Plan Overview

A Data Management Plan created using DMPonline

Title: Promotion, Application, and Policy Optimization of Green Manure in Southern China's Rice Cultivation

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Project Administrator: Annah Zhu, LingZhang

Affiliation: Wageningen University and Research (Netherlands)

Template: Data Management Plan | Wageningen University and Research

Project abstract:

The double-cropping rice system in southern China is essential for national food security. However, it faces increasing threats from unsustainable practices, particularly the intensive use of chemical fertilizers. This has caused soil degradation, water contamination, and elevated greenhouse gas emissions. These consequences underscore the urgent need for sustainable solutions. Green manure, a winter cover crop, offers a promising solution by improving soil health, reducing dependence on chemical fertilizers, and lowering carbon emissions. During its growth, green manure absorbs and stores nutrients, which are later returned to the soil as organic matter. This process enhances soil organic matter content, improves soil quality, and supports overall soil health. Despite these benefits, green manure adoption remains limited due to socio-economic factors, such as inadequate farmer education, risk aversion, and adherence to traditional practices. These challenges are further compounded by biophysical factors such as soil type, precipitation, and climatic variability. Addressing these factors requires a comprehensive approach that integrates economic, environmental, and behavioural insights.

This study aims to understand the underlying factors influencing the adoption of green manure in double-cropping rice systems, including its socio- economic and environmental benefits, socio-economic and biophysical barriers, and to develop data-driven, region-specific policy interventions that promote such sustainable practices.

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Grant number / URL: A scholarship from the Chinese Academy of Agricultural Sciences

Copyright information:

Promotion, Application, and Policy Optimization of Green Manure in Southern China's Rice Cultivation

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A. Describe the research project

1. Name researcher (please, add your full name):

Ling Zhang

2. What is the name of your department(s)?

- Social Sciences

3. What is the name of your chair group(s) or business unit(s)? English name and abbreviation for chair groups from **this page**; business units from **this page** (expand to Wageningen Research and keep expanding to find your specific division / group). Examples: Bioprocess Engineering (BPE) or Contract Research Organization (CRO).

Environmental Economics and Natural Resources (ENR) group

4. Describe the organisational context of your research project.

DMP version (or date last modified)	
Supervisor / (co-)promotors	Xueqin Zhu, Annah Zhu
Graduate School (WU only)	WASS
Start date of project	2024.03.01
End date of project	2028.02.29
Project number	
Funding body	Chinese Academy of Agricultural Sciences

5. Give a short description of your research project.

Title	Promotion, Application, and Policy Optimization of Green Manure in Southern China's Rice Cultivation
Summary	The double-cropping rice system in southern China is essential for national food security. However, it faces increasing threats from unsustainable practices, particularly the intensive use of chemical fertilizers. This has caused soil degradation, water contamination, and elevated greenhouse gas emissions. These consequences underscore the urgent need for sustainable solutions. Green manure, a winter cover crop, offers a promising solution by improving soil health, reducing dependence on chemical fertilizers, and lowering carbon emissions. During its growth, green manure absorbs and stores nutrients, which are later returned to the soil as organic matter. This process enhances soil organic matter content, improves soil quality, and supports overall soil health. Despite these benefits, green manure adoption remains limited due to socio-economic factors, such as inadequate farmer education, risk aversion, and adherence to traditional practices. These challenges are further compounded by biophysical factors such as soil type, precipitation, and climatic variability. Addressing these factors requires a comprehensive approach that integrates economic, environmental, and behavioural insights. This study aims to understand the underlying factors influencing the adoption of green manure in double-cropping rice systems, including its socio- economic and environmental benefits, socio-economic and biophysical barriers, and to develop data-driven, region-specific policy interventions that promote such sustainable practices.

6. List the individuals responsible for the following data management tasks.

Data collection	LingZhang(PhD candidate) Xi Zhang(research assistant) Xinjile Bao(research assistant)
Data quality	LingZhang(PhD candidate)
Storage and backup	LingZhang(PhD candidate)
Data archiving / publishing	LingZhang(PhD candidate)
Data stewardship / support	LingZhang(PhD candidate) Xueqin Zhu(Professor ENR) Annah Zhu(Professor ENP)
Any other role [......]	

7. I have requested a review of this data management plan from:

- The (coordinating) data steward of my chair group / business unit.
- WUR Library - Data Management Support (data@wur.nl).

