Savez proizvođača jagodičastog voća u Bosni i Hercegovini

CARITAS Schweiz Suisse Svizzera Svizra

Klimatske promjene i njihove posljedice na poljoprivredu Bosne i Hercegovine

Grujica Vico

Sarajevo, 14.03.2018.

O čemu pričati?

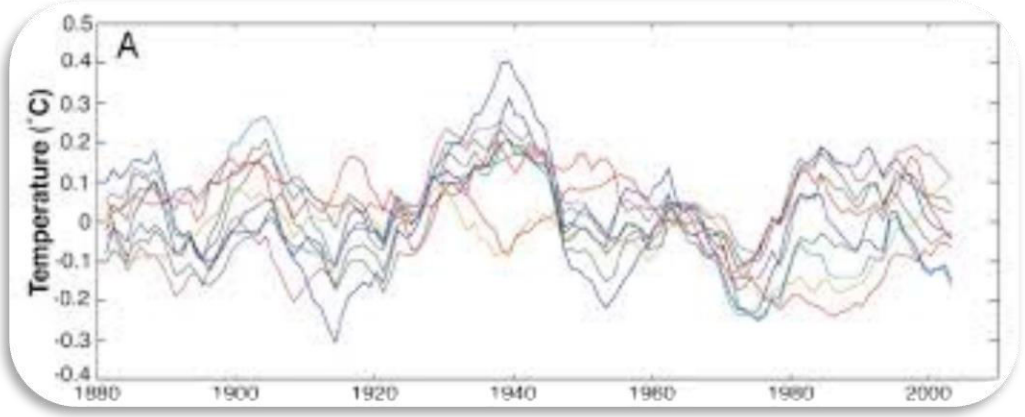
- Klimatske promjene – stanje, podaci, trendovi - globalno
- Poljoprivreda - subjekat i/ili objekat (u kontekstu klimatskih promjena)
- Bosna i Hercegovina – stanje, trendovi, mape
- Klimatske promjene – kratak osvrt na malinu
- Zaključno mišljenje/pitanja

