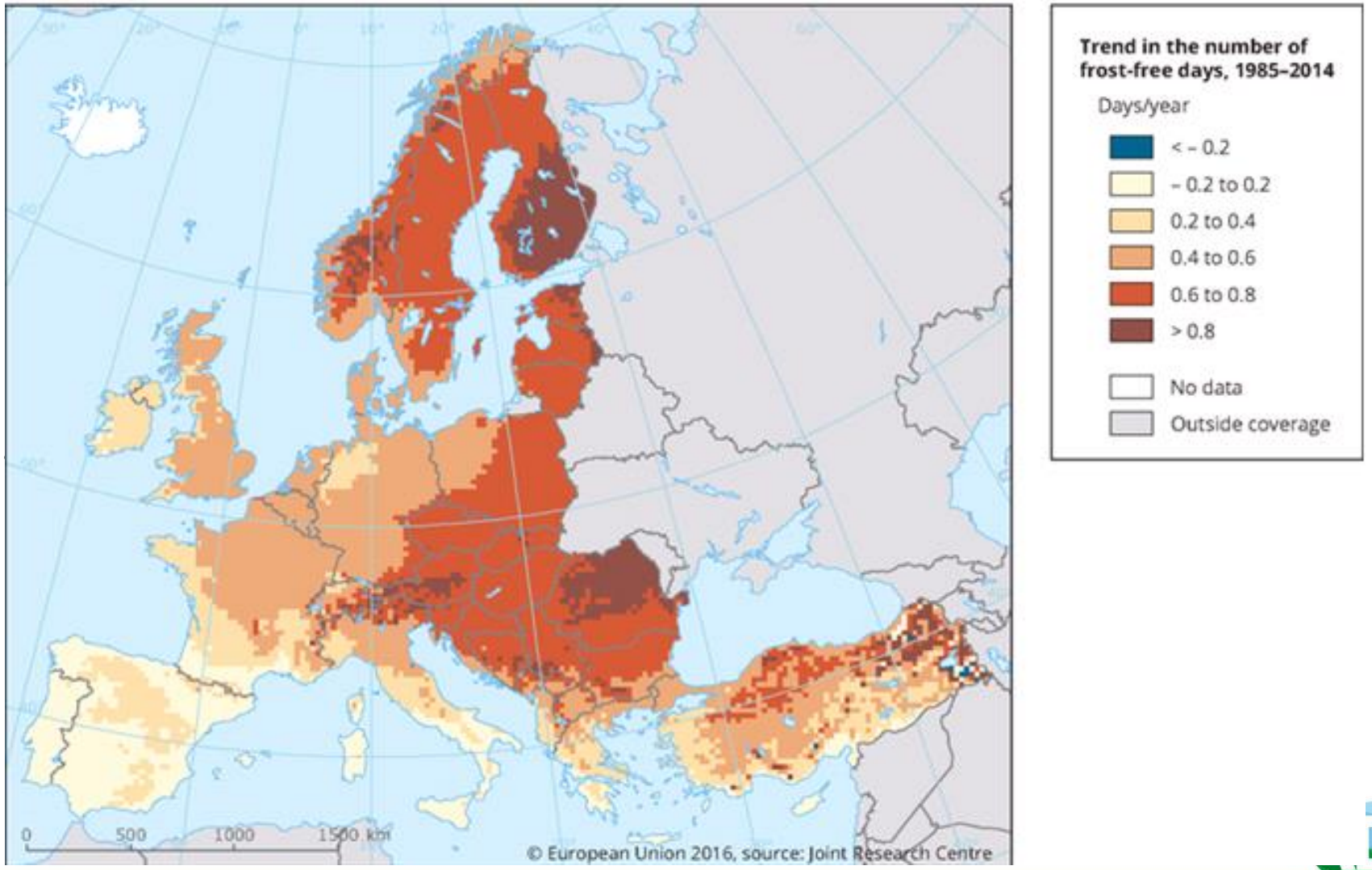
Potenziale stagione di crescita

10 giorni in più dal 1992.

Lo spostamento in avanti della fine è più rapido dell'anticipo dell'inizio.

Spostamento verso Nord, verso l'alto e verso l'inverno

Nuove malattie?



