Plan Overview

A Data Management Plan created using DMPonline

Title: Copy of Human Exposure to Antimicrobial resistance Through Water in Africa (Nigeria) as Related to Sanitation

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Template: TU Delft Data Management Plan template (2025)

Project abstract:

This study, titled *Human Exposure to Antimicrobial Resistance through Water in Africa (Nigeria) as related to Sanitation*, will investigates how water and sanitation systems contribute to antimicrobial resistance (AMR) exposure in Nigeria.The research aims to examines how the proximity of sanitation systems, such as pit latrines, and the depth of wells influence groundwater contamination. The study also evaluates AMR contamination in surface waters and links these environmental risks to household-level exposure pathways. The study includes conducting **structured interviews** to collect answers to **questionnaires** from locals. In alignment with Nigerian culture, local community leaders will be approached and informed about the research before research participants will be approached.
Households that rely on groundwater sources for drinking water will be recruited from Rural communities in Kano state. Approximately **[100] households/participants** will be involved. Participants will be asked to take part in a structured interview lasting about one hour, where they will answer questions about water use, sanitation practices, and potential exposure pathways.
The research is carried out under the umbrella of the GROW project, which recruits individuals with African backgrounds to conduct a PhD at TU Delft. The Main researcher is **Ismail Rabiu**, Nigerian, who now conducts a PhD at TUD under supervision of [Prof Mark van Loosdrecht and Prof Haike Schmitt] (TU Delft) and [Prof Ibrahim Yusuf] (from “KIRCT” a local research institution in Nigeria; A Member of my PhD Advisory Committee as required of GROW scholarship office). I speak Hausa – the local language of Kano state, Nigeria (place where the research is conducted).

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Copyright information:

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Copy of Human Exposure to Antimicrobial resistance Through Water in Africa (Nigeria) as Related to Sanitation

0. Adminstrative questions

1. Provide the name of the data management support staff consulted during the preparation of this plan and the date of consultation. Please also mention if you consulted any other support staff.

Sophie Tschirpke: Data Steward at the Faculty of Applied Science. She provided valuable feedback dated, 17/03/2026.

2. Is TU Delft the lead institution for this project?

- Yes, the only institution involved

I. Data/code description and collection or re-use

3. Provide a general description of the types of data/code you will be working with, including any re-used data/code.

Type of data/code	**File format(s)**	**How will data/code be collected/generated?** *For re-used data/code: what are the sources and terms of use?*	**Purpose of processing**	**Storage location**	**Who will have access to the data/code?**
Bacterial Isolate Metadata	CSV excel	questionnaire for sample source and lab analysis for isolate meta data	Required to address the research question	Project drive - for secure institutional storage	My supervisors: Heike Schmitt, Mark van Loosdrecht and I (Ismail Rabiu)
Phenotypic AMR Test Results	CSV excel, 100 MB	Microbiological analysis	Required to address the research question	Cloud storage (OneDrive, TUD solutions "incl. MS products") for accessibility	My supervisors: Heike Schmitt, Mark van Loosdrecht and I (Ismail Rabiu)
Genotypic AMR Data	FASTQ, FASTA,, 5-50GB	Microbiological analysis	Required to address the research question	Cloud storage (OneDrive, TUD solutions "incl. MS products") for accessibility	My supervisors: Heike Schmitt, Mark van Loosdrecht and I (Ismail Rabiu)
Whole Genome Sequencing (WGS) Data	FASTQ, BAM, VCF, 5-200B	Sequencing and Bioinformatics analysis	Required to address the research question	Project drive My supervisors: Heike Schmitt, Mark van Loosdrecht and I (Ismail Rabiu)	My supervisors: Heike Schmitt, Mark van Loosdrecht and I (Ismail Rabiu)

Quantitative interview/survey data	CSV excel	MS Teams, or Whisper Transcription software	Required to address the research question	Project drive- for secure institutional storage	My supervisors: Heike Schmitt, Mark van Loosdrecht and I (Ismail Rabiu)
Personally Identifiable Information	Excel file	Questionnaires	For administrative purposes: obtaining consent and communicating with participants.	Project drive	My supervisors: Heike Schmitt, Mark van Loosdrecht and I (Ismail Rabiu)
Environmental samples (fecal sludge, household drinking water "well & borehole water" and surface water).	Environmental samples taken in the units of ml for water and gram for fecal sludge	Sampling	Required to address the research question	Samples will be pre-processed at the KIRCT Lab Kano (Nigeria) and then transferred to the TUD laboratory. Data of the pre-processing will be stored in TUD OneDrive. As the samples contain microorganisms, Nagoya regulations will be followed and all permits will be obtained before starting this research.	My supervisors: Heike Schmitt, Mark van Loosdrecht and I (Ismail Rabiu)

