



ARSO METEO
Slovenian Environment Agency

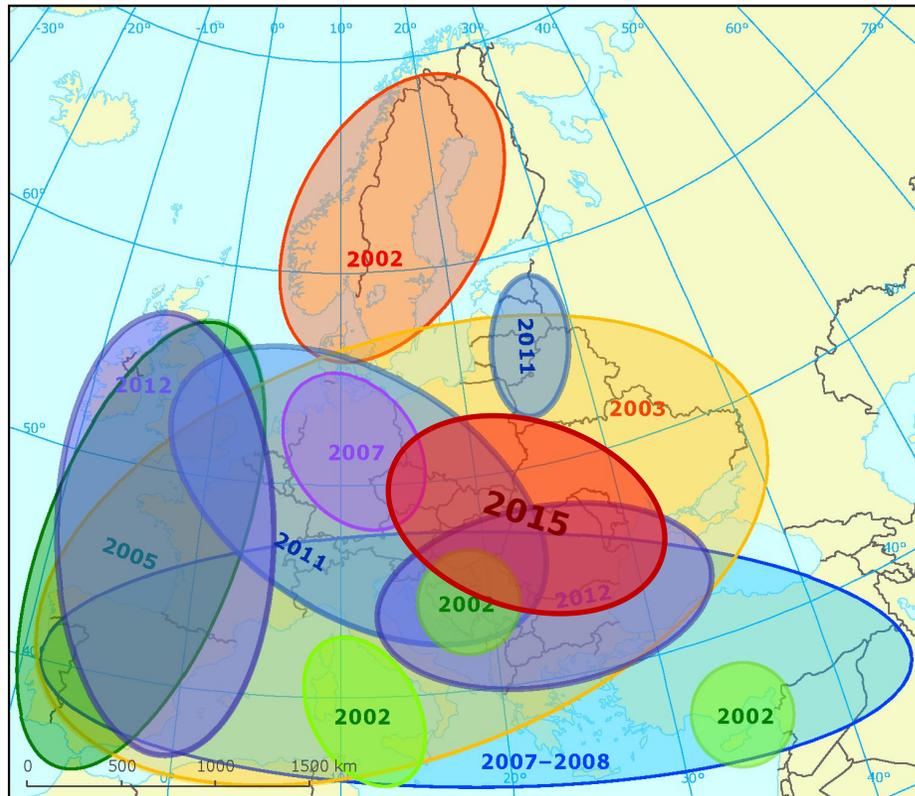
Drought-smart approach in Slovenian agriculture

