The Effectiveness of Conservation Agriculture in Mitigating Climate Change through Soil Conservation and Carbon Storage

Jug, Danijel

Data management plan / Plan upravljanja istraživačkim podacima

RESEARCH DATA MANAGEMENT PLAN (RDMP)

Administrative information		
	Legal entity (Applicant)	Faculty of Agrobiotechnical Sciences Osijek
	Principal investigator	Danijel Jug
	Project proposal title	The Effectiveness of Conservation Agriculture in Mitigating Climate Change through Soil Conservation and Carbon Storage
	RDMP contact person	Danijel Jug, djug@fazos.hr
1.	**Data collection and documentation**	
	What data will you collect, analyse, generate or reuse? (Please state the type, format and volume of data you will collect, not only final data set that will be the result of research)	The data collected by the research as well as the processed data will be divided and classified according to the following data groups: o Pedophysical and pedomechanical research parameters o Chemical-biological research parameters o Plant-breeding research parameters o Climate projection analyses o Economic analyses and projections Some of the most important monitored/researched indicators, which belong to the previously mentioned data groups, are: Soil solid phase density, Soil bulk density, Soil porosity and air capacity, Water retention capacity, Soil water permeability, Soil temperature, Stability of soil structural aggregates, Degree of soil compaction, Soil pH value, Hydrolytic acidity, Soil carbonate content, Soil organic carbon (SOC), Soil organic matter content (SOM), Active organic carbon, Soil electrical conductivity (EC), Humic acid and fulvic acid content, Available phosphorus and potassium content, Micronutrient concentration, Soil cation exchange capacity (CEC), Soil respiration, C/N ratio, Determination of soil microbial biomass, Determination of species of mycotoxicogenic molds to the genus level, determination of occurrence of phenological phases and biometric components of corn, soybeans and winter wheat, analysis of climate projections, economic analyzes and projections.
	How will the data be collected, processed, or generated? (Briefly describe methodologies and quality assurance processes you will use, organization of your project files and data, tools and instruments which will be used for collecting and processing the data)	Data will be collected by sampling soil for physical, chemical and biological analyzes (probing, soil sampling in disturbed and undisturbed state) and plant material (in certain phenological stages of growth and development) at project-defined research locations under different tillage treatments and by monitoring climatic indicators. Soil and plant material samples will be analyzed according to the prescribed methodology (ISO standards and other standardized methods). Data of meteorological elements will be collected from stationary meteorological measuring stations ("ATMOS 41") In the analysis of climate simulations, an ensemble of regional climate models from the EURO-CORDEX initiative and the RCP scenario of greenhouse gas concentration will be used. The economic analysis will be based on the application of the Direct costing method of cost accounting and calculation of contribution for coverage or margin of coverage.

	Is there a need for computer systems for performing resource-intensive scientific applications (e.g. supercomputer, cloud computing)?[1]	In our work, we do not plan and do not need computer systems to perform resource-intensive scientific applications.
	What data documentation and metadata you will develop that are accompanying the data? (The documentation should provide all information needed for users to be able to read and interpret the data in the future e. g. code books, ReadMe files, etc.)	Metadata collected from data loggers, metadata from greenhouse gas sensors (Sensor Sensirion NDIR SCD30 and Sensirion SFM4100-N2O Legris) and sensors for measuring temperature (Sensor DS18820) and soil moisture (Sensor SEN193) will be available. At the same time, GPS location and sampling depth will be available with each soil sample.
2.	**Ethical, legal and security issues**	
	Are you restricted by a confidentiality agreement? Do you have the necessary permission to obtain process, preserve and share the data? Have the people whose data is being preserved been informed or did they give their consent? What methods will you use to ensure the protection of sensitive data (GDPR special category personal data, specify methods of data anonymization)?	We are not bound by a confidentiality agreement. We have all the permissions to conduct the research and sampling because they are carried out on the experimental site areas owned by the Faculty of Agrobiotechnical Sciences Osijek and on the experimental site owned by the Polytechnic in Križevci. These institutions are also collaborating institutions on the Project. No ethical principles will be violated in the implementation of this project.
	How will you regulate access to the data and their security? What potential risks do you have to take in consideration? How will you ensure safe sensitive data storage?	The data will be stored in the internal database of the Faculty of Agrobiotechnical Sciences Osijek and in the "Puh" database. Possible risks that need to be taken into account are possible data loss due to computer failure or the presence of computer viruses that can delete data. To avoid this, the data is also copied to an external drive and most researchers also save the data on their personal computers. At the same time, all data is transferred to One Drive, where only members of the research group have access.