II. Storage and backup during the research process

4. How much data/code storage will you require during the project lifetime?

- 250 GB – 5 TB

5. Where will the data/code be stored and backed-up during the project lifetime? (Select all that apply.)

- TU Delft OneDrive
- Project Data Storage (U:) drive at TU Delft

III. Data/code documentation

6. What documentation will accompany data/code? (Select all that apply.)

- Metadata – I will adhere to the metadata standards used by the data repository where the data will be shared (see section V)
- Procedure – Documentation of research method in an Electronic Lab Notebook
- Procedure – A description of data processing procedure(s) (such as laboratory setup, simulation workflows).
- Data – README file or other documentation explaining how data are organised
- Data – Data dictionary explaining the variables used
- Data – Codebook describing the contents, structure, layout, and variable definitions of the data
- Data – Methodology of data collection

IV. Legal and ethical requirements, code of conducts

7. Does your research involve human subjects or third-party datasets collected from human participants?

If you are working with a human subject(s), you will need to obtain the HREC approval for your research project.

- Yes – please provide details in the additional information box below

Yes, data will be collected from human subjects through structured interviews & questionaires about water use, sanitation systems, and household-level exposure. Additionally, it involves collecting fecal sludge and drinking water samples linked to participant households, which are used to assess groundwater contamination and antimicrobial resistance (AMR) exposure pathways. These activities involve personal and household-level data derived from human participants **(regulated by Nagoya protocol).**

These activities involve personal and household-level data derived from human participants.

All responses will be treated with strict confidentiality and used solely for academic and scientific purposes. Participation is voluntary, and informed consent will be obtained from all participants. Ethical considerations, including data privacy, cultural sensitivity, and non-coercion, are carefully integrated into the questionnaire design to ensure compliance with institutional and international research ethics standards.

I intend to apply for ethical approval from the Human Research Ethics Committee.

8. Will you work with personal data? (This is information about an identified or identifiable natural person, either for research or project administration purposes.)

- Yes

9. Will you work with any other types of confidential or classified data or code as listed below? (Select all that apply and provide additional details below.)

If you are not sure which option to select, ask your Faculty Data Steward for advice.

- No, I will not work with any other types of confidential or classified data/code

Since the proposed research entails working with environmental and microbial samples within Nigeria (e.g., water & fecal sludge), the Nagoya Protocol must be observed.

Approvals required for the Nagoya protocol will be obtained before the start of the research. An overview of the steps is given in [overview document]

10. How will ownership of the data and intellectual property rights to the data be managed?

For projects involving commercially-sensitive research or research involving third parties, seek advice of your Faculty Contract Manager when answering this question.

The principal investigator (Heike Schmitt and Marrk van Loosdrecht) will serve as the data controller, overseeing access and use of all collected data. Apart from personally identifiable documents, which will remain confidential and protected, all other research data will become publicly available for transparency and scientific advancement.

Preprocessing of environmental samples will be conducted at KIRCT before transporting the samples to the Netherlands, As there is no collaboration document/agreement in place, NO personal data or any research data from this research will be shared. Only data underlying public research outputs will be shared via public data repositories.

Access to the data may be granted to:

- **Nigerian partner institutions** involved in the study (with de-identified data only)
- **Collaborating with supervisors or research advisors**
- **Relevant government agencies** (e.g., the Ministry of Environment or Health) upon request
- **Open-access repositories** post-analysis (with de-identified data only)

11. Which personal data or data from human participants do you work with? (Select all that apply.)

- Audio recordings
- Free text fields (for instance, in questionnaires) in which participants could unintentionally share personal data
- Proof of consent (such as signed consent materials which contain name and signature)
- Telephone number, email addresses and/or other addresses as contact details for administrative purposes
- Names and/or geolocation information as part of research data
- Date of birth and/or age
- Gender
- Names as contact details for administrative purposes

12. Please list the categories of data subjects and their geographical location.

Category of Data Subjects	Description	Geographical Location
Households Residents	Residents in selected communities located near surface water in selected rural communities	Rural areas of Kano state in Nigeria
Traditional Rulers and Community Leaders	Gatekeepers and informants on cultural and sanitation practices	Rural areas Kano state in Nigeria
Environmental Protection Officials and Public Health Officers	Local or state-level stakeholders involved in waste and water management, and Professionals with insights on AMR, sanitation, and outbreak reporting	RUWASSA-Kano, Nigeria
Researchers and Academic Collaborators	Nigerian institutional collaborators providing technical input	Kano and Ibadan, Nigeria

13. Will you be receiving personal data from or transferring personal data to third parties (groups of individuals or organisations)?