Gregor Gregorič

Training course on drought risk assessment
Budapest, Hungary, 6-8 November 2018

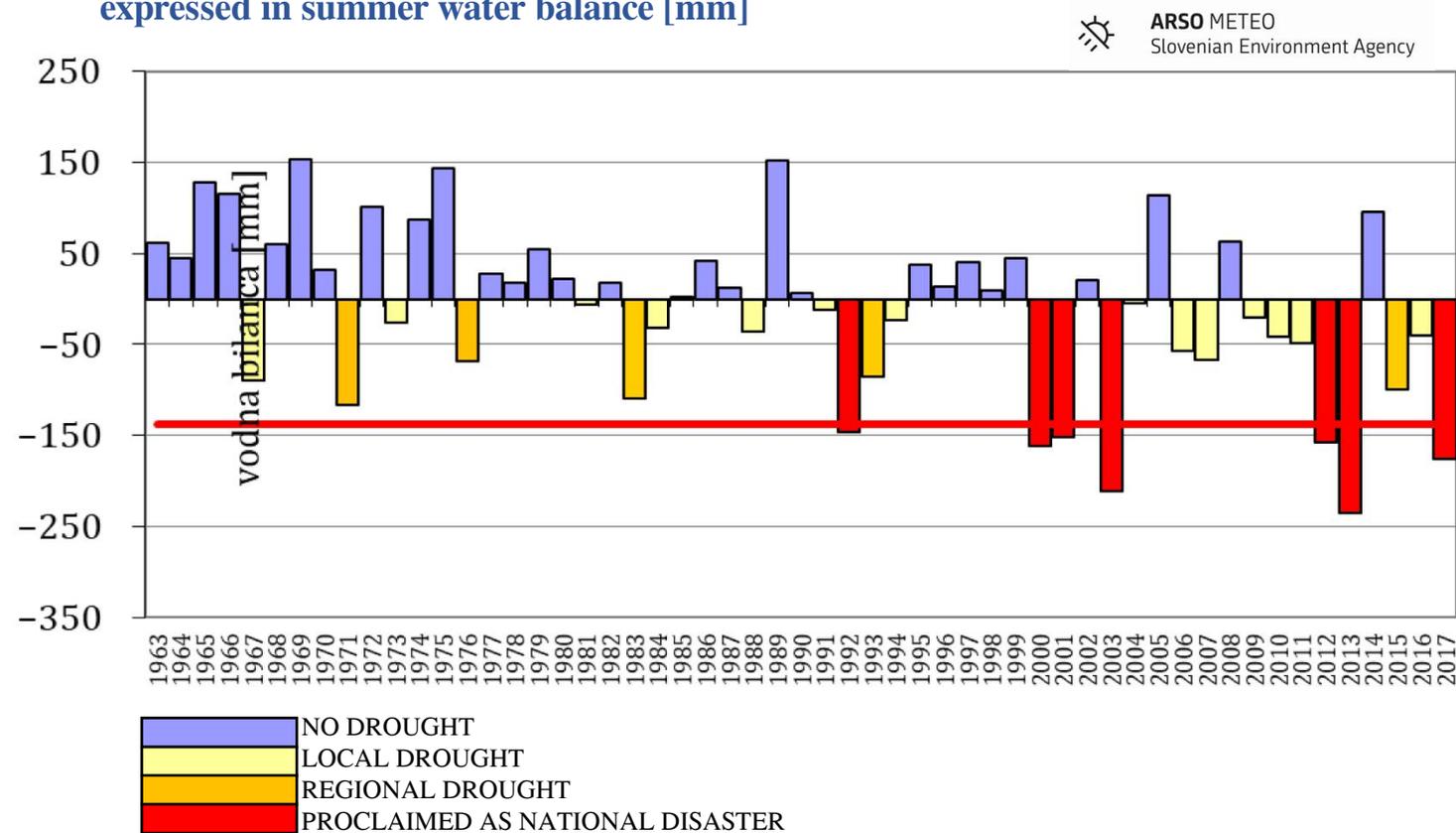
Drought reality in Europe and Slovenia

European droughts 2002–2017



Source: EEA, 2012; EEA, 2017

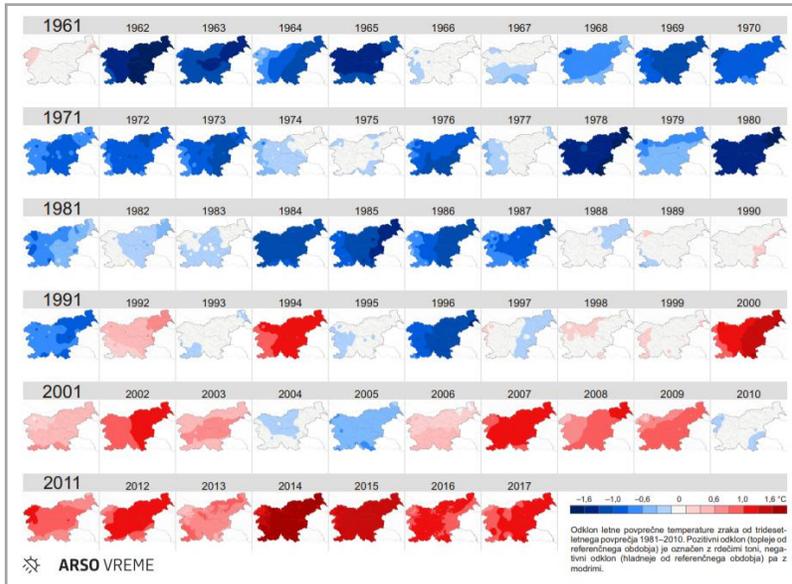
Agricultural droughts in Slovenia 1963–2017 expressed in summer water balance [mm]



Increasing drought intensity and severity in Slovenia and in wider region –
7 severe droughts since year 2000: **2000, 2001, 2003, 2012, 2013, 2015, 2017.**

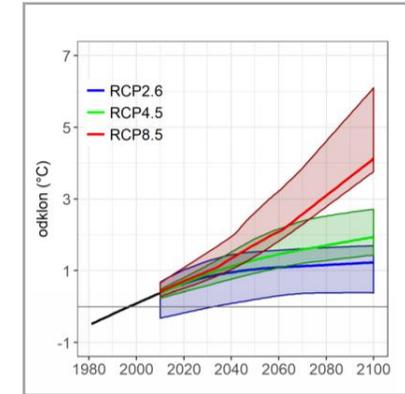
CC studies in Slovenia - dryer & warmer climate in the future

Decline of yearly temperature trends in Slovenia from 1981-2010

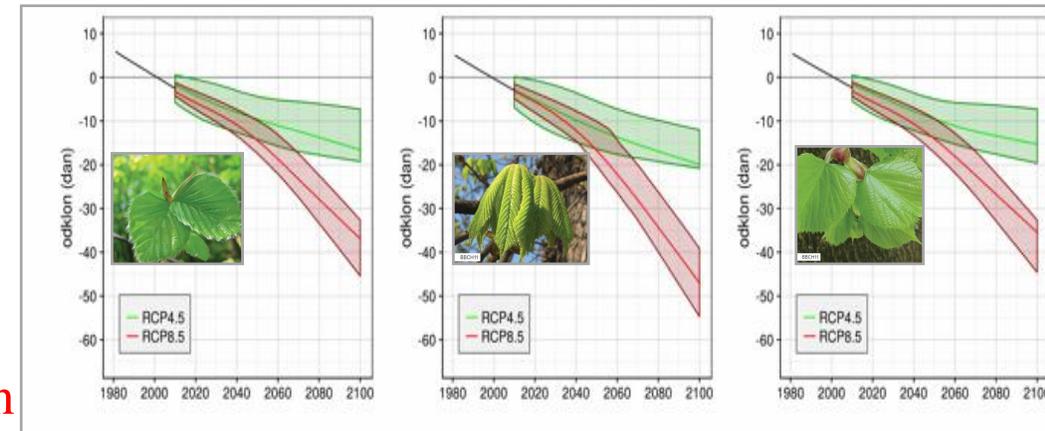


<http://meteo.arso.gov.si/met/sl/climate/change/>

- Changes of drought patterns (earlier droughts in spring);
- Water deficits will increase, summer agricultural droughts (like in the years 2003 and 2013, 2017) will affect all country;
- Increased evapotranspiration;
- Increase of air temperature is causing increase of soil temperature;
- Prolonged vegetation period;
- Spring phenological development is earlier, risk of spring frost exists.