8. Name of the data management support staff and / or data steward consulted during the preparation of this plan and date of consultation.

Maria Juliana Gallego

B. Describe the data to be collected, software used, file formats and data size.

9. Will you use existing data for this project?

- Yes. Please specify below which data (e.g. DOI, URL, or storage location) and the terms of use (e.g. licence).

We will be using pre-existing unpublished data from our previous study focusing on Green Manure (adding DOI + licence when published). All creators of these data agreed on data reuse for this project. The data from that study consist of: - Socio-economic data in green manure planting. - Biophysical data in green manure planting. Additionally, we will be using data published openly in China National Bureau of Statistics(CNBS).

10. Will new data be produced?

- Yes.

11. Please describe the data you expect to generate and / or use in the table below. Include reused existing data as well (as these are files that you manage and store).

File contents	Data type	Software	(Open) file format	Estimated size of each file (range)	Estimated number of files (range)
(e.g. lab analysis, gene sequence, interviews, lesion scores, etc.)	(e.g. numerical)	(e.g. Excel)	(e.g. .csv)	(e.g. 20-50 Mb)	(e.g. 50-100)
interviews	numerical	Excel	csv	5-10GB	20-100
Existing data in CNBS	numerical	Excel	csv	1-10GB	50-100

12. Estimate how much data storage you require in total (e.g. by using the information in the table at question 11).

- 100-1000 GB

C. Storage of data and data documentation / metadata during research

13. Where will the data,code and accompanying documentation / metadata be stored and backed up during the research project (see the [WUR Data Storage Finder](#))? Include platforms you use to share data, collect data on, or send data to for processing or analysis.
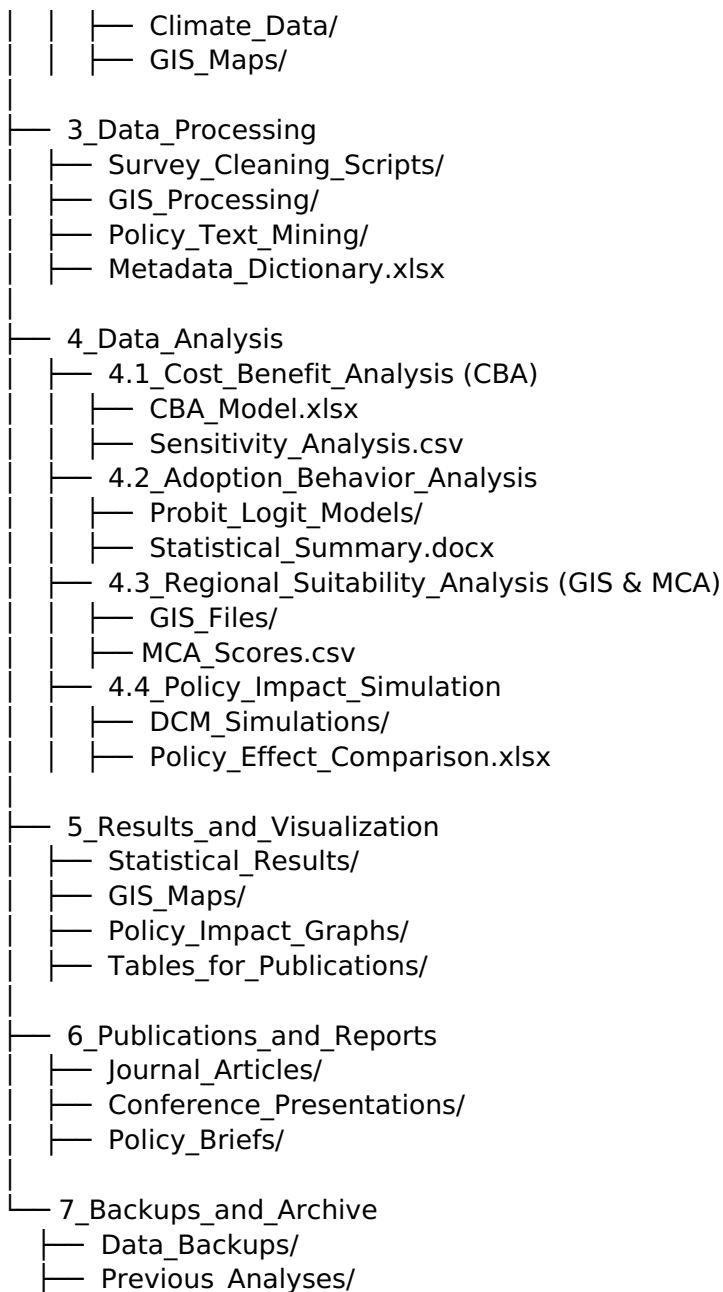
- W:drive Enterprise File Storage (WUR network drive).
- WUR OneDrive for Business - only when an up to date version of the research data is also safely stored on the W:drive or Yoda.
- Yoda (data management platform; SURF hosted WUR instance).
- W:drive Massive File Storage without Disaster Recovery (WUR network drive).
- Git@WUR (GitLab locally hosted at WUR)
- W:drive Massive File Storage Disaster Recovery (WUR network drive).