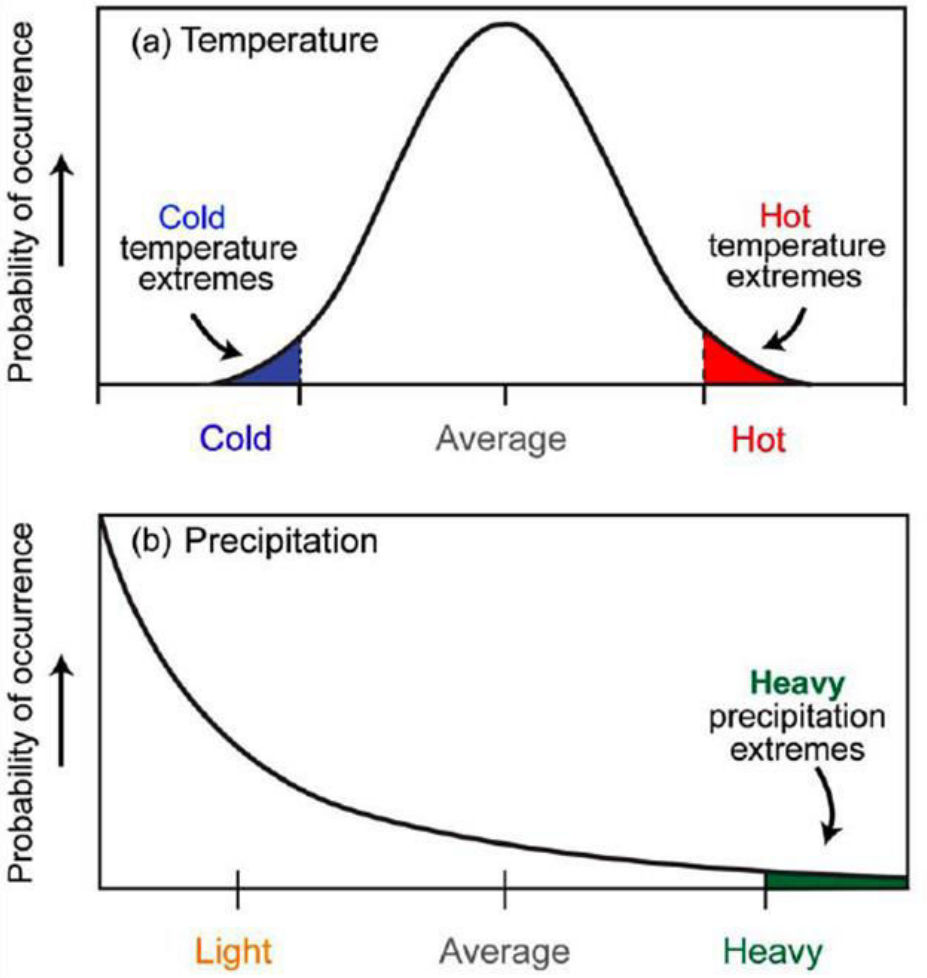
KLIMA

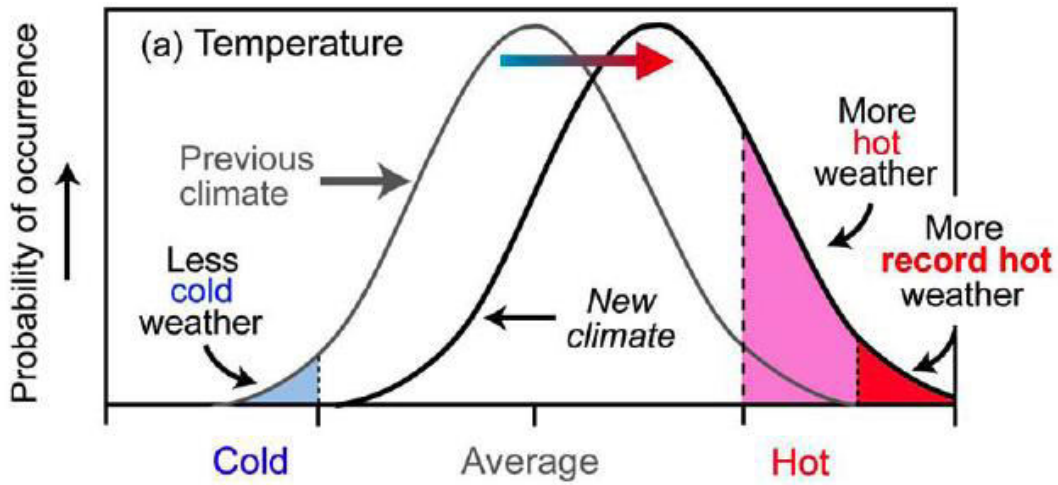
Prosjek

ili

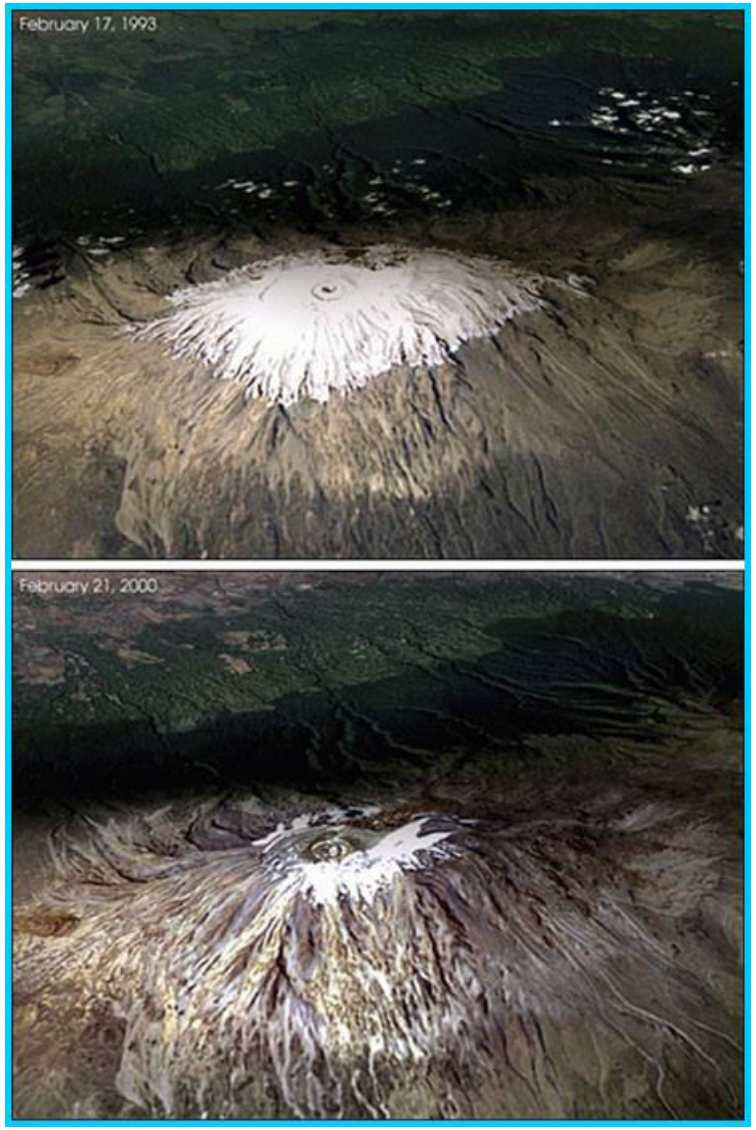
Zakonitost



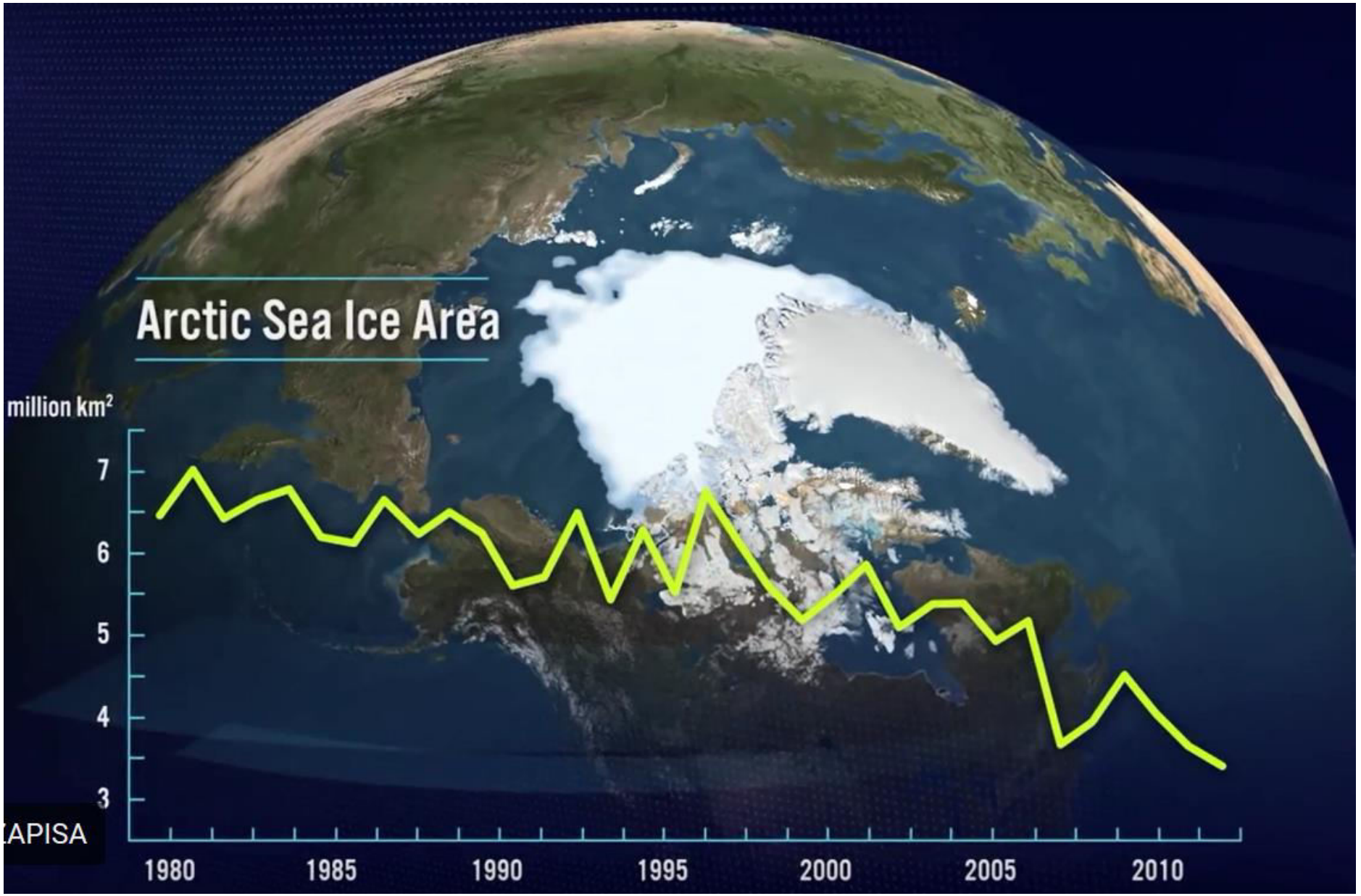

(a) Temperature
Probability of occurrence
Cold temperature extremes
Hot temperature extremes
Cold
Average
Hot
(b) Precipitation
Probability of occurrence
Heavy precipitation extremes
Light
Average
Heavy


(a) Temperature
Probability of occurrence
Previous climate
Less cold weather
New climate
More hot weather
More record hot weather
Cold
Average
Hot

Klimatske promjene u slici



Arktički okean

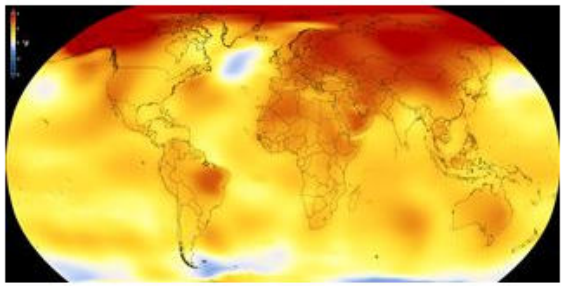


Environment

2017 was one of the hottest years on record, NASA says

And the five warmest years on record all came since 2010.

by David Freeman / Jan.18.2018 / 5:30 PM ET



Earth's average global temperature from 2013 to 2017, as compared to a baseline average from 1951 to 1980, according to a NASA analysis. Yellows, oranges, and reds show regions warmer than the baseline.NASA

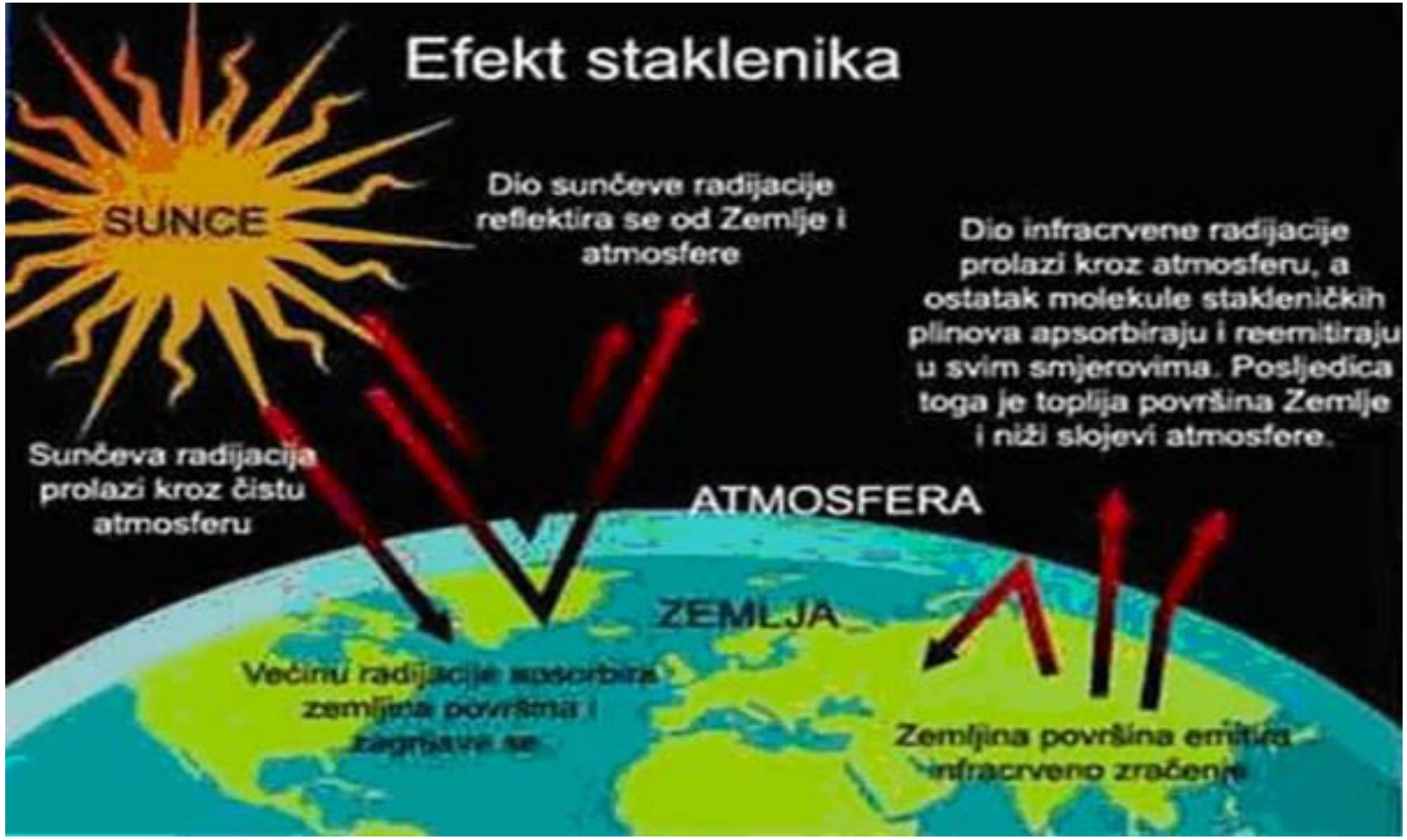
President Trump may have doubts about climate change, but a pair of new federal reports indicate that our planet's long-term warming trend continues — and that 2017 was one of the hottest years on record.

Global surface temperatures last year were the second hottest since 1880, according to an analysis by scientists with NASA's Goddard Institute for Space Studies. Average temperatures in 2017 were 1.62 degrees Fahrenheit warmer than the average between 1951 and 1980, the year global temperature measurements became possible.

Only 2016 was warmer, according to NASA.

A separate analysis by the National Oceanic and Atmospheric Administration pegged 2017 as the third-warmest year on record. The agencies said the discrepancy in the rankings was the result of different methods that they use to analyze global temperature data, but that overall, their assessments on the state of the global climate are in agreement.