Warmer in vegetation season - yearly T change according to 3 RCP scenarios



Earlier– up to 20 days earlier spring phenology , warmer spring, higher evapotranspiration = early spring drought

Decision support system for farmers

Agrometeorological forecast – info related to drought

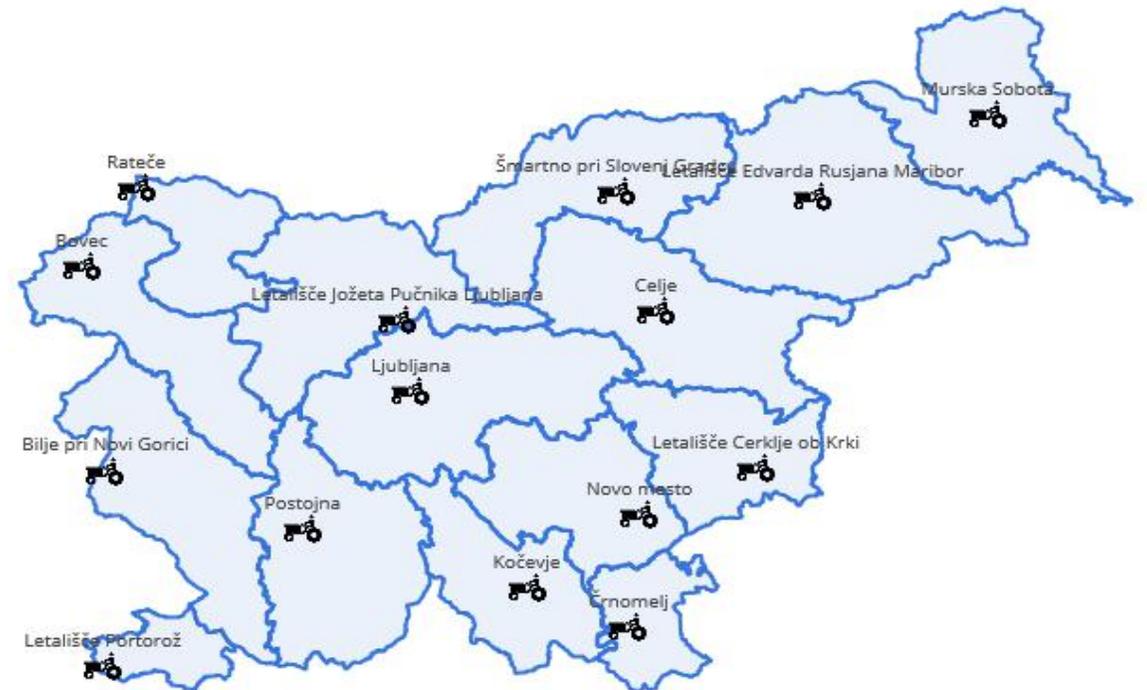
Link:

<http://meteo.arso.gov.si/met/sl/agromet/forecast/>

15 regions in Slovenia

CONTENT:

- Daily agro/meteorological information,
- 1- to 10-day forecasts of different agrometeorological parameters:
 - Air temperature
 - Soil temperature
 - THI index
 - Wind
 - Surface water balance (daily; seasonal accumulations)
 - Evapotranspiration



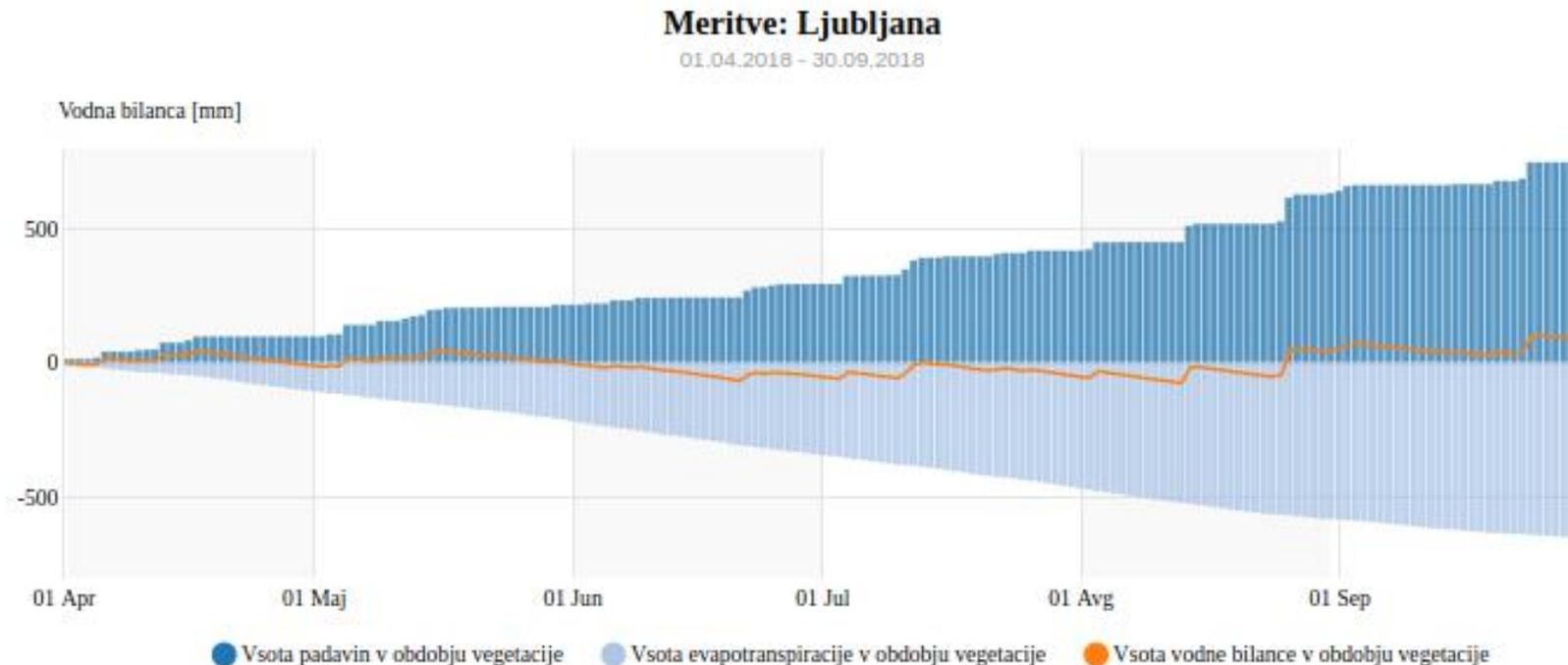
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Surface water balance accumulated from start of the vegetation season

