

⇒ The key elements for the open data in agriculture in Croatia

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2nd TODO Research Seminar on Open Data 1. - 2. July 2021



This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement Number 857592 - TODO

Agriculture open data in Croatia



A

TODO project initiative at Faculty of Agriculture, University of Zagreb



TODO team and research group formed at FAZ

B

Agriculture sector diversity and background in Croatia



Who opens data?

C

Why open data and stakeholders



Policies, stakeholder needs

D

Landscaping results - Key data categories and quality



Which data, applications, portals, databases?

E

TODO framework for open data ecosystem assessment



F

Conclusions at the current state





A

The onset of open data initiative for agricultural sector in Croatia

TUDO PROJECT INITIATIVE AT FACULTY OF AGRICULTURE, UNIVERSITY OF ZAGREB



OD research at AGRI-UNIZG



- Primarily OD users
- OD providers
 - project and/or researcher based, centres of excellence
 - raw and modified data,
- Research **with** OD
 - Research OD: mostly
 - food production sector data: very diverse
- Research **on** OD
 - beginning with TODO



AGRI TODO Team



prof. Alen Džidić, PhD

- Biostatistics
- Automated milking production

- Genetic resources

assist. prof. Maja Ferenčaković, PhD



- animal, tissue, DNA collections
- animal inventory and location

assist. prof. Dragica Šalamon, PhD



- plant databases and portals

Filip Varga, PhD

A

Faculty of Agriculture, UNIZG



- Art, economics, biotechnology, biomedicine...



- Natural resources data (*genetics, farm resources, biodiversity, invasive species...*)
- Earth and Environment data (*meteorological, elevation, hydrology, soil...*)
- Policy and administration data (*government, agricultural land, official records, gov. finance, rural development...*)
- Socio-economic data (*infrastructure, market, land use, productivity, value chain*)
- Agronomy (*pest*)
- Agricultural technology (*Disease management, Production advice*)
- *Landscape modelling and value*

A



UNIZG
Faculty of Humanities
and Social Sciences



UNIZG
Faculty of Sciences
Division of Biology



ESRs: Larisa Hrustek FOI
Filip Varga, AGRI

foi





Interdisciplinary research group focusing on open data



Two IRD-OD meetings since this spring.

assist. prof. Hrvoje Kutnjak, PhD
- land use, desertification, carst



prof. Ivica Ljubičić, PhD
- Herbariums and botanical
gardens



assist. prof. Igor Bogunović, PhD
- soil sciences



assist. prof. Lucija Blašković, PhD
- Communication systems
- Data literacy and OD in
education



assist. prof. Dubravka Mandušić, PhD
- digital agriculture



assist. prof. Petra Posedel Šimović
- business statistics
- Machine learning, wine





Plans



- Agriculture sector in Croatia - **landscaping**
 - **Datasets, bases, applications, portals** assessment
 - Stakeholders, needs
 - Useful production data (real time predictive data and models)
 - **Synthesis/evaluation**
- Biological databases in Croatia
 - Botanical – Filip Varga
 - animal spatial, temporal, movement data (GEOD)
 - DNA (crio, in silico)
 - Resources and potential in Croatia
 - Genomic databases – metadata, data quality
- Data literacy + OD in/for Education
 - Tresholds
 - Needs and opportunities

B



Who opens data?

AGRICULTURE SECTOR DIVERSITY AND BACKGROUND IN CROATIA

B

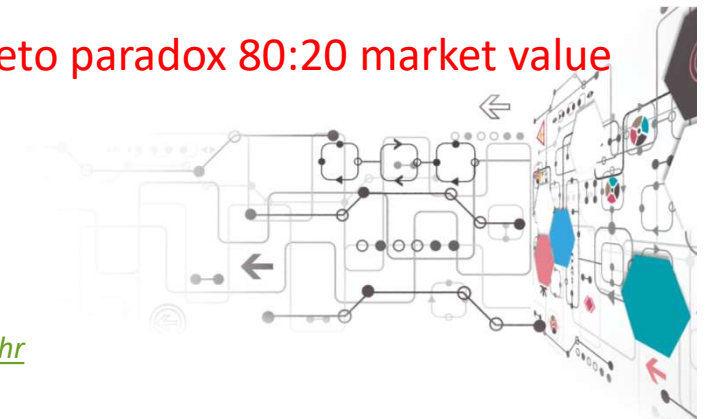
Sector diversity – agriculture in general



- Basis:
 - cultivating certain plants
 - raising domesticated animals
 - sustainable harvesting of natural resources
- husbandry, forestry, fisheries, horticulture, aquaculture...
 - many contextual differences affecting scope of activities, priorities and capacities (different types of actors and organisations)
 - Industrial food production 30%
 - Small urban producers 7,5%
 - Small rural producers 50%