Efekat staklene bašte



H_2O

CO_2

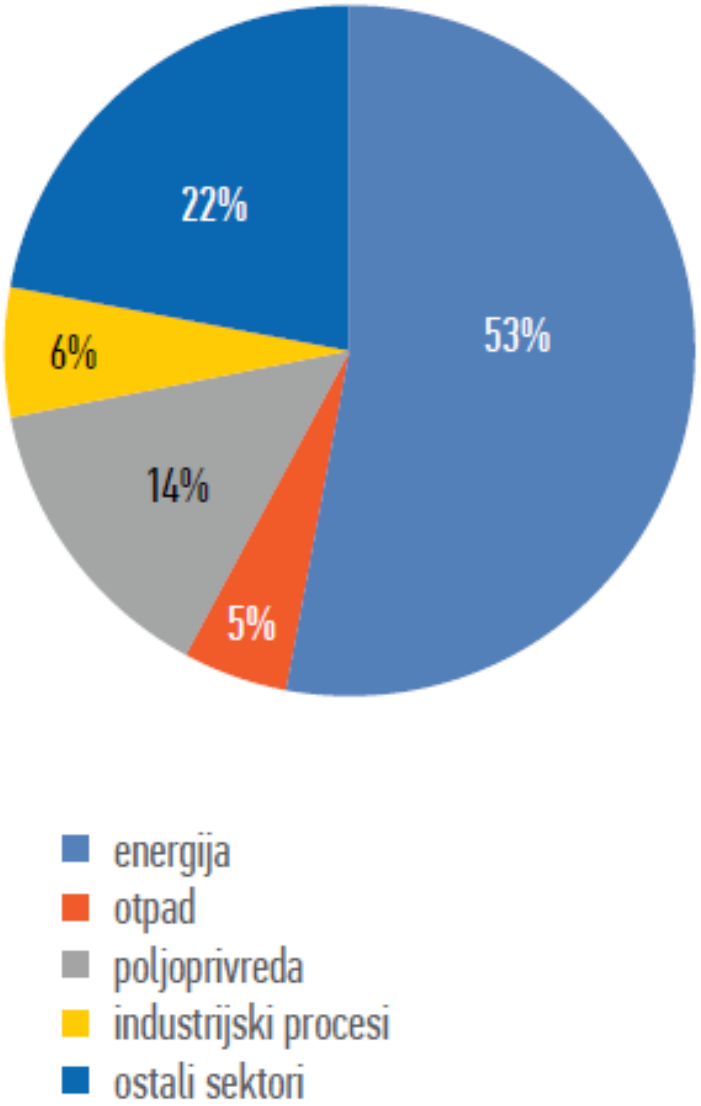
CH_4

O_3

N_2O

CFC (freon)

Doprinos poljoprivrede klimatskim promjenama u BiH (kroz doprinos emisiji CO_2)



Klimatske promjene

Poljoprivreda

Uticaji/rizici

•Otopljavanje ce povecati duzinu vegetacionog perioda i pomeriti pocetak vegetacije prema ranijim datumima Prostorna pomeranja agroklimatskih uslova značajno će uticati na uslove gajenja poljoprivrednih kultura i izbor odgovarajućih sorti.

•Otopljavanje će dovodeći do bržeg razvoja. Posledica toga ogledaće se u smanjenju prinosa, izuzev ako se sorte ne prilagode prisustvu visokih temperatura (promena u grupama zrenja).

•Smanjenja padavina u toku letnjih meseci i povećanja evapotranspiracije, dovodi do pojave ozbiljnih suša tokom leta. Suvi periodi će najviše da utiču na prinos jarih useva koji se ne navodnjavaju. Kod zemljišta sa malim vodnim kapacitetom potencijalni prinos će biti smanjen

•Intenzivnije i učestalije pojave ekstremnih i nepovoljnih vremenskih prilika uticaće na smanjenje potencijalnog prinosa i povećanje varijabilnosti prinosa naročito ne navodnjavanih i jarih useva.

•Toplotni talasi će povećati rizik proizvodnje i smanjiti ratarsku i stočarsku proizvodnju. Termički stres negativno utiče na plodnost pojedinih kultura (npr. kukuruza) kao i na zdravstveno stanje i proizvodnju stoke, kao i na odgovarajuće sanitarne uslove (mleko i meso)

•Dugoročno, efekti ekstremnih vremenskih prilika mogu smanjiti plodnost zeljišta i narušiti značajno njegove funkcijea. Specijalna pažnja treba da se posveti eroziji.

Klimatske promjene

Poljoprivreda

Moguće mjere za adaptaciju

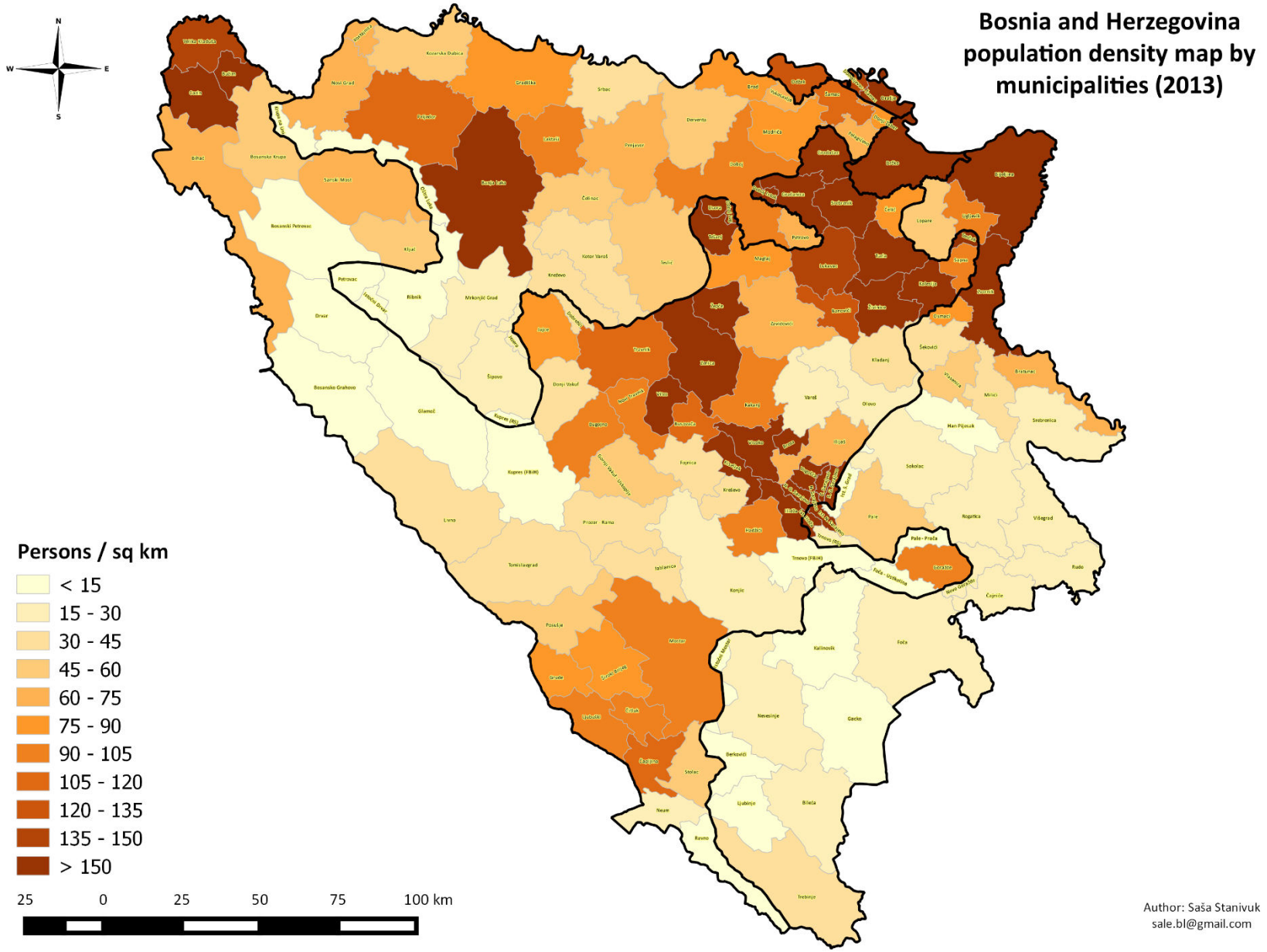
- Selekcija i uvođenje u proizvodnju genotipova otpornih na sušu i visoke temerature
- Gajenje sorti i hibrida ranijeg zrenja u uslovima aridnije klime bez navodnjavanja
- Povećanje učešće zimskih usjeva
- Unapređenje efikasnosti korišćenja vodnih resursa i optimizacija tehnika navodnjavanja
- Optimizacija upotrebe đubriva
- Zaoravanje biljni ostataka
- Povećanje organskog sadržaja u zemljištu
- Značajnija upotreba protivgradnih mreža
- Regionalizacija.....

Autori (Authors): F. Bašić, M. Bogunović, S. Husnjak, Zavod za opću proizvodnju bilja i Zavod za pedologiju, Agronomski fakultet Sveučilišta u Zagrebu, 2000.
(Faculty of Agronomy University of Zagreb, Department of Agronomy and Department of Soil Science)

Kada


Poljoprivreda
Z
Z
Z
© TOSIRREL .com

Depopulacija



PRVA SRPSKA SORTA OZIMOG GRAŠKA „NS MRAZ“

Vojislav MIHAILOVIĆ[1], Sanja VASILJEVIĆ[1], Đura KARAGIĆ[1], Branko MILOŠEVIĆ[1], Vera POPOVIĆ[1], Ivica ĐALOVIĆ[1]

[1]*Institut za ratarstvo i povrtarstvo, Novi Sad, Srbija*

UN vremenska linija

1979 – The first World Climate Conference takes place.