EEA 2016, based on the JRC-MARS gridded meteorological data at 25 km resolution

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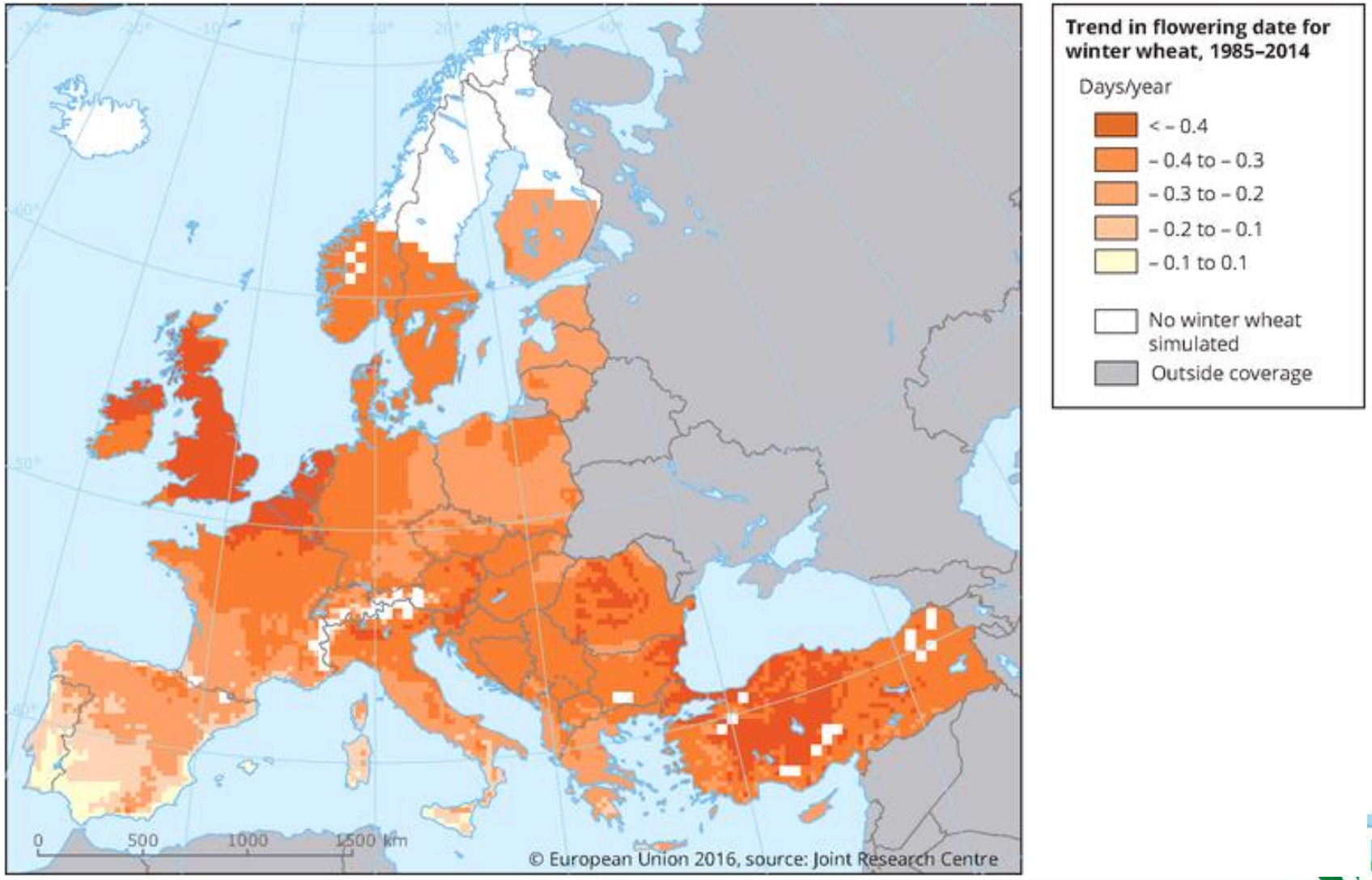
Fenologia agraria

Anticipo di circa 2 giorni/decade negli ultimi 50 anni per molte piante perenni e annuali