Total globally produced food
12,5%

Pareto paradox 80:20 market value

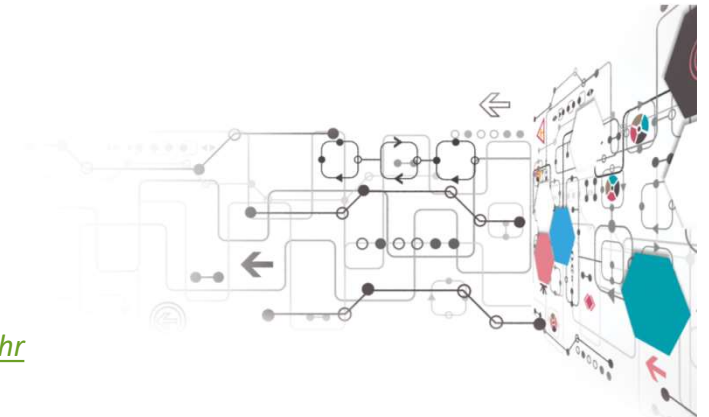


B

4th industrial and 4th agricultural revolution



- Arable farming – first field “to go”
 - As in other countries
- What about other fields?
 - Digital agriculture transition
- Accurate and up-to-date agriculture data can be difficult to obtain



C



Policies, stakeholder needs

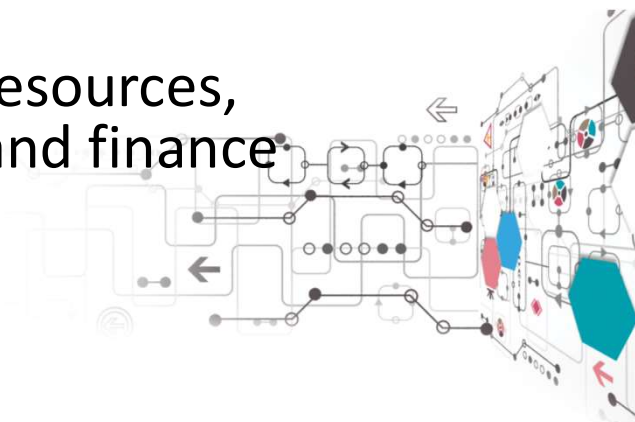
WHY OPEN DATA AND STAKEHOLDERS



Responsibility for collecting and maintaining data



- different government organisations
 - inefficient use of scarce public resources
- data assets are also (semi) privatized
- relevant government data for AG can generally be found in:
- the ministry of AG + associated extension, research or subsidy bodies;
 - other government agencies (may be semi-privatised)
 - weather and climate data, geographical data, and statistical offices
 - ministries dealing with water, natural resources, infrastructure, spatial planning, trade and finance

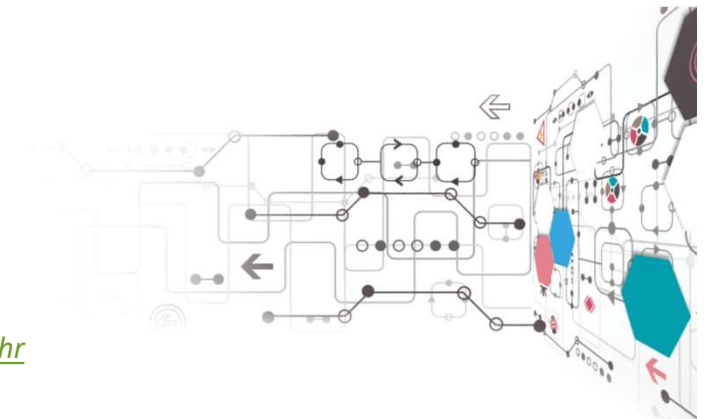




Also opening data with AG value



- Nongovernmental organisations
 - LAGs, FLAGs, Breeders associations, NGOs
- Peripheral governmental
 - Counties, municipalities, cities
- Buisness
 - Producers, farms, advisory

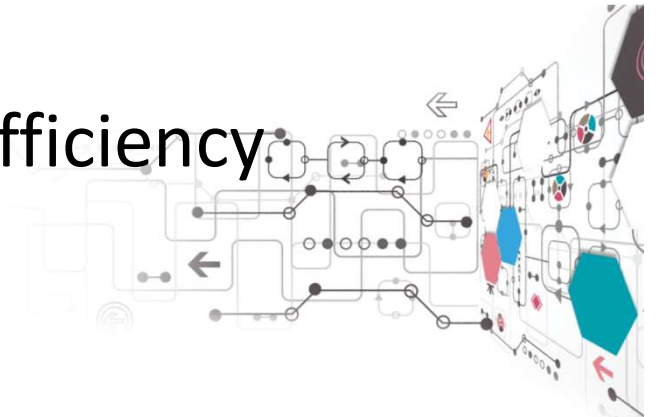




Why open AGRI datasets



- Connecting agriculture data to user needs is more or less general for different AGRI fields
 1. Empowering the farmer (especially small)
 2. Optimizing agricultural practice
 3. Stimulating rural finance
 4. Facilitating the agri value chain
 5. Enforcing policies
 6. Government transparency and efficiency