- No

16. What are the legal grounds for personal data processing?

- Informed consent
- Informed consent

17. Please describe the informed consent procedure you will follow below.

Prior to data collection, all participants will be provided with a **detailed information sheet** explaining the purpose of the study, the types of data to be collected (including any personal data), potential risks and benefits, confidentiality measures, and their rights as participants.

The consent process will follow these steps:

1. **Verbal and Written Explanation**: The study will be explained to participants in Hausa language for local communities ensuring comprehension regardless of education level. I speaks [Hausa language] – the local language of Kano state, Nigeria (place where the research is conducted).
2. **Voluntary Participation**: Participants will be informed that their involvement is entirely voluntary, and they may refuse or withdraw at any point without penalty. In alignment with Nigerian culture, **local community leaders will be approached and informed about the research before research participants** will be approached.
3. **Documentation of Consent**: Literate participants will sign a **written consent form**. For those that cannot read, a **verbal consent** will be recorded in the presence of a witness who will sign on their behalf.
4. **Confidentiality Assurance**: Participants will be assured that their personal information will be anonymized and securely

stored. No identifiable data will be made public.

5. **Right to Withdraw**: It will be emphasized that participants can withdraw their data before or during analysis without needing to give a reason.

18. Where will you store the physical/digital signed consent forms or other types of proof of consent (such as recording of verbal consent)?

TU Delft Project Data Storage (U:) drive.

19. Does the processing of the personal data result in a high risk to the data subjects? (Select all that apply.)

If the processing of the personal data results in a high risk to the data subjects, it is required to perform a Data Protection Impact Assessment (DPIA). In order to determine if there is a high risk for the data subjects, please check if any of the options below that are applicable to the processing of the personal data in your research project.

If any category applies, please provide additional information in the box below. Likewise, if you collect other type of potentially sensitive data, or if you have any additional comments, include these in the box below.

If one or more options listed below apply, your project might need a DPIA. Please get in touch with the Privacy team (privacy-tud@tudelft.nl) to get advice as to whether DPIA is necessary.

- None of the above apply

None

23. What will happen with the personal data used in the research after the end of the research project?

- Anonymised or aggregated data will be shared with others

24. For how long will personal research data (including pseudonymised data) be stored?

- Personal data will be deleted at the end of the research project

25. How will your study participants be asked for their consent for data sharing?

- In the informed consent form: participants are informed that their personal data will be anonymised and that the anonymised dataset is shared publicly

Only anonymous and aggregated (put together) data will be shared and used for the research outputs (e.g. scientific publications, science outreach materials).

V. Data sharing and long term preservation

27. Apart from personal data mentioned in question 23, will any other data be publicly shared?

Please provide a list of data/code you are going to share under 'Additional Information'.

- All other non-personal data/code underlying published articles/reports/theses

29. How will you share research data/code, including those mentioned in question 23?
Select all that apply and provide additional details below.

- All anonymised or aggregated data, and/or all other non-personal data/code will be uploaded to 4TU.ResearchData with public access

30. How much of your data/code will be shared in a research data repository?

- 100 GB - 1 TB

31. When will the data/code be shared?

- As soon as corresponding results (papers, theses, reports) are published

32. Under what licence(s) will the data/code be released?

- CC BY

VI. Data management responsibilities and resources

33. If you leave TU Delft (or are unavailable), who is going to be responsible for the data/code resulting from this project?

My Supervisor, Pro. Heike Schmitt, Principal investigator, EBT, TU Delft.
Email: h.schmitt@tudelft.nl

34. What resources (for example financial and time) will be dedicated to data management and ensuring that data will be FAIR (Findable, Accessible, Interoperable, Re-usable)?

The 4TU. ResearchData is able to archive 1TB of data/code per researcher per year free of charge for all TU Delft researchers. We do not expect to exceed this and therefore there are no additional costs of long term preservation.

35. Which faculty do you belong to?

- Faculty of Applied Sciences (AS)

Faculty of Applied Science, Department of Biotechnology, Environmental biotechnology (EBT) research group.