Anticipo nella maturità più veloce della fioritura

Fotoperiodo



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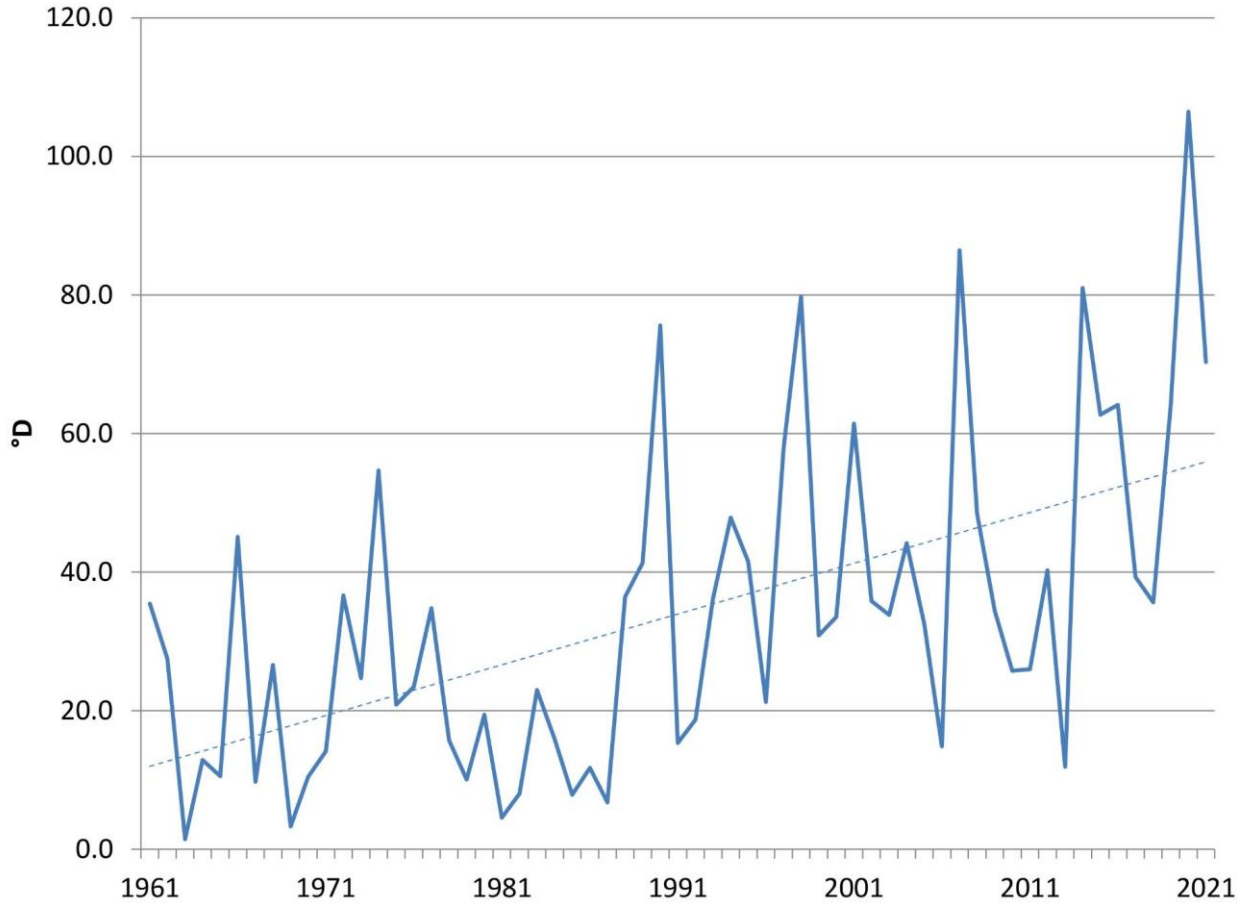
Rischio da gelo primaverile