We will store all research data and documentation initially within Yoda@WUR. The data will be placed in the Yoda Vault at key moments within the research after appropriate Yoda metadata has been added at the folder level. Key moments in research are at least when raw data is collected, data is fully analysed, and at the end of the project. Data in the vault will permanently be available and represents a secure copy of the data at that point in time. When required, non-research data (presentations, informed consents, contracts, etc) will be placed on the W: drive Enterprise File Storage (EFS). Once data is not required in high access (when experiments have been performed and published), data will be transferred to W: drive Massive File Storage with disaster recovery (MFSDR). EFS is more costly but offers high availability to the data while working with the data. MFSDR is less costly and suitable for long term storage, but has less quick data availability during data center disasters.

D. Structuring your data and information

14. Give a (visual) representation of the folder structure you intend to use.

```
Green_Manure_Adoption_Research
├── 1__Literature_Review
│   ├── References/
│   ├── Summaries/
│   ├── Zotero_Library/
│
├── 2_Data_Collection
│   ├── 2.1_Survey_Data
│   │   ├── Raw_Survey_Responses.csv
│   │   ├── Cleaned_Survey_Data.csv
│   │   ├── Survey_Questions.pdf
│   ├── 2.2_Interview_Transcripts
│   │   ├── Farmer_Interviews/
│   │   ├── Village_Leader_Interviews/
│   ├── 2.3_Policy_Data
│   │   ├── Government_Policies/
│   │   ├── Market_Reports/
│   ├── 2.4_Environmental_Data
│   │   ├── Soil_Quality/
```

```
│   │   ├── Climate_Data/
│   │   ├── GIS_Maps/
│   │
│   ├── 3_Data_Processing
│   │   ├── Survey_Cleaning_Scripts/
│   │   ├── GIS_Processing/
│   │   ├── Policy_Text_Mining/
│   │   ├── Metadata_Dictionary.xlsx
│   │
│   ├── 4_Data_Analysis
│   │   ├── 4.1_Cost_Benefit_Analysis (CBA)
│   │   │   ├── CBA_Model.xlsx
│   │   │   ├── Sensitivity_Analysis.csv
│   │   ├── 4.2_Adoption_Behavior_Analysis
│   │   │   ├── Probit_Logit_Models/
│   │   │   ├── Statistical_Summary.docx
│   │   ├── 4.3_Regional_Suitability_Analysis (GIS & MCA)
│   │   │   ├── GIS_Files/
│   │   │   ├── MCA_Scores.csv
│   │   ├── 4.4_Policy_Impact_Simulation
│   │   │   ├── DCM_Simulations/
│   │   │   ├── Policy_Effect_Comparison.xlsx
│   │
│   ├── 5_Results_and_Visualization
│   │   ├── Statistical_Results/
│   │   ├── GIS_Maps/
│   │   ├── Policy_Impact_Graphs/
│   │   ├── Tables_for_Publications/
│   │
│   ├── 6_Publications_and_Reports
│   │   ├── Journal_Articles/
│   │   ├── Conference_Presentations/
│   │   ├── Policy_Briefs/
│   │
│   └── 7_Backups_and_Archive
│       ├── Data_Backups/
│       ├── Previous_Analyses/
```

15. Describe the file naming conventions you intend to use. Please give one or multiple example(s).

GMA_DataCleaning_Survey_20240305_v01.R
GMA_GISProcessing_SoilSuitability_20240310_v01.py
GMA_MetadataDictionary_20240315_v01.xlsx