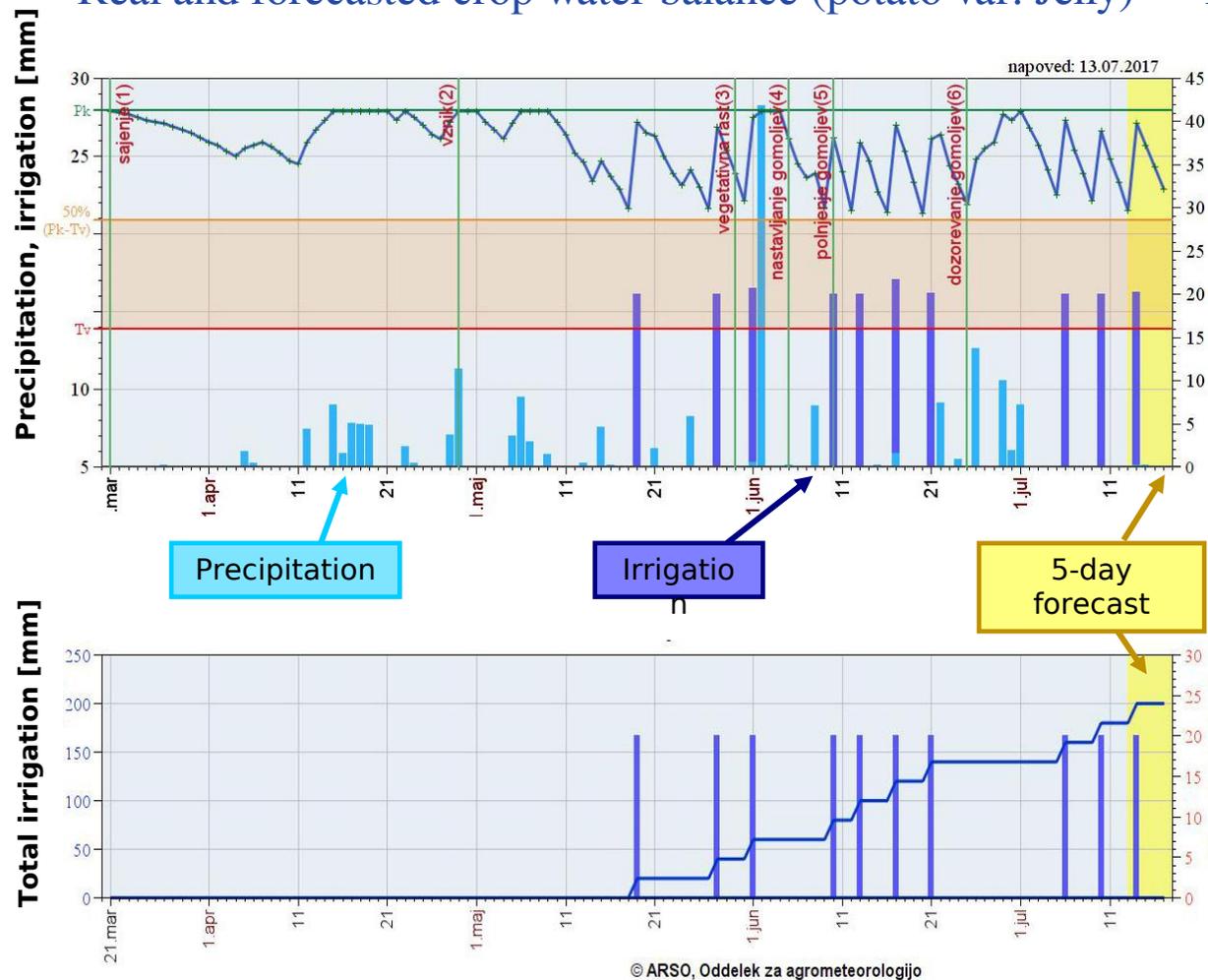
Vodna bilanca v vegetacijskem obdobju (od 1.4. do 30.9.)