Inverni miti portano a un risveglio vegetativo anticipato



Sommatorie termiche invernali (soglia 7 °C) in pianura Emilia-Romagna

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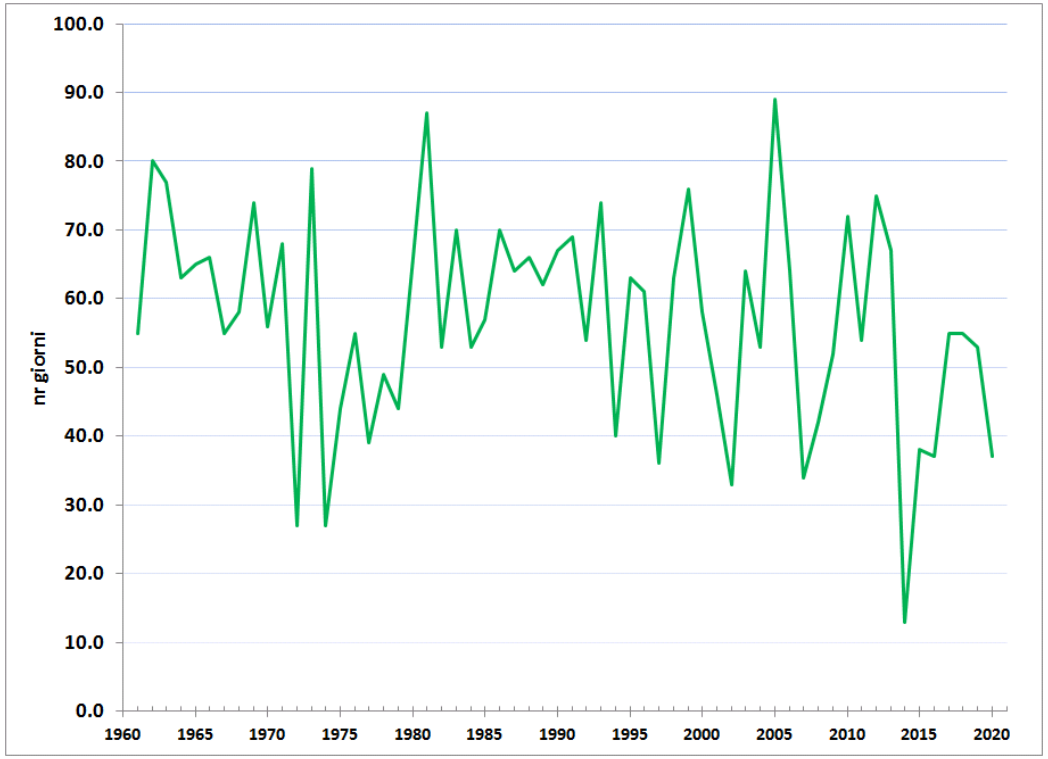
Rischio da gelo primaverile

Il numero di giorni di gelo a livello annuo è in diminuzione, ma **contro-tendenza** in primavera



Mese	Marzo								
Decade	1			2			3		
Soglia	0	-1	-2	0	-1	-2	0	-1	-2
1961-1990	77	49	37	46	32	17	6	3	2
1991-2020	56	40	25	23	13	5	25	12	5

Mese	Aprile								
Decade	1			2			3		
Soglia	0	-1	-2	0	-1	-2	0	-1	-2
1961-1990	0	0	0	2	0	0	0	0	0
1991-2020	4	3	1	0	0	0	0	0	0

