RIBES policy on Research Data Management

The Radboud Institute for Biological and Environmental Sciences highly values clear and accurate data management, which refers to processes that

- guard and maintain the consistency and accuracy of collected data,
- guarantee the reproducibility of analyses and results,
- and facilitate the re-use of data.

For each project, RIBES researchers are therefore expected to follow these three data management steps:

- Before: have a Data Management Plan
- During: store Raw & Processed data and metadata on a backed-up C&CZ server
- After: upon publication, archive data in a repository[*]

Data Management Plan (DMP) and Paragraph (DM¶)

Before data collection starts a RIBES project[†] should have a DMP. If you are following the protocol described here, this document can be your DMP. If you deviate for good reasons, you should write your own DMP. Also, funding agencies may require specific DMP formats. The people of RDM Support[‡] can provide advice and feedback, and have developed an online tool that helps you writing a project-tailored DMP[§].

Grant proposals often include a data management paragraph (DM¶). RDM Support offers help to write these[**]. Also, proposal writers could contact the RIBES data steward[††] to see examples of paragraphs composed by colleagues.

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[*] Trusted repositories like DANS, NCBI, Dryad and Zenodo make your data findable and accessible, and require that your database is formatted in a way that enables potential reuse. Please note that 'accessible' does not necessarily imply open access.

[†] A RIBES project is defined is any project of which the lead investigator is affiliated with the RIBES. The size of a project may vary, but more or less coincides with what will eventually be published as a database and/or paper.

[‡] www.ru.nl/rdm; rdmsupport@ubn.ru.nl; 024-3612863

[§] https://www.ru.nl/research-information-services/manuals/step-step-writing-data-management-plan/ This platform is useful because it creates a shared document that can be edited by all people involved.

[**] https://www.ru.nl/rdm/planning-research/data-management-paragraph/

[††] Currently: Eelke.Jongejans@ru.nl

C&CZ File Servers

To ensure data integrity and prevent data loss, all research data, metadata, final analysis scripts and info about software and operating system should be stored on a backed-up server managed by FNWI's C&CZ as soon as data collection starts and until at least 10 years after publication[*]. A project's file folder should be shared with all researchers involved, for instance supervisors[†]. As is commonly recognized as good data management practice, a project's file folder should at least contain the following, clearly labeled subfolders:

- 'Data Management Plan', containing either this document or a more specific, tailor-made DMP.
- 'Raw Data', which should contain the unprocessed research data that are collected electronically or digitized from written lab and field journals[‡].
- 'Metadata', explaining how the data were collected, what column headings and factor levels mean, and what the units are of all variables.
- 'Analyses', containing the final analysis scripts and info about software and operating system.
- 'Publication': if the research data associated with the final publication are deposited in an internationally recognized data repository like DANS-EASY (via RIS), this folder could just contain a small .txt note explaining where the data are archived. Alternatively, if researchers have good reasons not to archive their data in a data repository, this folder must include intelligible files containing the research data as they are used for the analyses, tables, figures and conclusions in the final publication. This folder must then also contain proper metadata files and clearly annotated analysis code. Whenever possible the files in this folder should be in non-proprietary formats[§].

PhD theses

should include an appendix titled 'Research Data Management', simply stating '*The research in this thesis has been carried out under the RDM policy of the Radboud Institute for Biological and Environmental Sciences, version 1-Dec-2022 accessed at www.ru.nl/ribes*" followed by a list that specifies per thesis chapter where the research data are archived (mentioning persistent identifiers of the datasets) or an explicit statement that no data or code has been produced. Please note that data of (yet) unpublished chapters also need to be placed in a data repository (as dissertations are publications as well), with a title like "Data from: <TITLE DISSERTATION>". Use Zenodo if you do not want data of unpublished chapters to be accessible. In all cases, proper metadata are required.

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[*] C&CZ file folders are organized at the department level, and can be requested via the appointed data manager: Jelle Hilbers, Sebastian Lücker, Rens Cronau, Hans de Kroon, Jian Xu, Wim Atsma and Eelke Jongejans.

[†] Research data collected by RU employees officially belong to the RU. The role of overseeing RU's research data has been delegated to the director of RIBES. See www.tinyurl.com/rubeleidrdm for RU policy on data management.

[‡] Lab and field journals should of course be stored in a secure place and digitized as soon as possible.

[§] Ideal are file formats with extensions like .csv, .pdf, .txt as these do not require licensed software like SPSS, Microsoft Excel or Word to be opened. See https://dans.knaw.nl/nl/bestandsformaten/

Data Repositories

At the time any RIBES publication* appears, the associated research data should be archived in a trusted data repository like DANS-EASY, Dryad, NCBI or Zenodo. Research data should not be published as online appendices to journal articles or as 'personal collections' on e.g. figshare, as that reduces the FAIR-ness of the data. The RIS service desk can assist with advice on how to prepare data and metadata files.

While the main idea of 'FAIR' data archiving is that research data are properly described and findable in research engines, FAIR does not necessarily mean that data are openly available. RIBES's policy is that research data are published open-access whenever possible, potentially after an embargo period or upon request.

After archiving research data in a data repository, the datasets need to be registered in Radboud Repository (which is not a data repository, but the database of RU publications). Researchers can do this themselves via RIS† or by sending the permanent identifier (e.g. DOI) of the dataset to RIBES' data steward.

Roles and Responsibilities

Each individual researcher is responsible for properly managing and archiving research data of his/her projects, adhering to RU and RIBES policy. The principal investigator makes sure that no data are lost when temporary employees are leaving. RIBES's director is ultimately responsible for data storage by RIBES researchers, but department chairs are also responsible for adequate data management at their department. The data steward is responsible for informing RIBES researchers about data management requirements, infrastructures and opportunities.
Researchers can contact the data steward or RDM Support with questions concerning for instance privacy-sensitive data or secondary‡ data, more information about FAIR, RU policy and open access, or how to write data management paragraphs, or with interesting ideas to improve RIBES's data management. More information about good practices in research data management can be found on www.ru.nl/rdm.

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* i.e. any publication (article, book chapter, dissertation, report, etc) with at least 1 RIBES author.

† https://www.ru.nl/research-information-services/manuals-ris/registering-dataset/

‡ Primary data are collected by researchers themselves, while secondary data are collected by others and generally available in (public) archives.