1988 – The Intergovernmental Panel on Climate Change (IPCC) is set up. Learn more about the science of climate change.

1990 – The IPCC and the second World Climate Conference call for a global treaty on climate change. The United Nations General Assembly negotiations on a framework convention begin.

1991 – First meeting of the Intergovernmental Negotiating Committee takes place.

1992 –At the Earth Summit in Rio, the UNFCCC is opened for signature along with its sister Rio Conventions, the UN Convention on Biological Diversity and the UN Convention to Combat Desertification.

1994 – The UNFCCC enters into force.

1995 – The first Conference of the Parties (COP 1) takes place in Berlin.

1996 – The UNFCCC Secretariat is set up to support action under the Convention.

1997 – The Kyoto Protocol is formally adopted in December at COP3.

2001 – The Marrakesh Accords are adopted at COP7, detailing the rules for implementation of the Kyoto Protocol, setting up new funding and planning instruments for adaptation, and establishing a technology transfer framework.

2005 – Entry into force of the Kyoto Protocol. The first Meeting of the Parties to the Kyoto Protocol (MOP 1) takes place in Montreal. In accordance with Kyoto Protocol requirements, Parties launched negotiations on the next phase of the KP under the Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol (AWG-KP). What was to become the Nairobi Work Programme on Adaptation (it would receive its name in 2006, one year later) is accepted and agreed on.

2007 – The IPCC's Fourth Assessment Report is released. Climate science entered into popular consciousness. At COP13, Parties agreed on the Bali Road Map, which charted the way towards a post-2012 outcome in two work streams: the AWG-KP, and another under the Convention, known as the Ad-Hoc Working Group on Long-Term

Strategija Evropa 2020

1. **Zapošljavanje** – 75 % osoba u dobi od 20 do 64 godine u radnom odnosu

2. **Istraživanje i razvoj** – 3 % BDP-a EU-a uloženo u istraživanje i razvoj

3. **Klimatske promjene i energija**
– emisije stakleničkih plinova za 20 % niže od razina iz 1990.
– povećanje udjela energije dobivene iz obnovljivih izvora na 20 %
– povećanje energetske učinkovitosti za 20 %

4. **Obrazovanje** – prijevremeno napuštanje školovanja ispod 10 %
– najmanje 40 % osoba u dobi od 30 do 34 godine sa završenim visokim obrazovanjem

5. **Siromaštvo i socijalna isključenost** – smanjenje broja ljudi koji žive u siromaštvu / socijalnoj isključenosti ili su izloženi riziku od takvog života za najmanje 20 milijuna

Posljedice klimatskih promjena - šta kaže EU

- Topljenje leda i dizanje nivo mora
- Ekstremni vremenski uslovi i promijenjen raspored padavina
- Posljedice u Evropi
    - U južnoj i središnjoj Evropi sve su češći toplinski talasi, šumski požari i suše.
    - Na mediteranskom području sve su sušniji uslovi zbog čega je ono još osjetljivije na sušu i šumske požare.
    - Sjever Evrope postaje sve mokriji te bi moglo doći do redovne pojave poplava tijekom zime.
    - Urbana područja, gdje danas živi 4 od 5 Evropljana, izložena su toplinskim talasima, poplavama ili podizanju razine mora, ali često su slabo opremljena za prilagodbu klimatskim promjenama
- Posljedice u zemljama u razvoju (više ovisne o životnoj sredini i manje resursa)
- Rizici za zdravlje ljudi (smrtni slućajevi zbog vrućine)
- Troškovi za društvo i gospodarstvo (poljoprivreda, energetika, šumarstvo...)
- Rizici za divlju floru i faunu (izumiranje)

Klimatske promjene u BiH

BiH

42 % planine
24 % brda
29 % kraške oblasti
5 % nizije

Ekstremne klimatske pojave u Bosni i Hercegovini su sve učestalije. Od posljednjih 12 godina, šest su bile veoma do ekstremno sušne (2003, 2007, 2008, 2011, 2012, 2013). Također, veoma su česte godine s velikim do katastrofalnim poplavama (2001, 2002, 2009, 2010, 2014). Ekstremne klimatske pojave su naročito izražene tokom sedam posljednjih godina (tokom 2009. i 2010. zabilježene su velike poplave, u 2011, 2012. i 2013. desile su se velike suše i talasi s visokim/tropskim temperaturama, početkom 2012. talas velike hladnoće, te pojava olujnih vjetrova polovinom 2012).

TNI – šta piše ?

- Povećana je varijabilnost i intenzitet ekstremnih vremenskih uslova (**toplotni talasi**, intenzivne padavine, olujni vjetrovi, dani s gradom...). U posljednjih pet godina Bosna i Hercegovina je suočena s nekoliko izuzetnih ekstremnih klimatskih i vremenskih epizoda koje su uslovile značajne materijalne i finansijske deficite, kao i gubitke ljudskih života. Dva najznačajnija događaja su **suša iz 2012**. i poplave **tokom 2014**.

TNI – šta piše ?

- Analizirani period: 1961 – 2014.
- Povećanje srednje godišnje tempreture vazduha u rasponu **0,4 - 1,0 °C**
- April - septembar i do +1,2 °C
- Svi indeksi toplih temperaturnih ekstrema imaju pozitivne trendove

- Neznatno povećanje količine padavina na godišnjem nivou
- .... Zbog povećanog intenziteta padavina i njegove veće promjenljivosti, kao i zbog povećanog udjela jakih kiša u ukupnoj visini kiša, povećan je rizik od poplava naročito u sjeveroistočnom dijelu BiH

TNI (posljedice na poljoprivredu) – šta piše ?

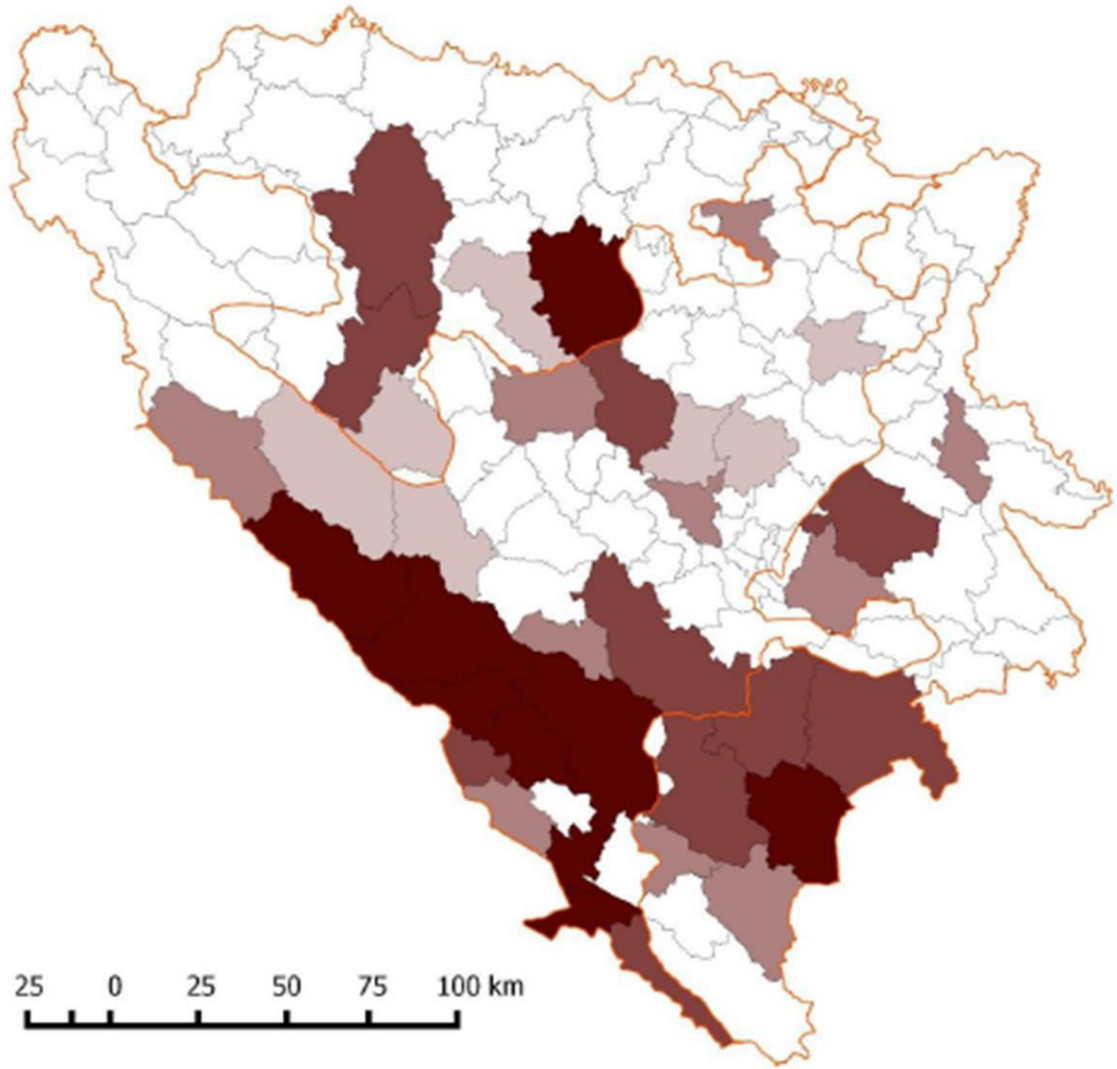
- Jedan od sektora koji je najviše pogođen
- Dominantno negativne posljedice, ali ne i isključivo
- Područje uzgoja voća i vinove loze će se proširiti
- Pozitivan uticaj na ozime usjeve
- Ugroženi jari usjevi
- Aridnija klima – navodnjavanje neizostavno
- Prouzrokovači bolesti i štetočine

Hazard and Risk Maps of Bosnia and Herzegovina

First Version
May 2016

Opasnost od zemljotresa

Bosnia and Herzegovina Earthquake Hazard Map



1. Data

This earthquake (EQ) hazard map is based on analysis of earthquake events from 1950 to 2015. The color coding of municipalities indicates the relative level of earthquake risk. The map sums the number and magnitude of seismic events above 4 on the Richter scale within municipal borders.