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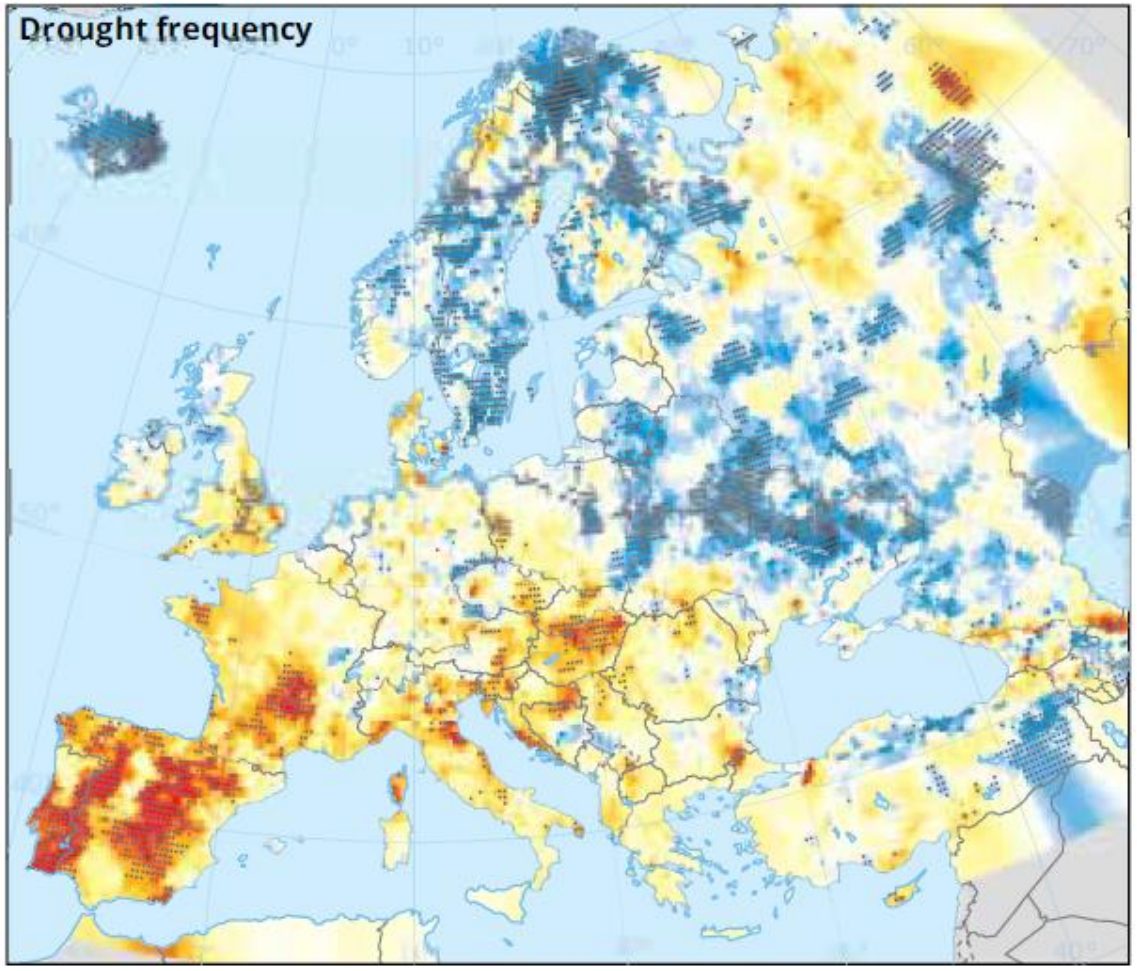
Siccità

1951-2012

aumento frequenza e intensità eventi siccitosi nel Mediterraneo



Observed trends in frequency and severity of meteorological droughts