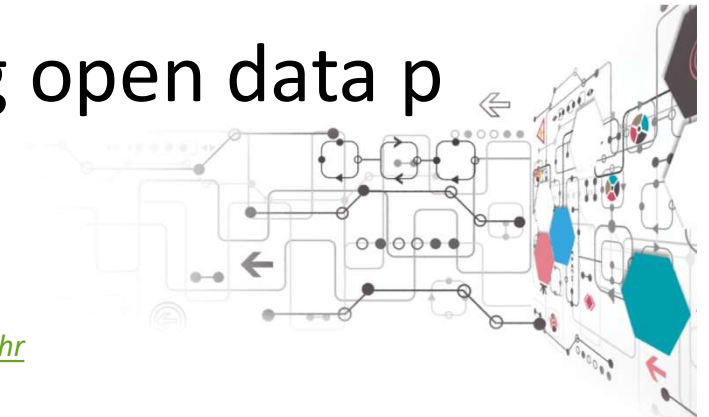




Define stakeholders and their needs



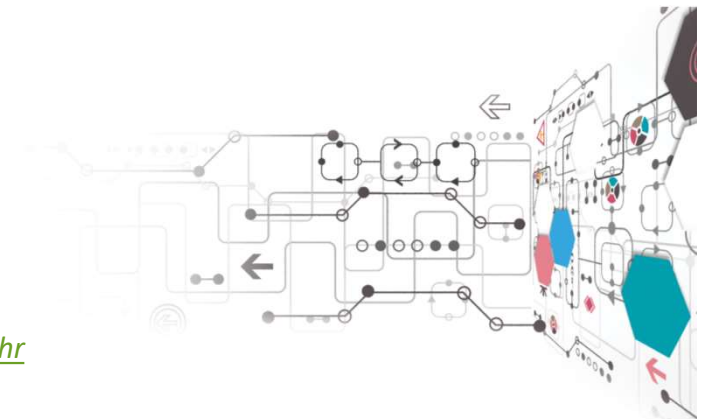
- In general
- For each agricultural field
- To have timely AND comprehensive + Comparable and interoperable DATA
- to identify stakeholder distinct needs when designing open data policies



Hrustek L, Tomičić Furjan M, Džidić A.,
Šalamon D, Varga F, van Loenen B **Key stakeholder groups for digital
innovation of agriculture in Croatia.**



- smallholder farmer -> needs information at a plot level **Not so much... if any**
 - to make operational or strategic decisions on when to plant what crop and how to manage these crops on his or her farm
- By contrast, financial service providers -> require more general picture of agricultural risks or harvest successes in a region **...Have this**
 - to determine a strategy for their operations
- Five groups of stakeholders have been identified in the agricultural ecosystem:
 - agricultural producers/ farmers,
 - management and support organisations (advisory organisations)
 - consumer organisations/ consumers,
 - researchers and scientists and
 - Suppliers
- Next steps... - what are their data needs, regarding the mentioned 6 general AG-data policies



D



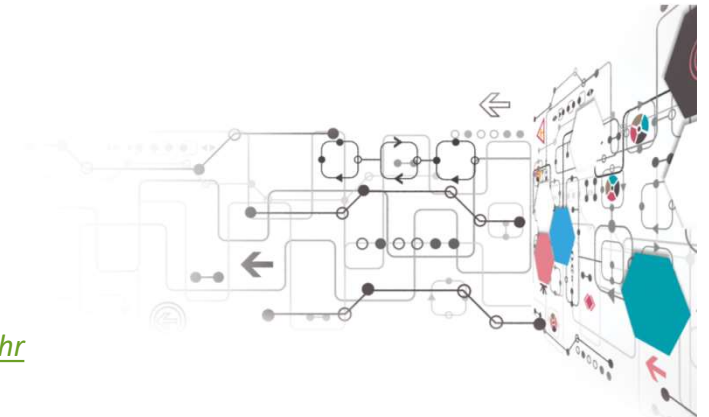
Which data, applications, portals, databases?

LANDSCAPING RESULTS – AG KEY DATA CATEGORIES AND QUALITY

Key AG- dataset categories



- responsibility on the government to make this data available in a meaningful way:
 - **pest and disease management,**
 - **production advice,**
 - **soil,**
 - hydrology,
 - elevation,
 - meteorology,
 - **markets,**
 - **infrastructure,**
 - **value chain,**
 - **land use and productivity,**
 - **rural projects,**
 - government finance,
 - official records and regulations





Open data in agriculture in Croatia



Šalamon D. (2019): Overview of open data in Croatia available for use in the sector of agriculture.