2. Legend

Entity Border

Municipal Border

Earthquake Hazard Level [# of municipalites] [143]

- Very High [11]
- High [10]
- Medium [11]
- Low [9]
- Very Low [10]

Earthquake Events by Magnitude [133]

- 5.5 - 7 [6]
- 5 - 5.5 [14]
- 4.5 - 5 [26]
- 4 - 4.5 [87]

3. Sources

Data from the United States Geological Survey (USGS) Earthquake Archives extracted on 28 August 2015 filtered by location, magnitude and time period.

4. Feedback

erik.kjaergaard@one.un.org, aida.hadzic-hurem@undp.org and jeremy.wetterwald@gmail.com

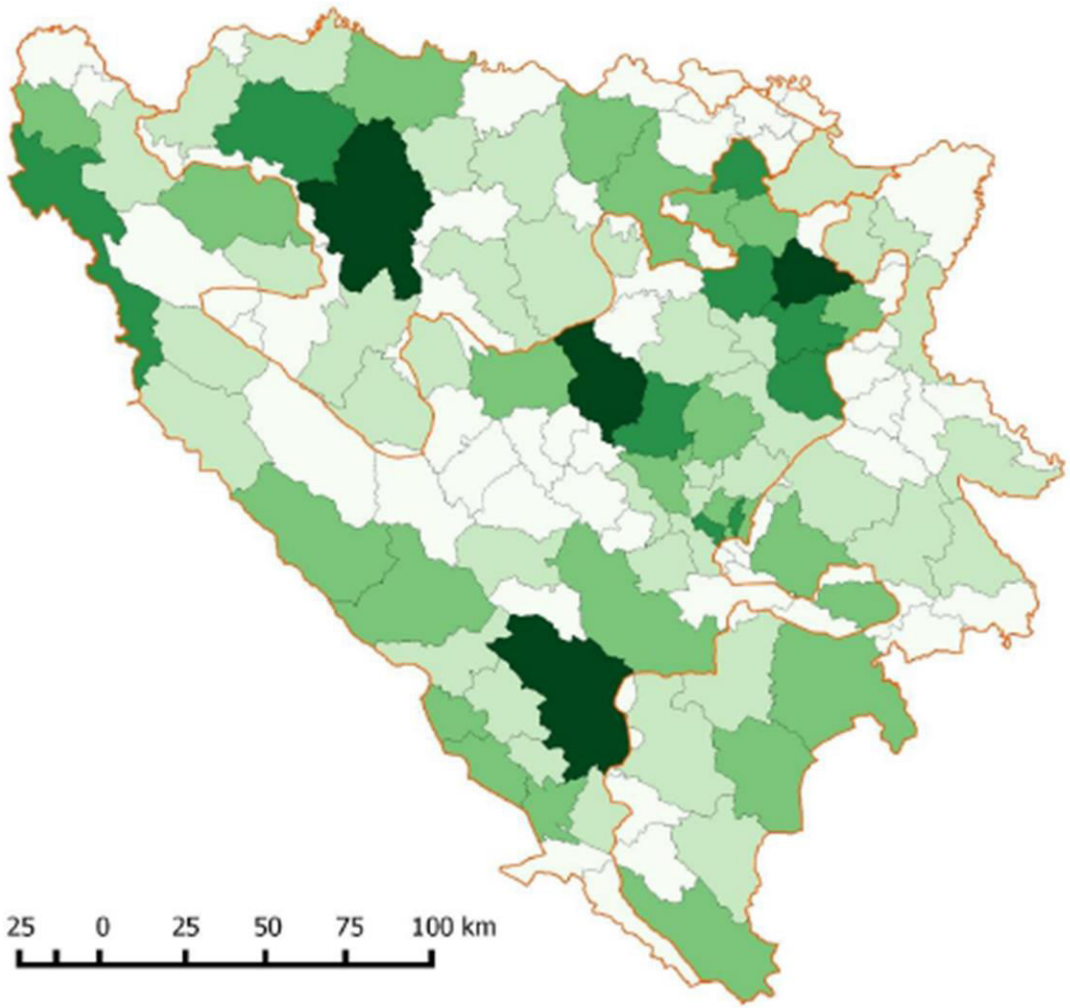
5. Disclaimer

The depiction and use of boundaries, geographic names and data shown here are not warranted to be error-free nor do they imply official endorsement or acceptance by the United Nations or the Government of BiH.

Date created 25 January 2016

Opasnost od klizišta

Bosnia and Herzegovina Landslide Hazard Map



1. Data

This modelled hazard map is based on an analysis of four variables of landslide susceptibility including lithology, slope, precipitation and land cover use in order to create area polygons representing the relative level of risk. The data sets were summed and weighted at the municipal level to create a composite risk index represented by the colour coding of municipalities.

2. Legend

Entity Border

Municipal Border

Landslide Risk Level [# of municipalites] [143]

- Very High [4]
- High [9]
- Medium [25]
- Low [38]
- Very Low [67]

3. Sources

Data for modelling was extracted from the Corine 2006 Landcover by the European Environment Agency (EEA), and by Digital Elevation Model (DEM) provided by the US Geological Survey (USGS) Global Multi-resolution Terrain Elevation Data. Other sources include BiH data by the UNDP Flood and Landslide Housing Risk Assessment.

4. Feedback

erik.kjaergaard@one.un.org, aida.hadzic-hurem@undp.org, jeremy.wetterwald@gmail.com

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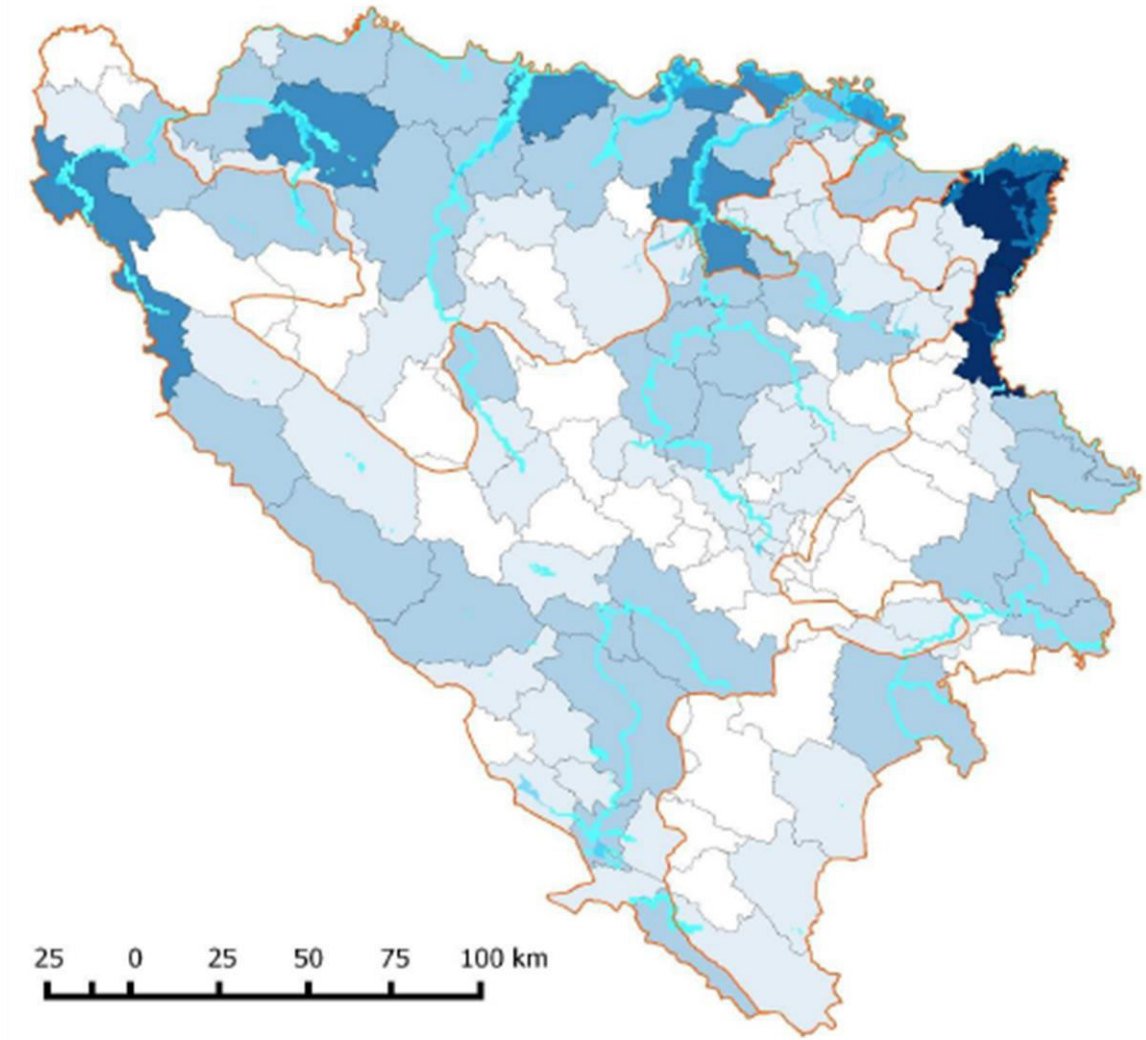
Date created 25 January 2016

Opasnost od poplava

Bosnia and Herzegovina Flood Hazard Map



1. Data

This flood hazard map is based on analysis of flood events 1999-2014. The raster data shows the number of sq kilometer flooded multiplied by the frequency of flooding events in all municipalities in BiH. The color coding of municipalities indicates the relative level of flood risk.