Drought frequency (events/decade)

+ 0.7

0

– 0.7

Outside coverage

Significance of trends

0 500 1 000 1 500 km

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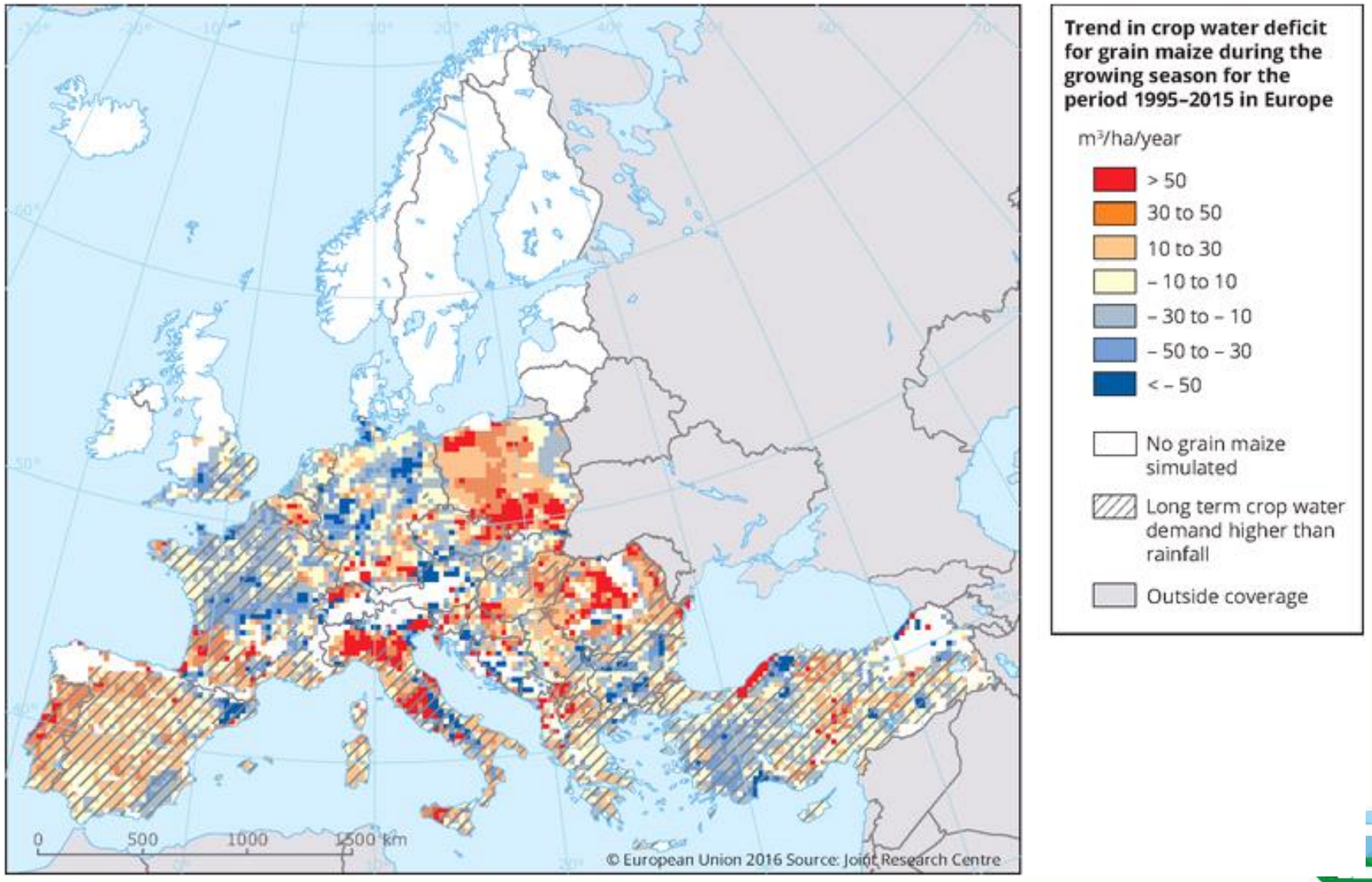
Deficit idrico