The screenshot shows the data.gov.hr website interface. At the top, there is a search bar with the text "Pretražite podatke..." and a search icon. Below the search bar, there is a navigation menu with options: "Podaci", "Aplikacije", "Dodatni sadržaji", and "Kontakti". The main content area displays "30 Rezultata" (30 Results) sorted by "Popularnosti" (Popularity). The results are listed in a grid format, each with a title, a brief description, and a "Popularity" score. The first result is "Bilanca vina" (Wine Balance) with a popularity score of 29. The second result is "Broj ekoloških jaja za konzumaciju" (Number of organic eggs for consumption) with a popularity score of 28. The third result is "Broj ekoloških poljoprivrednih subjekata" (Number of organic agricultural subjects) with a popularity score of 28. The fourth result is "Broj goveda" (Number of cattle) with a popularity score of 28. The left sidebar contains filters for "TEMA" (Topic), "FORMATI RESURSA" (Resource Formats), "IZDAVAČ" (Publisher), and "OTVORENOST REZULTATA (BETA)" (Result Openness (Beta)).



Open data in agriculture in Croatia



Podaci Aplikacije Dodatni sadržaji Kontakti

Skupovi podataka Prijedlozi za objavu Izdavači

🏠 / Prijedlozi za objavu / Posljednji prijedlozi za objavu

Prijedlozi za objavu

Ukoliko želite podnijeti prijedlog za objavu možete to učiniti nakon prijave. Da biste se prijavili u sustav morate posjedovati elektroničku vjerodajnicu za korištenje [usluga u sustavu e-Građani](#).

Prijava>

Dodatne informacije o tome kako možete postati e-Građanin saznajte [ovdje](#).

U nastavku možete pronaći popis prijedloga za objavu:

Registar iz

21.03.2017. Teme:

Opis:

Registar izvješća o provedenim energetske pregledima zgrade i izdanim energetskim certifikatima koji sukladno članku 25. Pravilnika o energetske pregledu zgrade i energetske certificiranju (NN 048/2014) ustrojava i vodi Ministarstvo...

Registar izvješća o provedenim energetske pregledima zgrada i izdanim...

21.03.2017. Teme: Energija

Opis:

Registar izvješća o provedenim energetske pregledima zgrade i izdanim energetskim certifikatima koji sukladno članku 25. Pravilnika o energetske pregledu zgrade i energetske certificiranju (NN 048/2014) ustrojava i vodi Ministarstvo...

Registar izvješća o provedenim energetske pregledima zgrada i izdanim...

21.03.2017. Teme: Okoliš

Opis:

Registar izvješća o provedenim energetske pregledima zgrade i izdanim energetskim certifikatima koji sukladno članku 25. Pravilnika o energetske pregledu zgrade i energetske certificiranju (NN 048/2014) ustrojava i vodi Ministarstvo...