2. Legend

Entity Border
Municipal Border
Past inundated areas
May 2014 inundated areas

Flood Risk Level [# of municipalities] [143]

Very High [2]
High [7]
Medium [36]
Low [51]
Very Low [47]

3. Sources

Data from the Global Risk Data Platform extracted by UNEP/GRID-Europe. The datasets from 1999 onwards combine modelled data with analysis of real events. In order to account for the May 2014 floods, additional vector data from UNDP was added to the flood analysis.

4. Feedback

erik.kjaergaard@one.un.org, aida.hadzic-hurem@undp.org and jeremy.wetterwald@gmail.com

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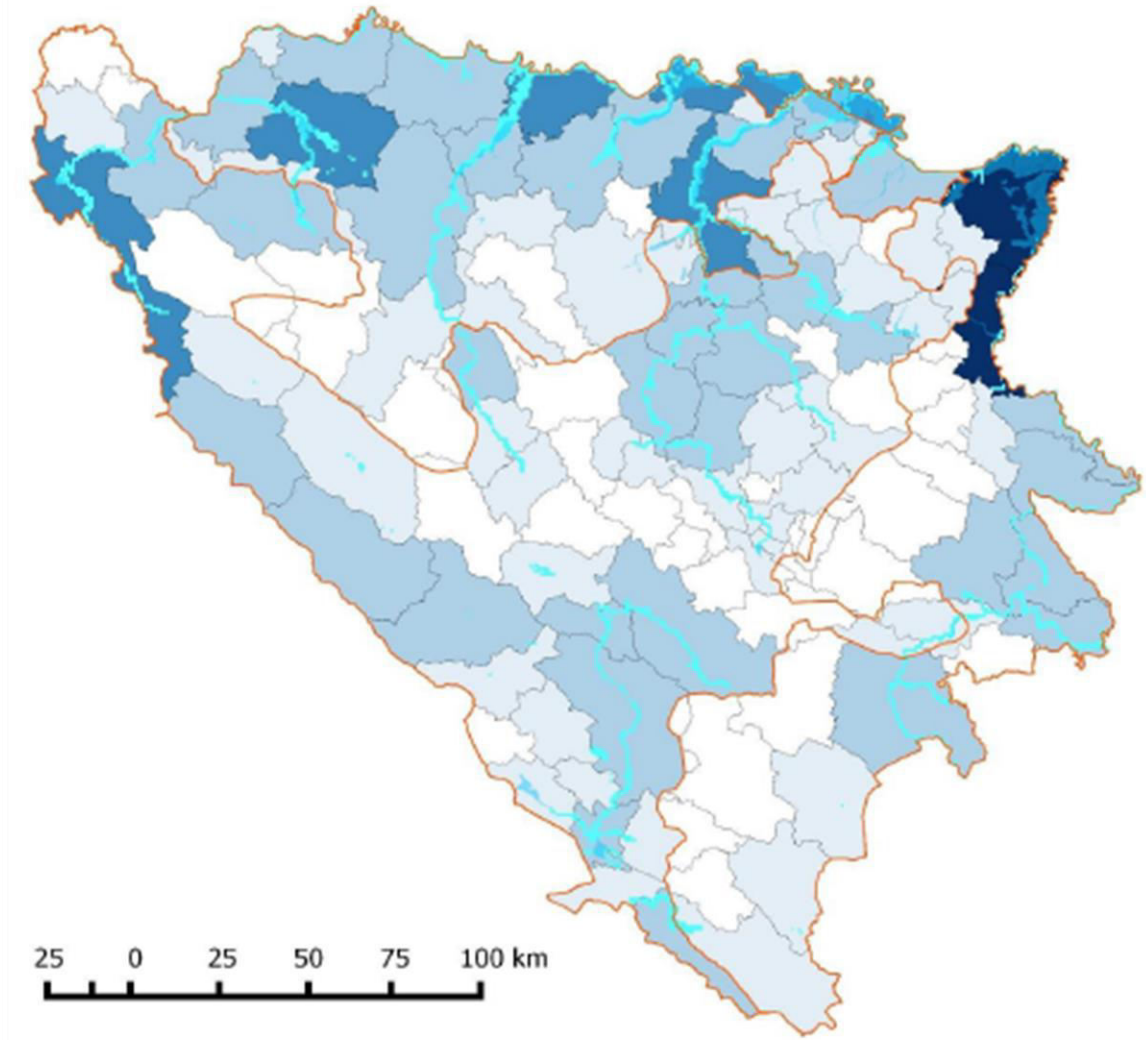
Date created 25 January 2016

Opasnost od poplava

Bosnia and Herzegovina Flood Hazard Map



1. Data

This flood hazard map is based on analysis of flood events 1999-2014. The raster data shows the number of sq kilometer flooded multiplied by the frequency of flooding events in all municipalities in BiH. The color coding of municipalities indicates the relative level of flood risk.

2. Legend

Entity Border
Municipal Border
Past inundated areas
May 2014 inundated areas

Flood Risk Level [# of municipalities] [143]

Very High [2]
High [7]
Medium [36]
Low [51]
Very Low [47]

3. Sources

Data from the Global Risk Data Platform extracted by UNEP/GRID-Europe. The datasets from 1999 onwards combine modelled data with analysis of real events. In order to account for the May 2014 floods, additional vector data from UNDP was added to the flood analysis.

4. Feedback

erik.kjaergaard@one.un.org, aida.hadzic-hurem@undp.org and jeremy.wetterwald@gmail.com

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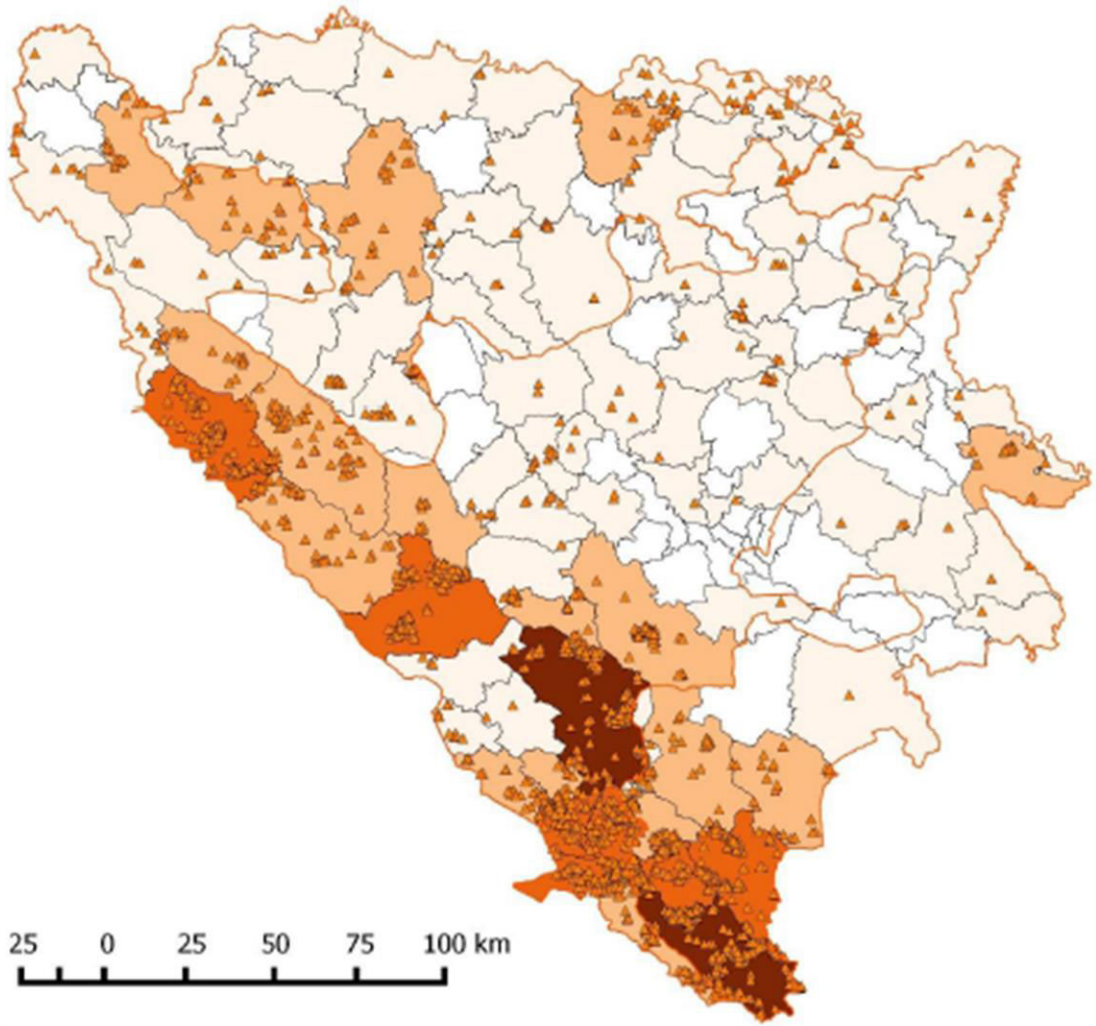
Date created 25 January 2016

Opasnost od poplava

Bosnia and Herzegovina Fire Hazard Map



1. Data

This fire hazard map is based on analysis of fire events 2001-2014. The vector data shows fire events at the GPS coordinate level. The color coding of municipalities indicates the relative level of fire risk estimated by a count of High Temperature Events (HTE) within municipal borders.