aumento domanda evapotraspirativa

aumento CO_2 (riduzione della traspirazione)

accorciamento stagione



EEA 2016: modelled using WOFOST model and JRC MARS gridded meteorological data

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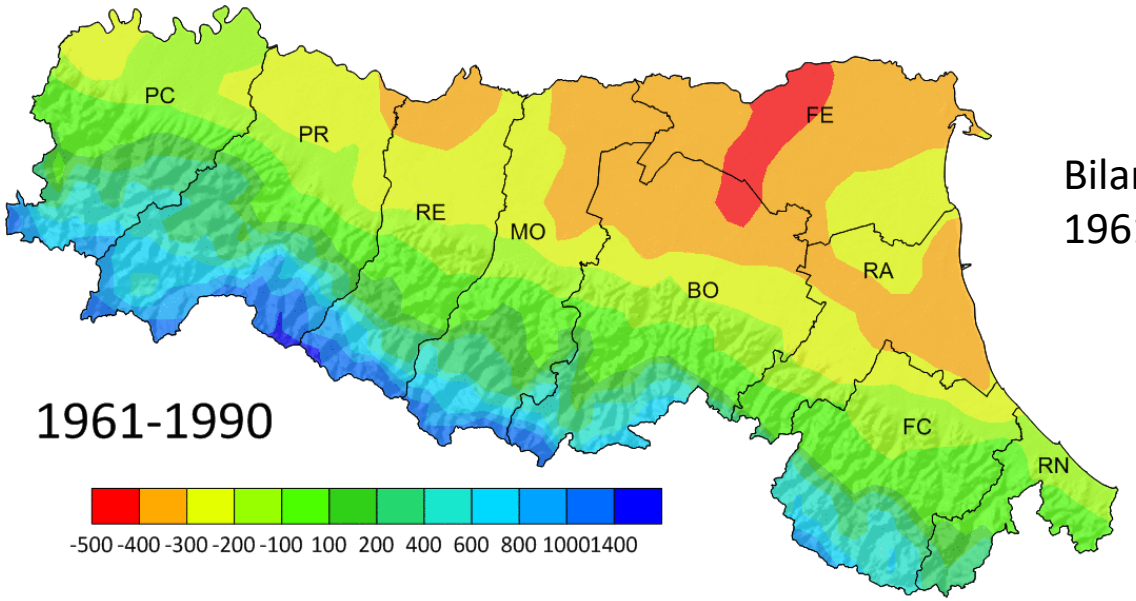
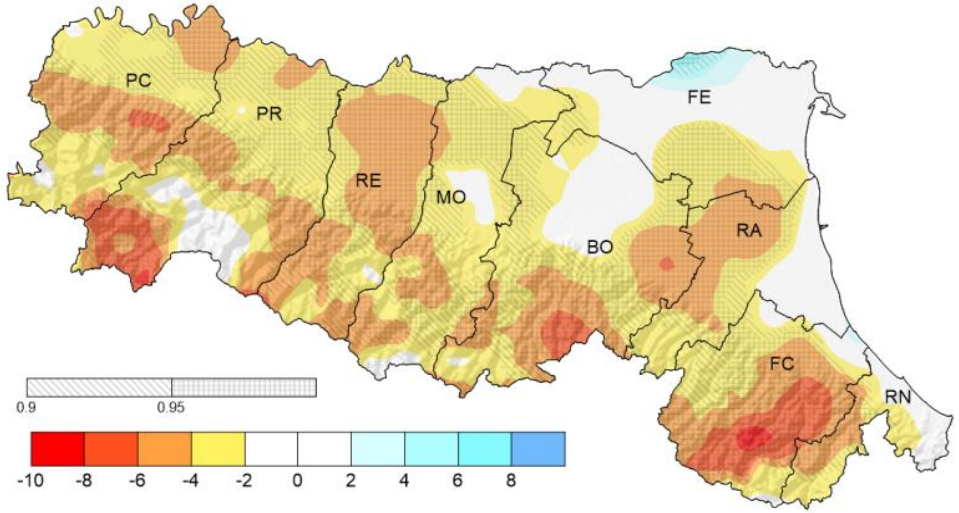
Risorse idriche - Bilancio idroclimatico