Akumulacija	01.04. - 30.09. Meritev [mm]
Padavine	739
ET ₀	644
Vodna bilanca	95



Irrigation forecast for farmers based on IRRFIB model

Real and forecasted crop water balance (potato var. Jelly) – Krško field (SE Slovenia)



OPTIMAL CROP WATER SUPPLY



FORECAST: 17.7.2017

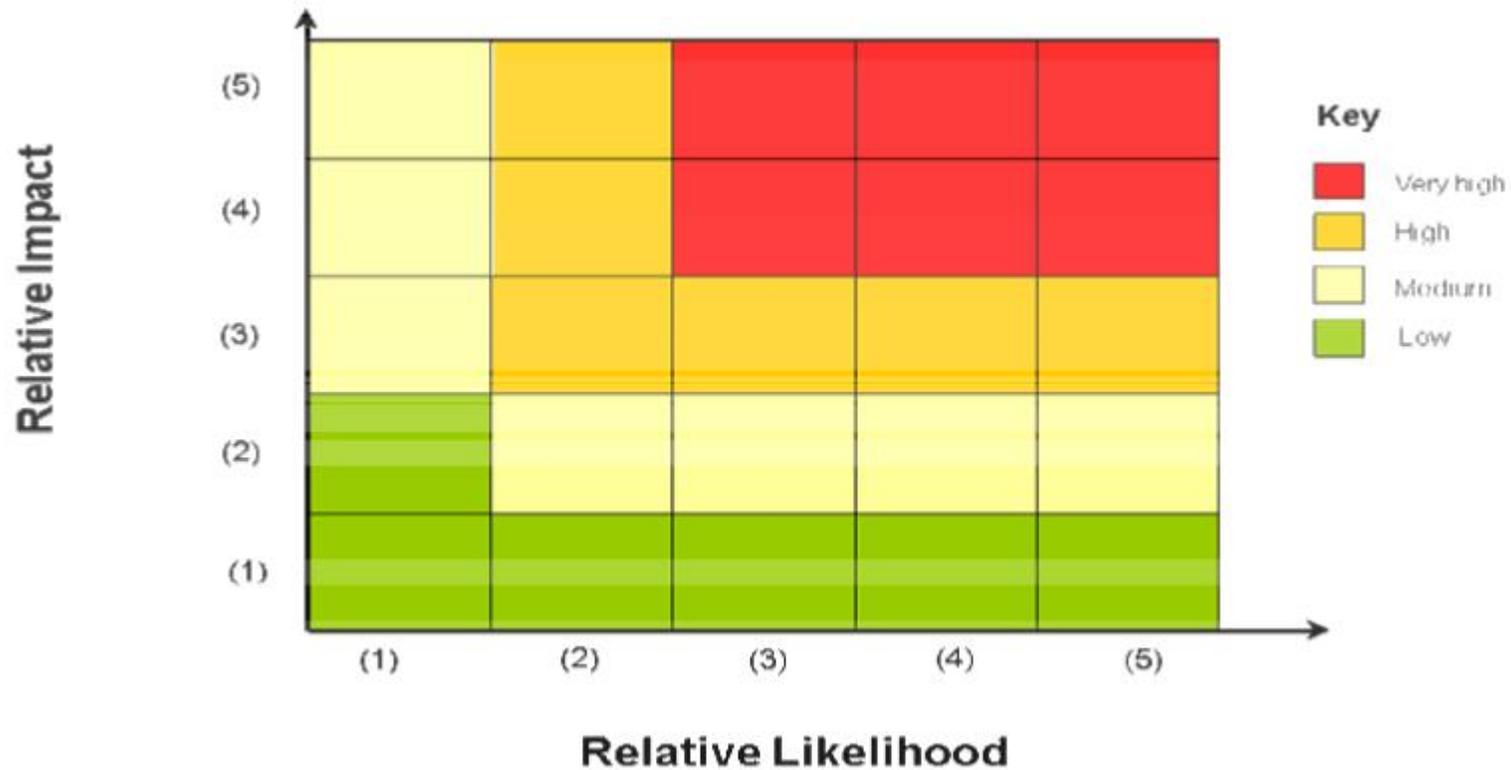
date	RR [mm]	ETo [mm]	ETr [mm]	irrigation [mm]
2017-07-17		5.3	4.2	0.0
2017-07-18		5.7	4.6	0.0
2017-07-19	0.1	4.8	3.8	0.0
2017-07-20	0.2	6.8	5.4	20.0
2017-07-21	0.4	4.3	3.5	0.0

RR = 172 mm; ETP= 527 mm. Crop water use 360 l of water.

Sprinkler irrigation – 10 times/ total 200.0 mm.