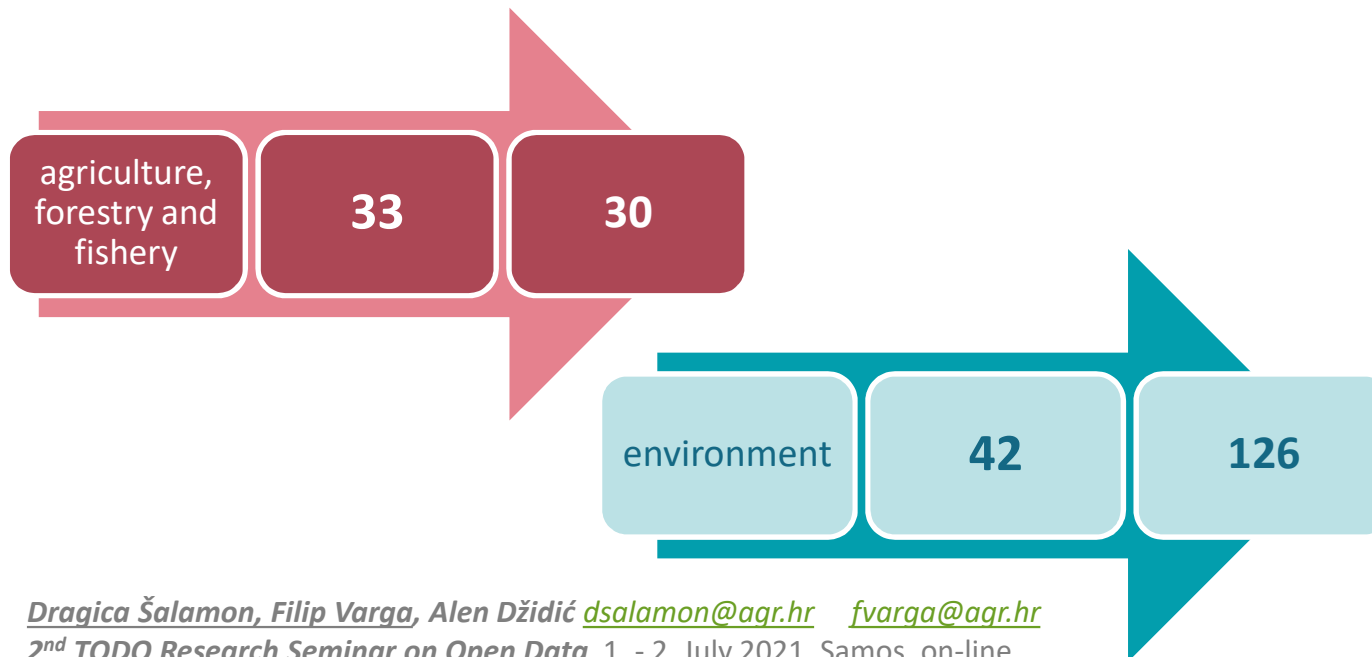
Open data in agriculture in Croatia



Šalamon D. (2019): Overview of open data in Croatia available for use in the sector of agriculture

Open data portal of the Republic of Croatia (Sep 2019 to Sep 2020)

- The only sector with reducing number of open data sets



data.gov.hr AG-data Publishers



- State Bureau of Statistics (29)
 - aggregated sets
 - .aspx with metadata
 - all (sub)selected data: .htm, .json, and various .csv, .xls format options.
 - Each set of data has the specified source, responsible service, contacts of responsible persons and copyright.
- APRRR (1)
 - lists aggregated **farm register** statistics and the register published in 2015, but the link is not valid.



Open data in agriculture in Croatia



REPUBLIKA HRVATSKA
Ministarstvo
poljoprivrede

- Vijesti
- O Ministarstvu
- Dokumenti
- Istaknute teme
- Pristup informacijama
- Kontakti
- Statistika

SLUŽBENO MJESTO ZA INFORMACIJE O KORONAVIRUSU



is important to the resor ministry

Zakoni i propisi



- Poljoprivreda
- Poljoprivredna politika
- Ruralni razvoj
- Poljoprivredno zemljište
- Ribarstvo
- Veterinarstvo
- Hrana
- Doniranje hrane
- Fitosanitarna politika
- Šumarstvo
- Lovstvo
- Drvena industrija
- Pravo na pristup informacijama
- Ratarstvo EU
- Javna nabava
- Unutarnja revizija



Open data in agriculture in Croatia



AGENCIJA ZA
PLAĆANJA U
POLJOPRIVREDI,
RIBARSTVU I
RURALNOM
RAZVOJU

**Paying Agency for Agriculture,
Fisheries and Rural Development
(PAAFRD)**

APPRRR ▾ ZAJEDNIČKA POLJOPRIVREDNA POLITIKA ▾ RIBARSTVO ▾ **UPISNICI I REGISTRI** ▾ KONTAKT



Upisnik poljoprivrednika

ARKOD

Registri

Agronet

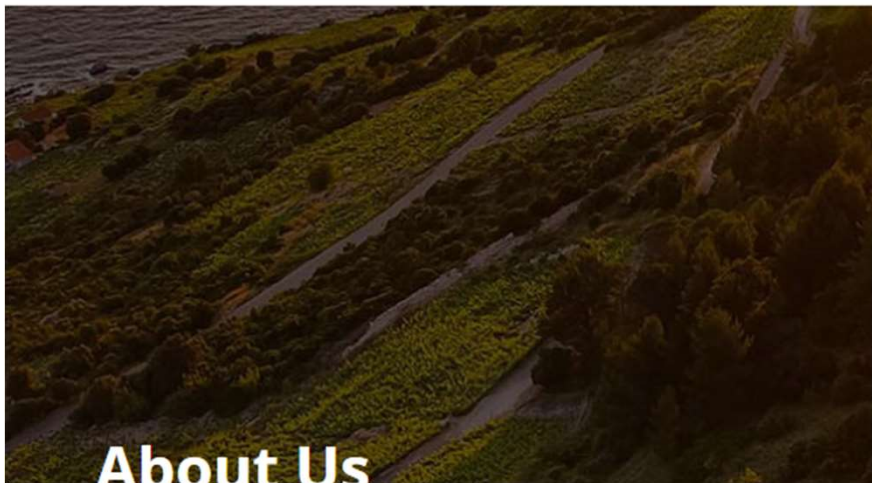
Prostorni podaci i servisi

Evidencija korisnika potpora u ruralnom razvoju i ribarstvu

Portal ponuda

Baza korisnika potpora

Otkupljivači mlijeka



About Us



Open data in agriculture in Croatia



Hrvatska agencija za poljoprivredu i hranu | Croatian Agency for Agriculture and Food | L'Agence Croate pour l'Agriculture et l'Alimentation