Bilancio idroclimatico annuo
1961-1990 vs 1991-2015 (mm)



Tendenza 1961-2015 (mm/anno) e
significatività

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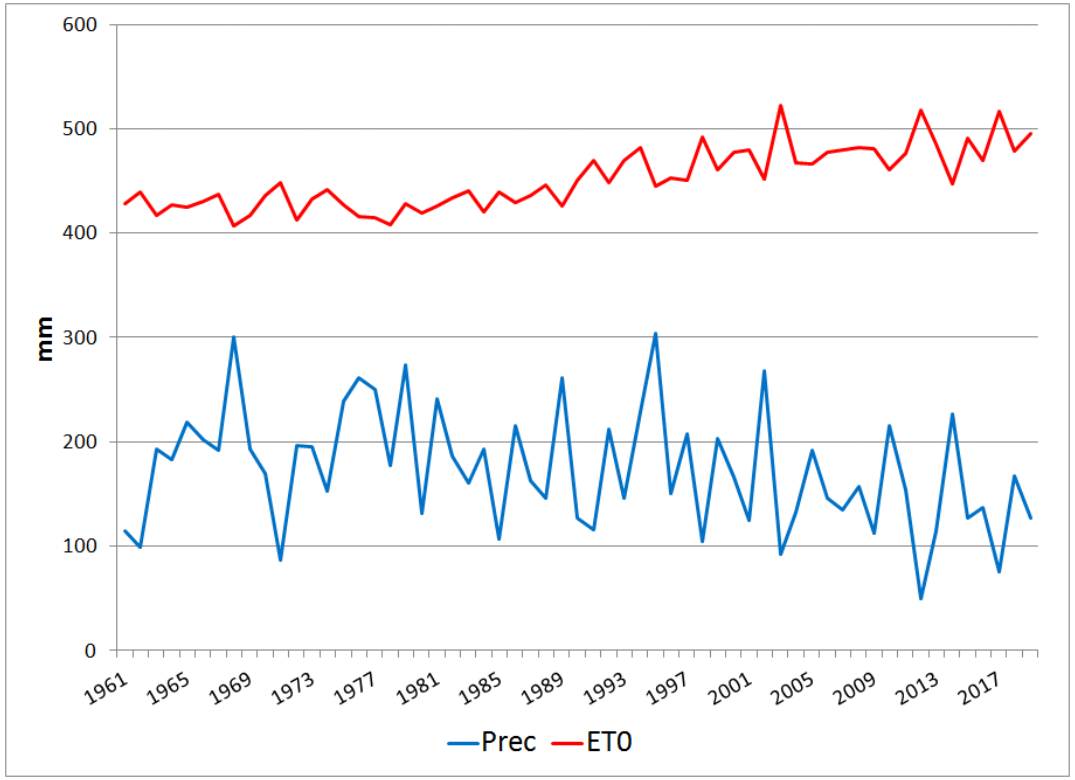
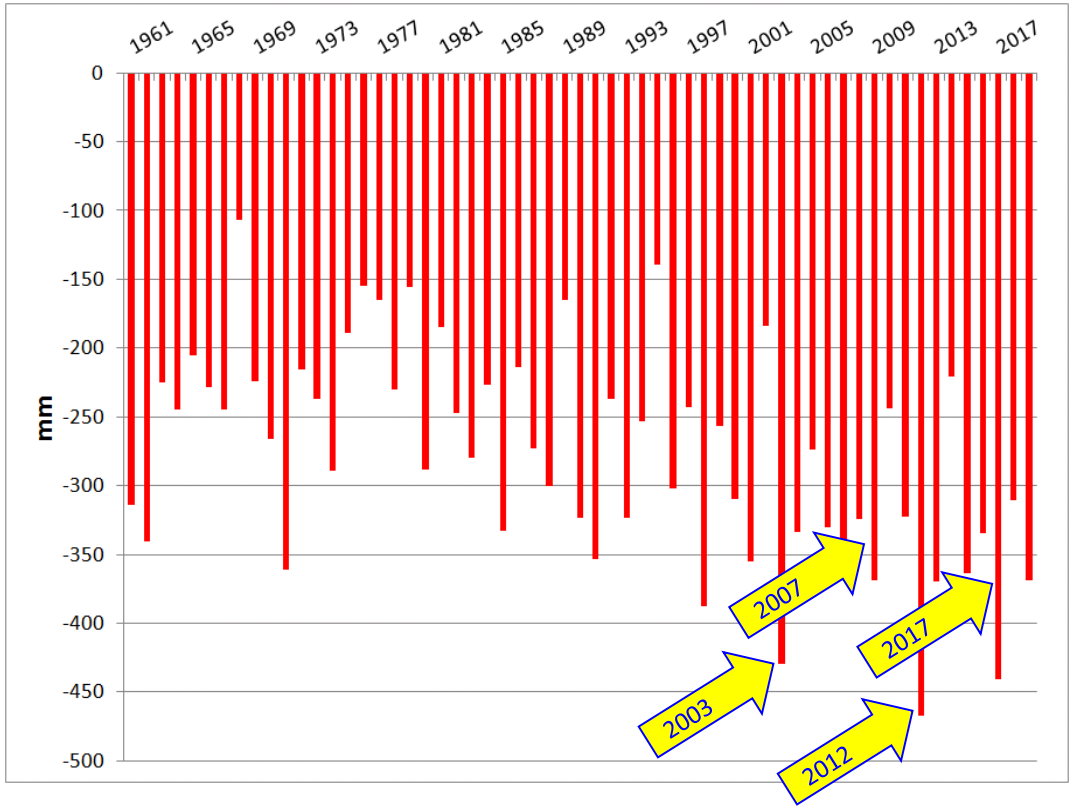
Risorse idriche

Emilia-Romagna: precipitazioni, evapotraspirazione e bilancio idroclimatico **estivi** regionali





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Impatti in Emilia-Romagna

- aumento generale fabbisogni irrigui
- riduzione acqua di falda
- maggiore frequenza irrigazione di soccorso (es. cereali autunno-vernini)
- castanicoltura: riduzione areali e malattie
- stress idrici e termici per orticole
- rischi scottature alberi da frutto
- erosione suoli
- riduzione giorni disponibili per operazioni meccanizzate
- aumento pressione parassitaria (pecilotermi)
- riduzione del benessere animale
- diminuzione della qualità e quantità delle risorse idriche
- diminuzione della sostanza organica e della fertilità dei suoli
- alterazione dei cicli di sviluppo (fenologia)
- aumento della domanda di energia

Aspetti peculiari

- Competizione tra settori (e tra regioni) per risorse idriche
- Presenza di colture idro-esigenti
- Rigidità DOP e maggiore vulnerabilità
- Intrusione salina

GRAZIE

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