Agricultural drought risk assessment

Matrix representation of risk - method defined by civil protection



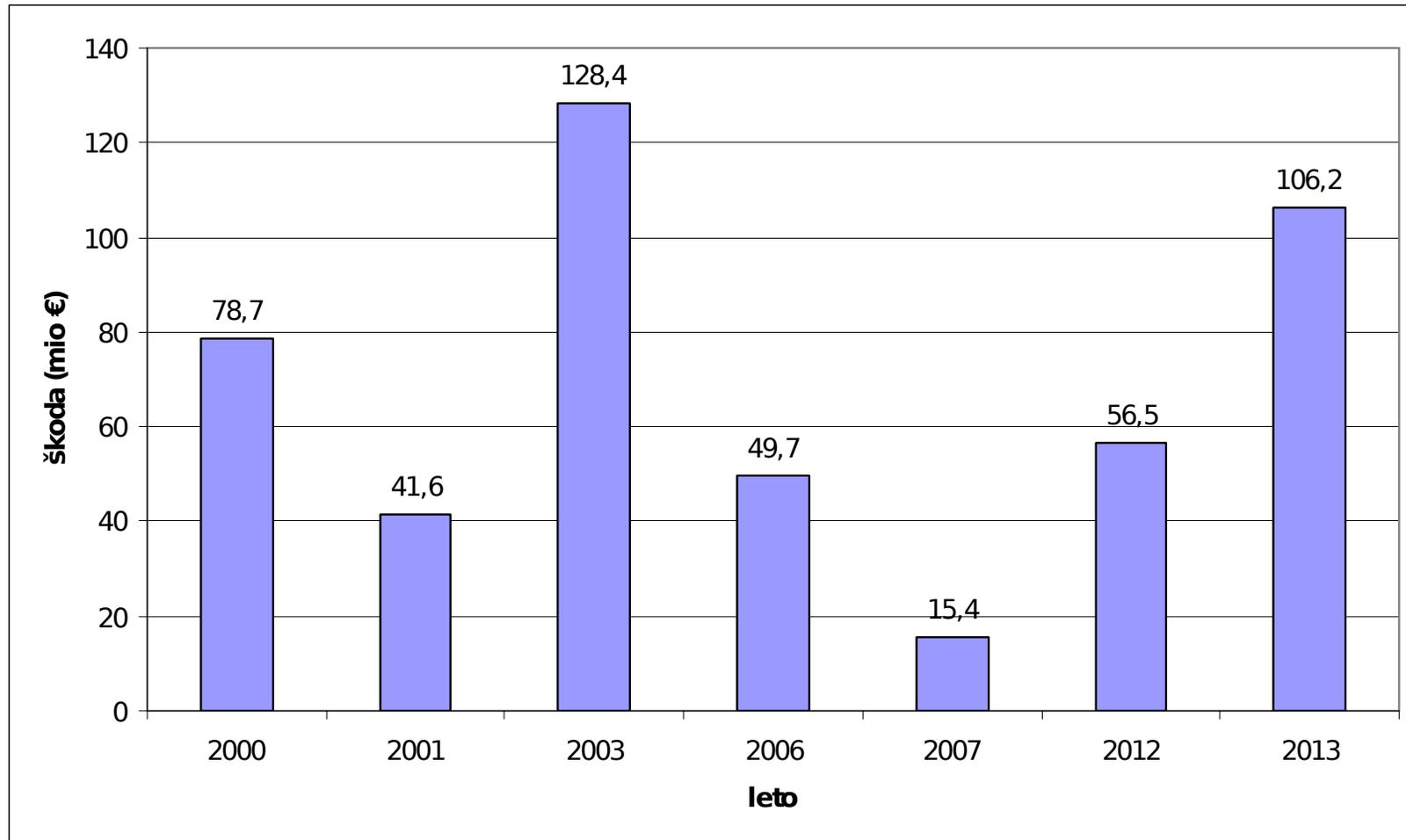
Agricultural drought risk assessment

Matrix representation of risk - method defined by civil protection

CLASS	1	2	3	4	5
Degree of impact	<0.3% GDP (<100M€)	<0.6% GDP (<220M€)	<1.2% GDP (<440M€)	<2.4% GDP (<880M€)	>2.4% GDP (>880M€)
Probability of occurrence - return level	>250 years	100 - 250 years	25 - 100 years	5 - 25 years	<5 years

Agricultural drought risk assessment

Impact data - Statistical office (for years drought was declared as natural disaster) - in M€