- Početna
- O nama
- Propisi
- Dokumenti
- Obrasci
- Publikacije
- EFSA Focal Point
- Javna nabava
- Potrošački kutak
- Kontakt
- eHAPIH**

Početna » eHAPIH

Centar za sigurnost hrane

Nacionalna mreža
Institucija u području
sigurnosti hrane i
hrane za životinje

Centar za stočarstvo

HAGRIS

Aplikacija za
posjednike

Centar za kontrolu kvalitete stočarskih proizvoda

Pregled analiza
uzoraka mlijeka

Centar za vinogradarstvo, vinarstvo i uljarstvo

e-Centar za
vinogradarstvo,
vinarstvo i uljarstvo

Centra za sjemenarstvo i rasadničarstvo

Baza podataka biljnih
genetskih izvora
Republike Hrvatske
(CPGRD)

Zbornik predavanja – 15. Savjetovanje uzgajivača goveda u Republici Hrvatskoj [PDF](#)

Kalendar stočarskih izložbi za 2019 [Word](#)

Uzgoj goveda br. 1 siječanj 2019. [PDF](#)

Uzgoj goveda br. 2 svibanj 2019. [PDF](#)

Zbornik sa savjetovanja uzgajivača goveda [PDF](#)

Zbornik sa savjetovanja uzgajivača konja 2019. [PDF](#)

Zbornik radova – 21. savjetovanje uzgajivača ovaca i koza u RH [PDF](#)

CS_govedarstvo_godišnje_izvješće_2019 [PDF](#)

CS_kopitari_godišnje_izvješće_2019 [PDF](#)

CS_ovčarstvo_kozarstvo_male životinje_godišnje_izvješće_2019 [PDF](#)

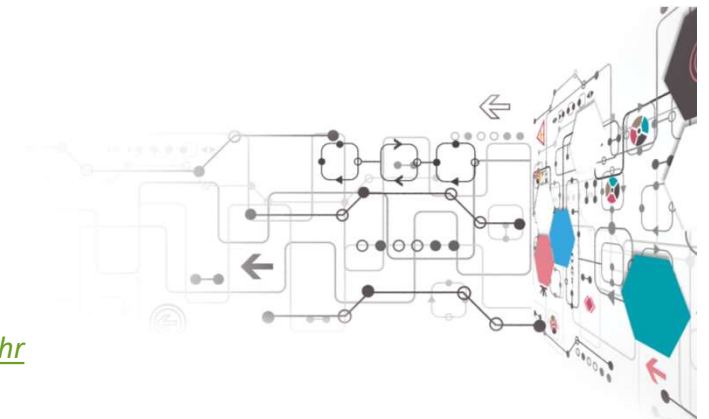
CS_svinjogojstvo_godišnje_izvješće_2019 [PDF](#)



-



Sustav poljoprivrednih knjigovodstvenih podataka





Šalamon D, Tomičić Furjan M, Džidić A, Varga F, Hrustek L, van Loenen B **Promoting digital innovation: Identifying the key elements in agricultural open data ecosystem in Croatia.**