2. Legend

Entity Border

Municipal Border

High Temperature Events (HTE)

Fire Risk Level

Very High

High

Medium

Low

Very Low

3. Sources

Data from the Fire Information for Resource Management System (FIRMS) provided from Earthdata by NASA. The datasets from 2001 to 2015 is a count in polygon analysis of real events with a confidence above 80% using the MODIS near real-time (NRT) active fire / hotspot database.

4. Feedback

erik.kjaergaard@one.un.org, aida.hadzic-hurem@undp.org, jeremy.wetterwald@gmail.com

5. Disclaimer

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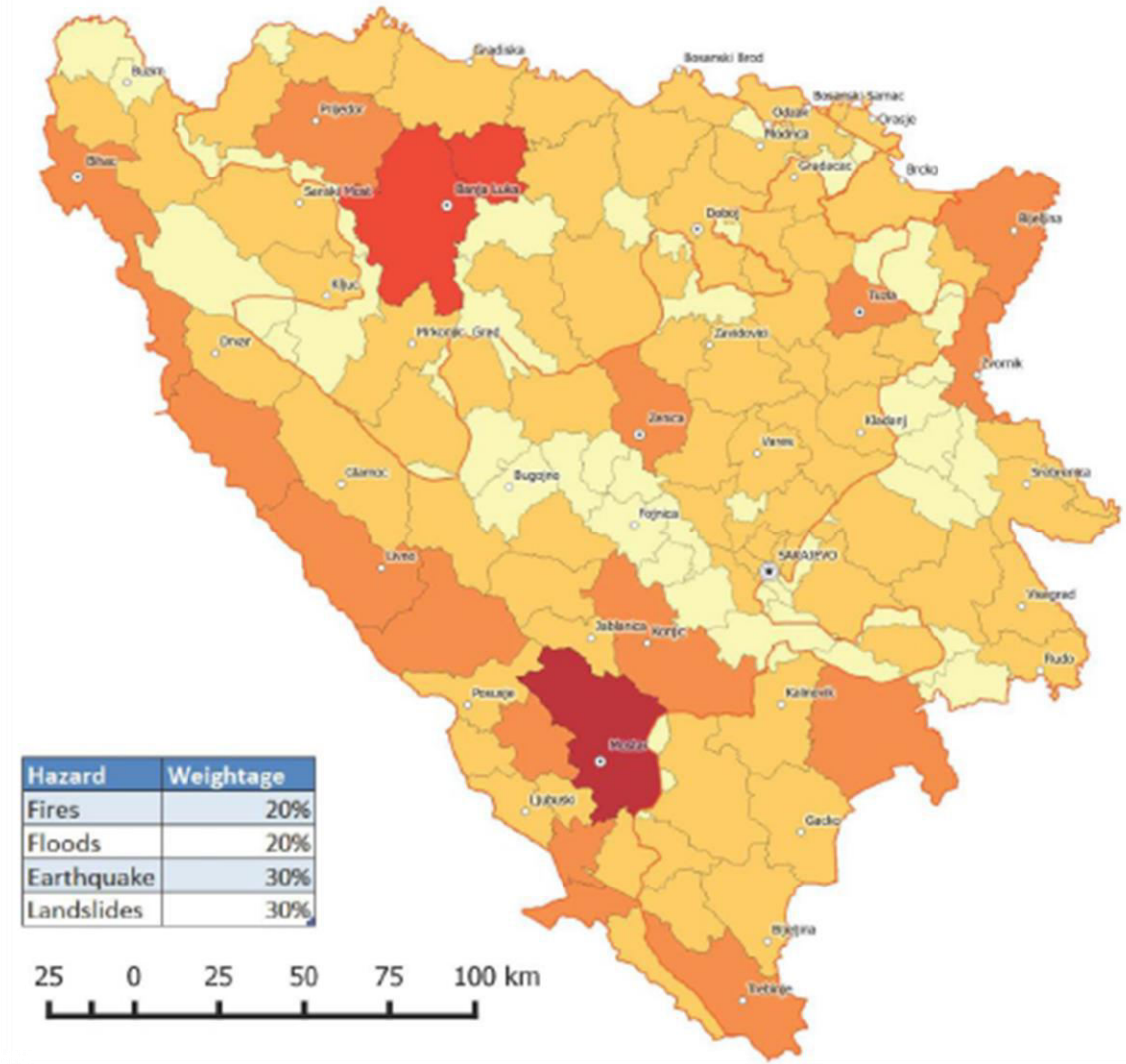
Date created 26 January 2016

Agregatna opasnost

Bosnia and Herzegovina Multi-Hazard Map 3

Sudden Onset Disaster Focus



Hazard	Weightage
Fires	20%
Floods	20%
Earthquake	30%
Landslides	30%

25 0 25 50 75 100 km

1. Data

This multi-hazard map depicts fire, earthquake, flood and landslide susceptibility by municipality. The map depicts a composite index of four hazards with the following weightage: floods (20%), fires (20%), earthquakes (30%) and landslides (30%). This weightage pays special attention to sudden-onset hazards that threaten the survival of people in at-risk municipalities.

2. Legend

Entity Border

Municipal Border

Natural hazard susceptibility [# of municipalities] [143]

- Very High [1]
- High [2]
- Medium [15]
- Low [74]
- Very Low [51]

3. Sources

For data sources please refer to the four individual hazard maps for Bosnia and Herzegovina developed September 2015 to February 2016. The data sets were normalized and merged based on the index described above and mapped in QGIS.

4. Feedback

erik.kjaergaard@one.un.org, aida.hadzic-hurem@undp.org, jeremy.wetterwald@gmail.com

5. Disclaimer

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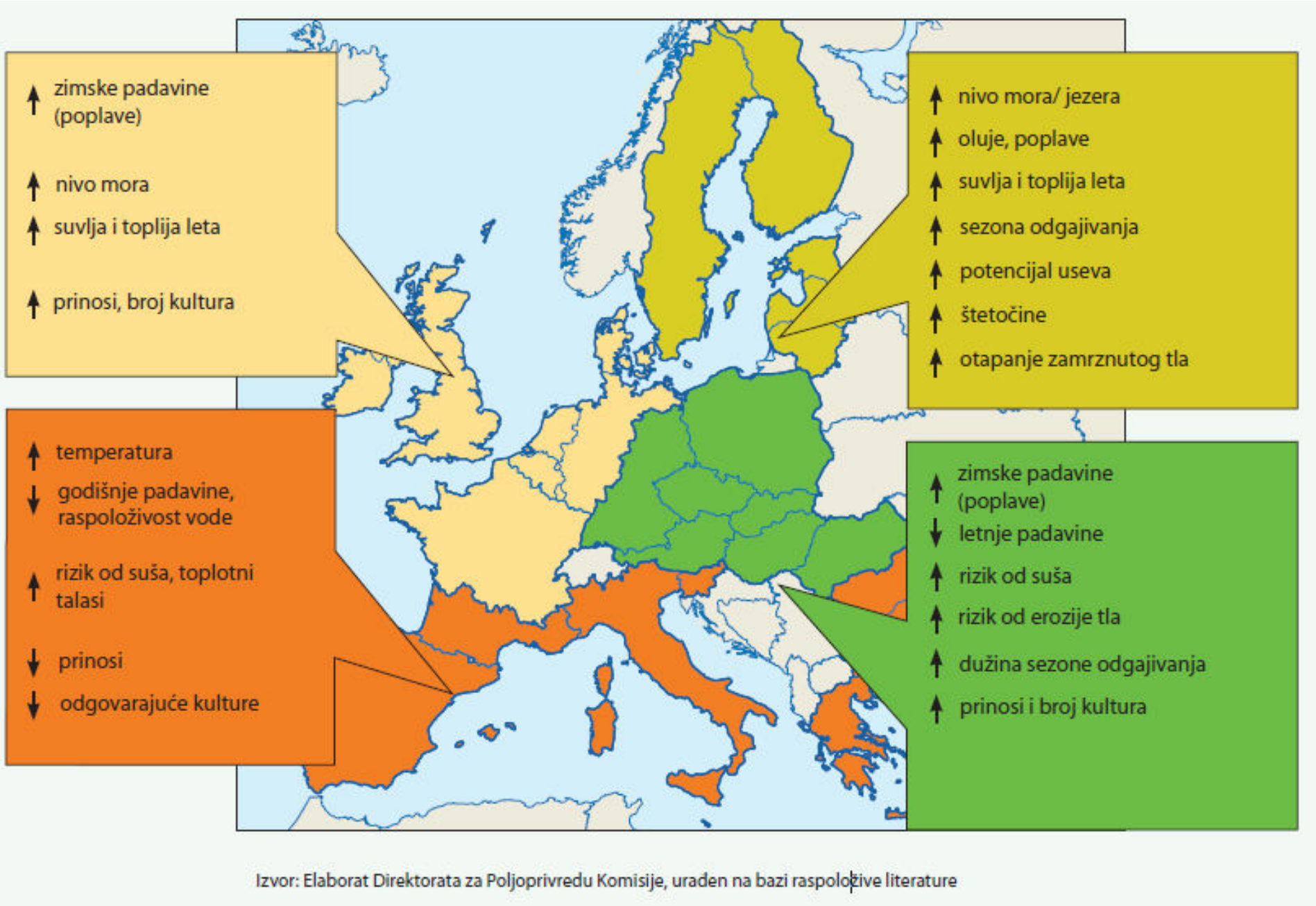
Date created 17 February 2016