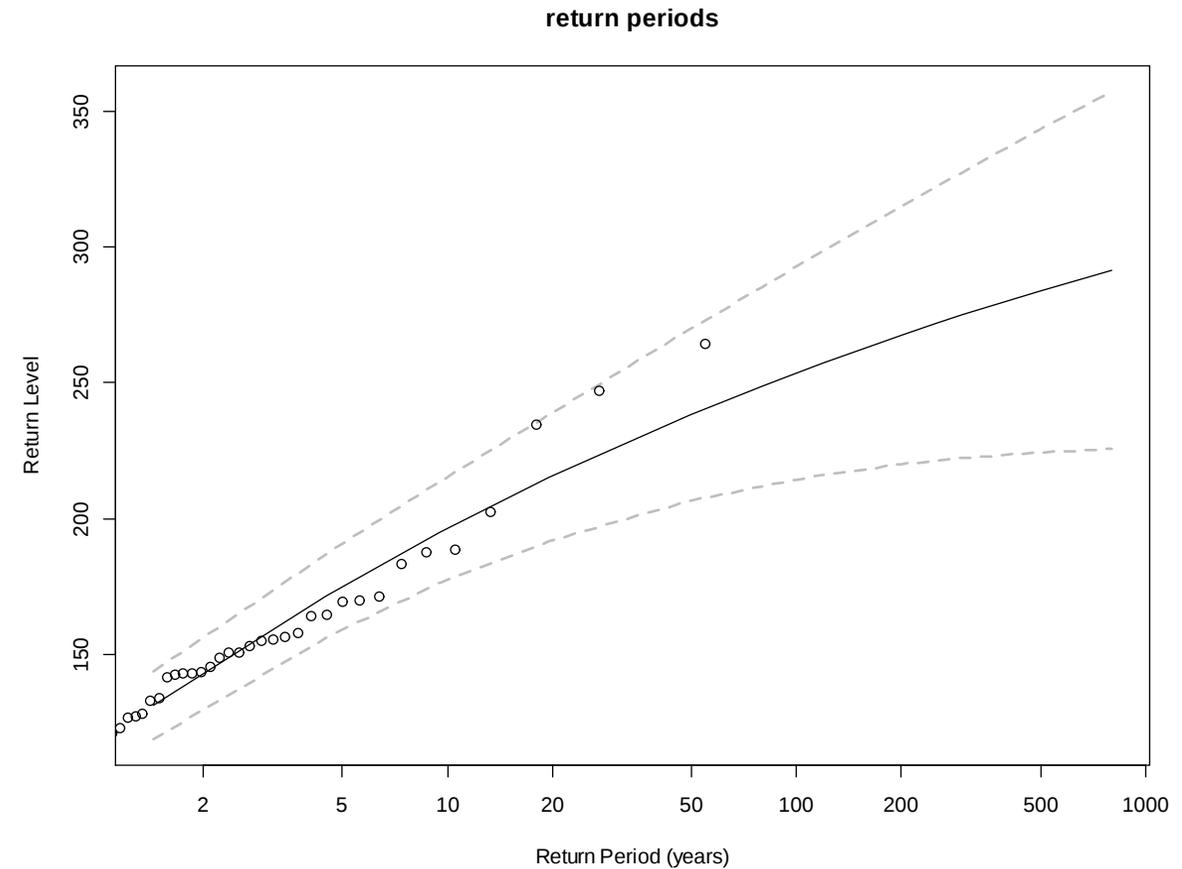
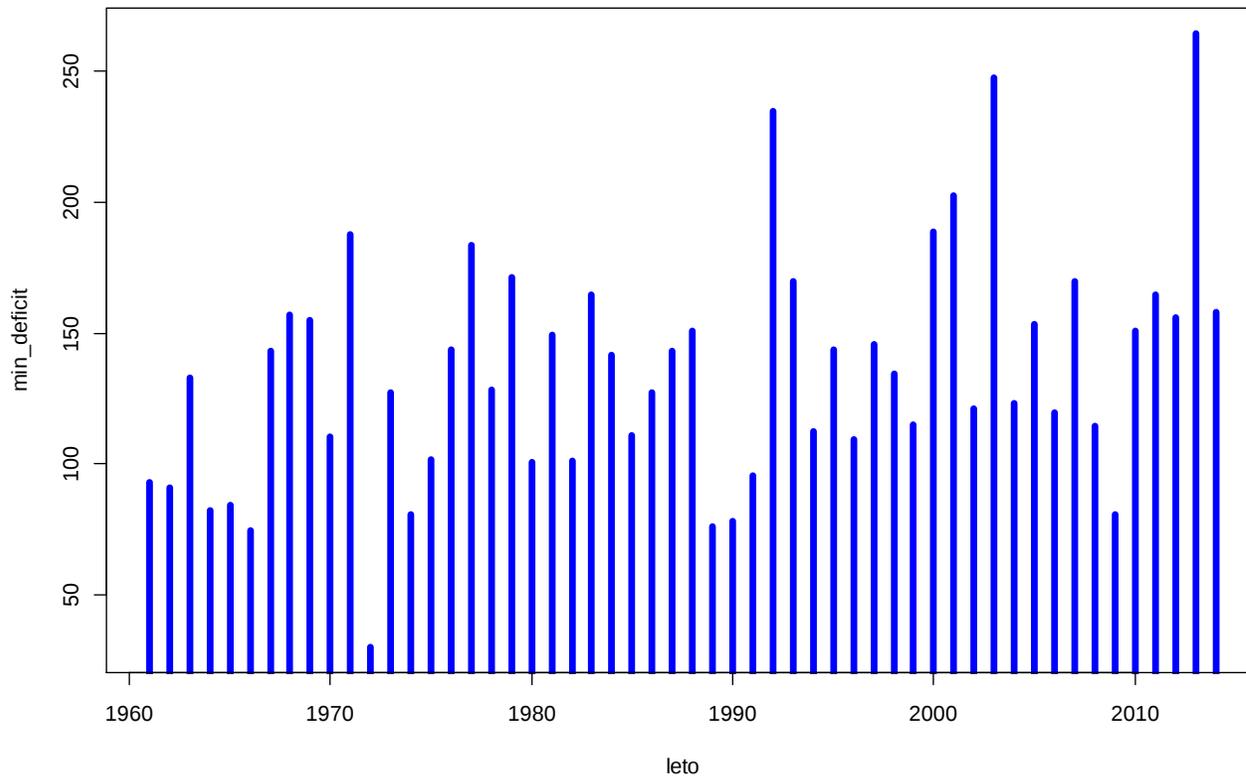


Agricultural drought risk assessment

Probability data - based on surface water balance (RR-ETP).