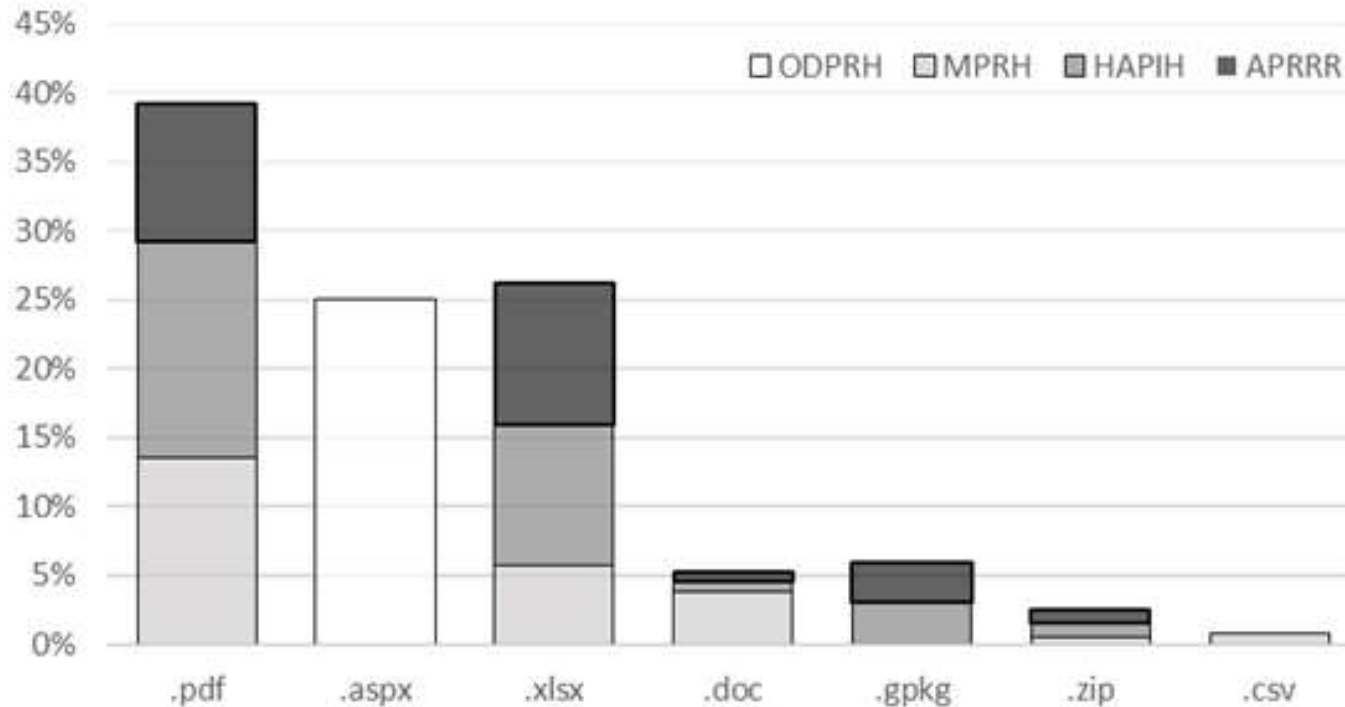


Chart 1. Shares of used formats of the number of analyzed files published by central public publishers of open agriculture data in Croatia. ODPRH – Open data portal (agriculture); MPRH – Ministry of agriculture; HAPIH – Croatian Agency for Agriculture and Food (Internet documents and documents on demand); APRRR – Paying agency

357 data files available via the Croatian Open data portal, the internet pages of the Ministry of agriculture, the Croatian agency for agriculture and food, as well as the Paying Agency for Agriculture, Fisheries and Rural Development were analysed.



- In addition to "open documents", the Ministry curates databases for different target groups (for consumers, or narrower professional communities)
 - Food bank, Hagris, SVIS, Lysacan, VetIS, Owner, Honey of the Croatian apiaries, Eggs of the Croatian farms, KOLK-VETI and By-products.
- available through (e.g. e-donations, eDPZ) web or installation applications of the Ministry.
- Access with registration,
- no information on how users can be registered.
- Honey of the Croatian apiaries, and Eggs of the Croatian farms offer limited search options for users that did not register.
- Feedback is enabled through the user system by contacting the person in charge of each application for both registered users and the ones not registered.



Biologer



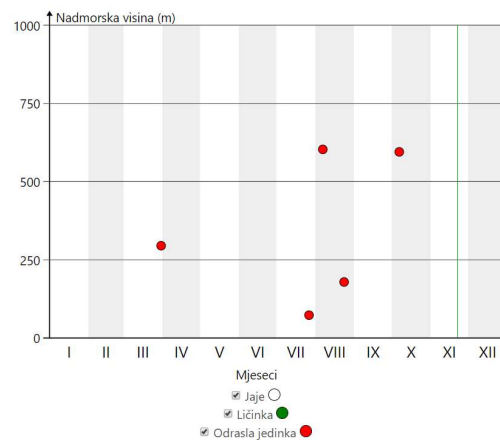
Biologer je jednostavan i slobodan softver osmišljen za prikupljanje podataka o biološkoj raznolikosti. Zajednica „Biologer.hr“ broji 85 korisnika, koji su prikupili 31743 nalaza.

Pregledaj podatke [Android aplikacija](#)
Leptoglossus occidentalis

Carstvo: **Animalia**
Koljeno: **Arthropoda**
Potkoljeno: **Hexapoda**
Razred: **Insecta**
Red: **Hemiptera**
Podred: **Heteroptera**
Porodica: **Coreidae**
Rod: **Leptoglossus**



© Toni Koren (Otvorena)