Izvor: Elaborat Direktorata za Poljoprivredu Komisije, uraden na bazi raspoložive literature

Klimatske promjene – kratak osvrt na malinu

Klimatske promjene – kratak osvrt na malinu

- Sortama maline nikako ne odgovaraju visoke temperature u periodu vegetacije, naročito ako se javljaju u fenofazi sazrevanja plodova i ako duže traju. Takođe, nepovoljni uslovi su i relativna vlažnost ispod 65% praćena visokim dnevnim temperaturama

Najviše, ali i najniže temperature u istoriji su zabilježene u 21. vijeku:

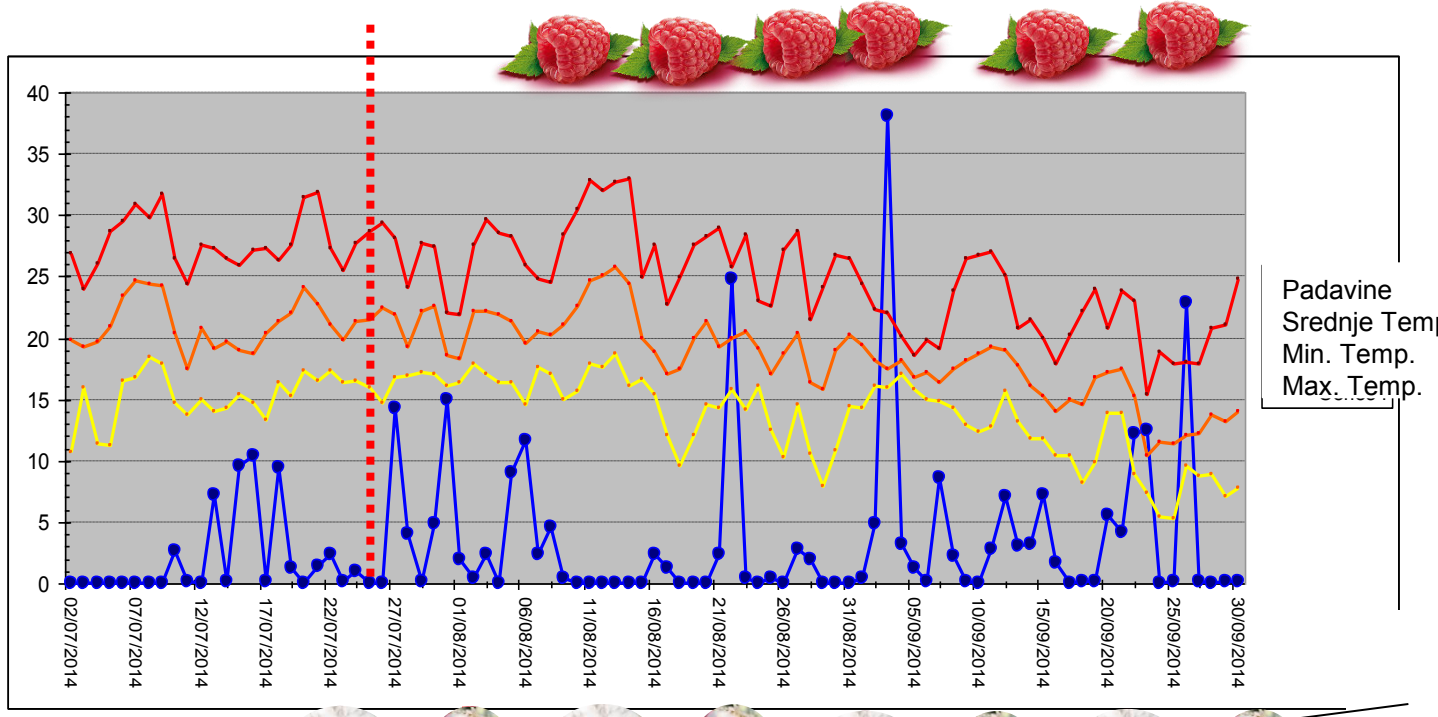
+44,9 °C 24.07.2007.
Smederevska Palanka

-39,0 °C 26.01.2006.
Karajukića Bunari

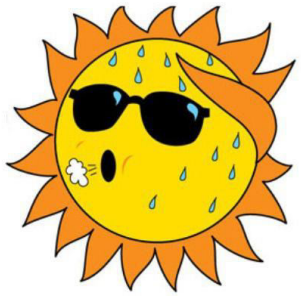
Od sredine 80-tih godina toplotni talasi* imaju veću čestinu, javljaju se u prosjeku svake godine (ili se čak godišnje javi i više od jednog toplotnog talasa) i duže traju!
Prije 80-tih prosjek je bio da se toplotni talas javlja jednom u dvije godine, ili čak jednom u tri godine.

* Toplotni talas = **6 i više dana** u kojima je najviša dnevna temperatura za **5,1 ºC** viša od višegodišnjeg prosjeka

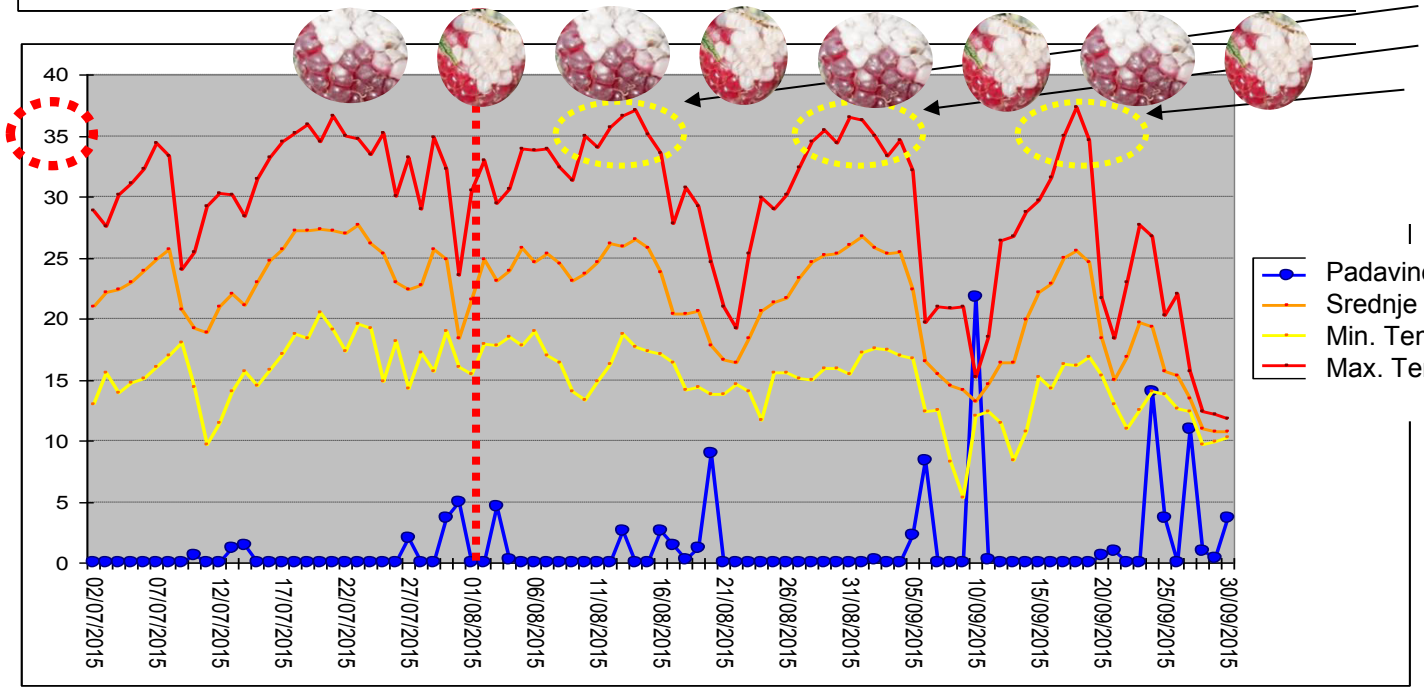
2014.



2014, prijatno ljeto, dug period berbe Polke, dobar i kvalitetan prinos...



2015.



2015, vrelo ljeto, Čak tri toplotna talasa Kratak period berbe, loš kvalitet i prinos...

Ožegotine na plodovima usljed visokih temperatura

Proljeće 2016

Malinjaci jugo-zapadne Srbije...

Proljeće 2017.

O čemu razmišljati ??? (sa aspekta agroekonomije)

- Osiguranje zasada
- Povećati investicije (navodnjavanje, mreža...)
- Mjere agrarne politike
- Manja površina, veća investicija
- ICT, precizna, pametna poljoprivreda

Hvala na pažnji !!!