Example: station M. Sobota in E Slovenia

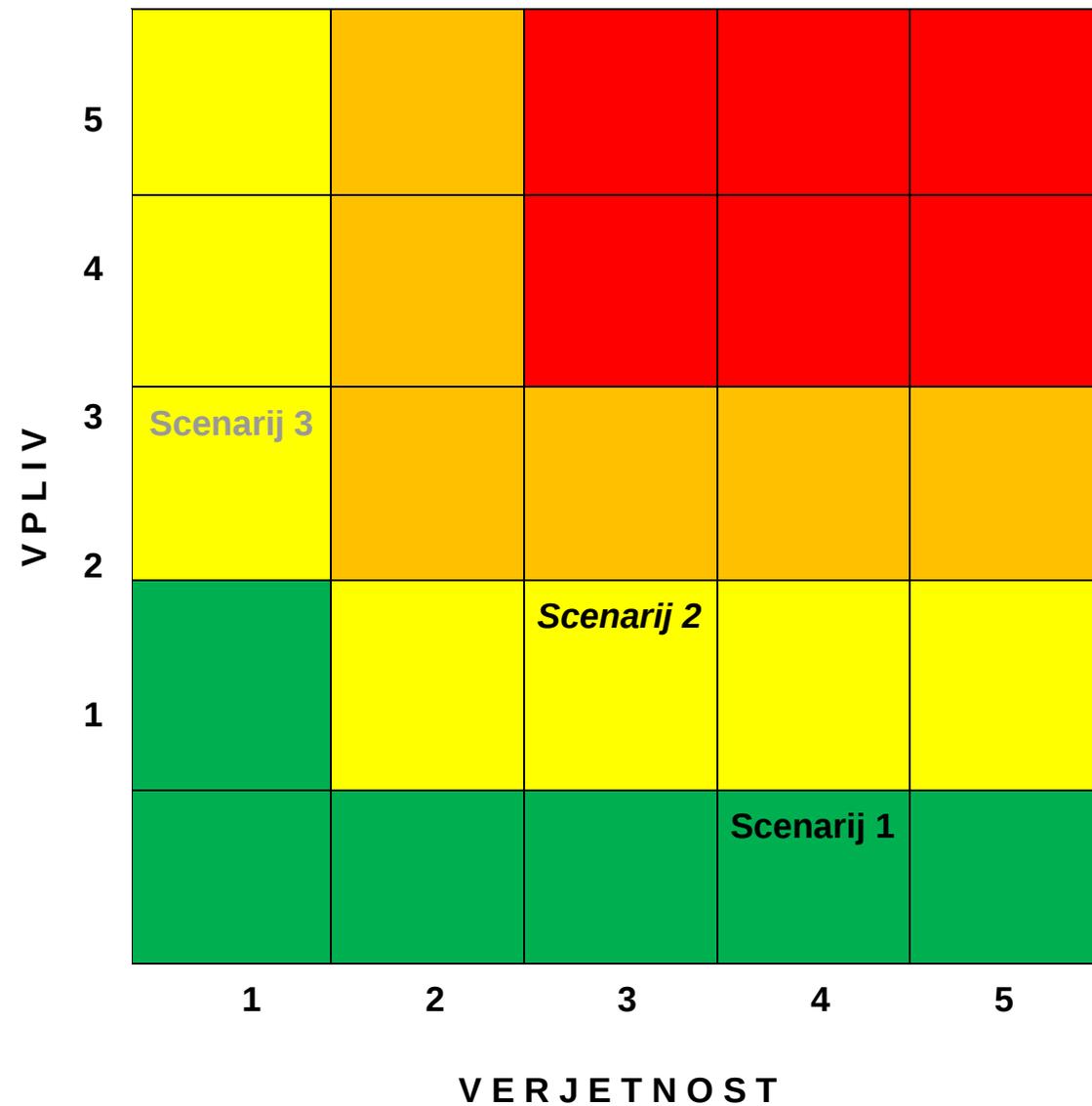
left: values of max. deficit per year. right: return levels



Agricultural drought risk assessment

Matrix representation of risk - final result

MATRIKA TVEGANJA ZA SUŠO – VPLIVI NA GOSPODARSTVO, OKOLJE IN KULTURNO DEDIŠČINO



Vision for 2018-2022



Early drought warning in Slovenia/SEE region – User oriented service (CAgM goal 1)

- active countries participation in existing platforms/technical capacities (global, regional – EDO, DMCSEE), exchange information inside/outside the countries, harmonized data collection, methodologies (impact & risk level);

Partnership & common projects – Fit for purpose service (goal 1)

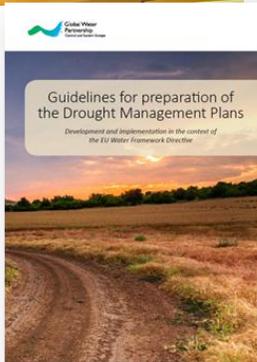
- WMO CAgM partners, GWP/IDMPDMCSEE and consortium partners;
- searching for funds for specific common objectives of met. services together with stakeholders – GWP/IDMP, DRR, Tromp foundation etc.;
- project calls (enlarge DriDanube, mirror projects, **new initiatives?**).

Change of management paradigm / policy – Work smarter (goal 5)

- missing policy; DriDanube project has intention to increase technical capacities and elaborate more targeted drought management policies taking into account water scarcity and droughts (DriDanube Strategy);
- Drought Directive/Initiative?;

Public awareness/capacity building / networks – Close the gap on service (goal 4)

- trainings/roving seminars/workshops/secondment of staff at DMCSEE;
- drought news/impacts information sharing, media;
- guidelines, manuals, publications, reports, help desk (IDMP), leaflets.



WORKSHOP

Agrometeorologists for farmers
in hotter, drier, wetter future.