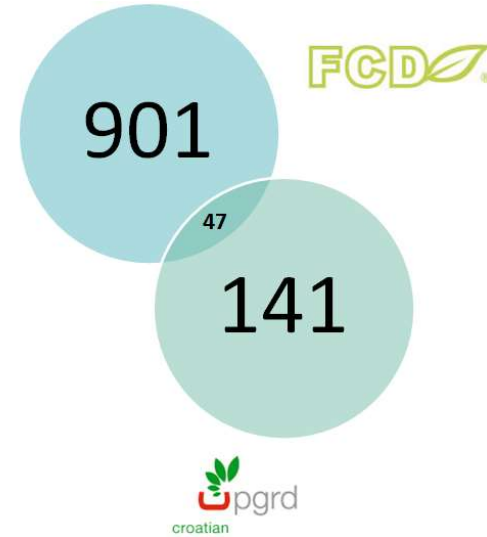
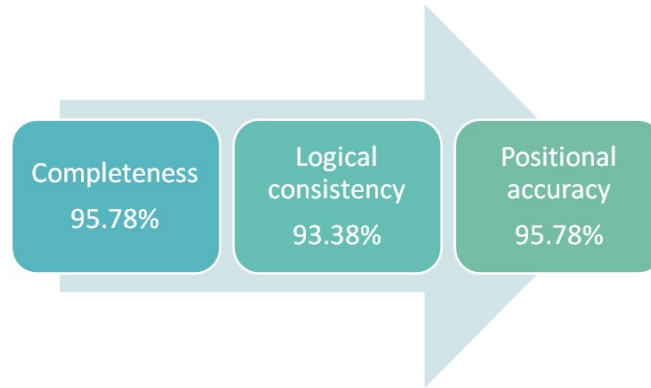
O nama [Prijava](#) [Registracija](#)

Skupine Spisak vrsta Pronađi u skupini

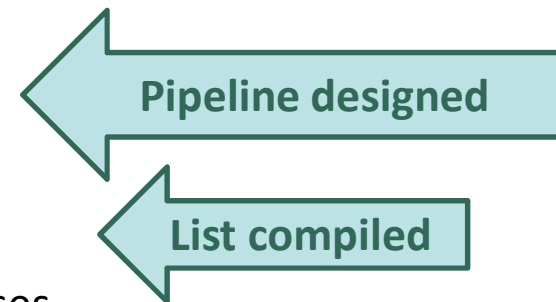
Dragica Šalamon, Filip Varga, Alen Džidić dsalamon@agr.hr fvarga@agr.hr
2nd TODO Research Seminar on Open Data 1. - 2. July 2021, Samos, on-line

D

Varga F., Grdiša M., Nikolić T., Guberović E., Bosnić I., Welle Donker F., Šalamon D (in press 2021) **Spatial records quality for Dalmatian pyrethrum from Croatian Open Databases.**



- Developing a tool for automatic assessment of positional/attribute accuracy
- Identifying the users of one or both databases and interviewing them
- Expanding the quality assessment to whole databases
- Assessment of openness of whole domain





Šalamon D., Blašković L., Džidić A., Varga F., Čavrak I., Bosnić I.
(2020) **Data literacy in the sector of agriculture of Croatia: Learning about and with open data**



- Limited education on OD and OD usage was found. Qualitative descriptive design was used to classify semi-structured interviews with the chosen early adopters, and document analysis of their course materials. Thematic analysis focusing at data skills and knowledge **showed that the lowest number of interviews and course materials is connected to developing digital competences of the students and developing data literacy of the lecturers.** The greatest number of references in the interviews and the documents was **relating to technical and conceptual skills required to understand and effectively use data**, and to combine domain knowledge with data literacy.
 - **Not mentioned explicitly** in the ECTS catalogue.
 - **Mentioned exceptionally** in the interviews.
 - Used by the early adopters **almost exclusively in graduate courses.**
- **Undergraduate courses:**
 - - 2.8% legislation and norms
 - 5% Examples world/Croatia
- **Master:**
 - 7.5% legislation and norms
 - 10.4% cases and examples
 - 5.8% data

E



AGRI results so far

TODO FRAMEWORK FOR OPEN DATA ECOSYSTEM ASSESSMENT

E

Dataset evaluation results



CPGRD datasets	OD Governance	Availability	Portals	Impact
	No formal policy Not specified	Free and open Not really findable	Not machine readable	No impact tracked
	Not applicable...	Not approachable Not downloadable	Versions not open, not tracked	

F



CONCLUSIONS AT THE CURRENT STATE

Open data research challenges in agriculture



- Diversity in agriculture- **real need for interdisciplinary approach**
- Scattered OD **bits and pieces**
- Introducing **OD as part of IT or data literacy** throughout the agriculture education
- to identify distinct needs of different stakeholders – **small producers of different fields needs**
- define how to benefit from decade advanced developed EU countries had



- ENPOWERING
 - Stakeholders promoting digital and precise agriculture
 - the Ministry of agriculture
 - bottom-up approach – small producers
- MINGOR i AGRICLTURe synergy
 - AG-revolution success depends on collaboration and aligning shared interests.
- Hosting national and local-level consultations
 - Landscaping the infrastructure,
 - defining policy areas,
 - plannig open agriculture data strategy
 - Prioritise relevant government agriculture data for release based on the 14 recommended data categories