[1]State whether you plan to use resource-intensive scientific applications for data processing or performing complex algorithms that require advanced computer systems such as the Supek supercomputer or Vrančić cloud computing resources. Provide an estimate of the required computing resources, such as the average number of processing cores, working memory (RAM), graphics processing unit (GPU), and fast storage space.

	How will you manage copyright and Intellectual Property Rights issues? Who will be the owner of the data? Which licenses will be applied to the data? What restrictions apply to the reuse of third-party data?	The research result is not expected to lead to a patent. The aim of this project is to publish the data in scientific publications and to publish the accompanying data under the open Creative Commons Attribution (CC BY) license. The owners of the copyright and intellectual property rights are the members of the research group who are engaged in a specific part of the research within the Project. The use of the data by other research groups requires the consent of the project leader and the members of the research group who were engaged in that part of the research. In the case of collaboration with other research groups, the same guidelines for the use of the data will apply.
3.	**Data storage and preservation**	
	How will you store different versions of data during the project? How will your data be backed-up during the project? What amount of data are you expecting to be collected and stored during the project (specify in MB/GB/TB)	The working versions will be stored on the personal computer of the project leader at the Faculty of Agrobiotechnical Sciences Osijek as well as in the internal database of FAZOS and on the One drive of the Faculty of Agrobiotechnical Sciences Osijek. The expected amount of collected data will not exceed 100GB, and 1TB of data has been secured on the One drive at the institution of the project leader at the Faculty of Agrobiotechnical Sciences Osijek for the needs of the project. During the research, the data will be copied from the computer of the principal investigator to the national data storage and sharing system Puh (https://www.srce.unizg.hr/puh) which provides project team members with access to the current version of the data and on which a daily automated backup copy of the data is made. In addition, the principal investigator makes a weekly backup copy from the computer to an external drive.
	How will your dataset be curated and preserved during the project and after the project? What file formats will be used for data storage? What amount of data are you expecting to be collected and stored after the project (specify in MB/GB/TB)?	The data will be stored permanently in the institutional repository of the Faculty of Agrobiotechnical Sciences Osijek established on the Dabar system. and in the internal database of FAZOS. Tabular data will be stored in CSV format, and text data in DOCX (Office Open XML) and PDF format. DOC format will be converted to DOCX format. The data will be stored permanently.
4.	**Data sharing and reuse**	
	How and where will the data be shared? On which repository do you plan to share your data? How will potential users find out about your data?	The data will not be shared outside the research group, and the final results of the research will be presented through scientific papers, graded papers, scientific conferences, etc. All graded papers will be located on the national infrastructure Digital Academic Archive and Repository Dabar and Puh. Records of activities and published papers will be available on the project website and entered into the Croatian Scientific Bibliography (CROSBI), as well as Google scholar.

	If there is any data which cannot be shared (due to legal, ethical, copyright, confidentiality reasons), explain the reasons of restrictions.	All data resulting from the Project are intended for publication.
	Confirm that the digital repository you choose is in line with the FAIR principles.	The digital repository that will be used is in accordance with the FAIR principles.
	Please confirm that you will use a digital repository maintained by a non-profit organisation (if not please explain why).	The data will not be shared on the repository maintained by the non-profit organization because the sharing of data on platforms maintained by Microsoft (OneDrive, Sharepoint, Office365) is organized at the level of the Faculty of Agrobiotechnical Sciences Osijek. In this way, greater data security is ensured, and data access is provided to all members of the research group. The mentioned platform is free for use by all members of the research group.