GMA_CBA_Analysis_20240401_v01.xlsx
GMA_ProbitAnalysis_Adoption_20240403_v01.do
GMA_MCA_RegionalSuitability_20240405_v01.xlsx
GMA_DCM_PolicySimulation_20240407_v01.csv

16. How will you distinguish between versions of files (multiple answers possible)?

- The designation 'vRAW' is added to file names that contain raw unaltered data (before any processing and cleaning). Any alteration of RAW data is done on a copy of the RAW data and appended with a version number which increases with each file modification (e.g. v01, v02, v03 etc.).
- Dates within file names are updated when files are modified.

E. Data documentation and data quality

17. Describe below what data documentation and metadata will accompany the data to help make the data findable, understandable, and reproducible.

- The Yoda metadata form (see the public Yoda metadata editor at https://utrechtuniversity.github.io/yoda-portal/).
- The WUR readme file template (see template at https://doi.org/10.5281/zenodo.7701727).

18. Describe what data and analysis quality controls will be used?

- We will use standardised coding and terms of data throughout all experiments so that data descriptions are equal throughout various datasets created.
- Supervisors or peers will review the data and results for any anomalies (e.g. unexpected inconsistencies, outliers, correct labeling of data and / or treatments, correct and consistent coding applied, etc.).
- We will perform preliminary (pilot) experiments to validate intended experimental methods.

F. Working with sensitive data (personal data, ethics), data ownership, sharing and access

19. Who is the (rights)holder of the data (commonly known as the owner of the data)?

- Other, please specify below.
- WUR is the (rights)holder of the data.

the Chinese Academy of Agricultural Sciences

20. What is the data classification for your project (for example as specified in SmartPIA) taking into account the (privacy) sensitivity of the data?

- Serious.

21. Is this project registered in SmartPIA?

- No. Please register in SmartPIA in the case (privacy) sensitive data is collected (when applicable: via your supervisor, the project manager, see guidance).

22. Please specify the (sensitive) data and privacy protection measures. Note that any measures undertaken should be consulted with the Information Security Officer (ISO) and Privacy Officer (PO).

- We will consult with the ISO and PO for appropriate measures to undertake.
- Personal and other sensitive data will not be made openly available and will at most be shared under formal agreements for which the ISO and PO are consulted.
- Access management to the data is either managed or approved by the project leader / supervisor of the project and contains clear documentation of who has access.

23. Are there other ethical issues that need to be taken into account which may include approval from **ethical committees**?

- No.

24. Will there be any intellectual property (IP) rights or alternative applications or routes to impact (such as commercial interests) associated with the data?

- No.

G. Data archiving and publishing

25. Are there reasons to restrict access to the data or limit which data will be made publicly available?

- No.

26. Describe what data from question 11 will be archived internally (e.g. WUR network drive / Yoda@WUR) and not published, for a minimum of 10 years? Include the exact name for the storage medium chosen (see the [WUR Data Storage Finder](#)).

- Not applicable as data will be published.

27. What data will be published and made available for reuse via a data repository?

- Data underlying publications or reports. Please specify below which data listed in question 11.
- Other, please specify below.

For all data openly published, it will be checked by all WUR project members that data does not contain any personal data. A privacy officer will be consulted. For the data that cannot be published openly, only the metadata will be published while the actual data remain archived in Yoda@WUR. This data can be requested from the project leader after publication. A data request will be evaluated by the project leader on the reason for the request and the underlying research hypotheses for which the data will be used. When a request is approved, a formal data sharing agreement is signed by the requesting party. The data sharing agreement will be set up by the legal department of the Social Sciences group.

28. When will the data be available for reuse, and for how long will the data be available?

- Publication of data not underlying an article or report will be considered at the end of the project.
- Data will be available for at least 10 years as soon as the article or report is published and not required for any other article publication.

29. Which data repository do you intend to use to make the data findable and accessible (see the [WUR Repository Finder](#))?

- DANS Data Stations

30. Which metadata standard will be used to describe the data during internal archiving and / or depositing in a data repository?

- Yoda metadata (DataCite metadata standard).
- Metadata standard from DANS Data Stations, 4TU.ResearchData and / or Zenodo (which often are the DublinCore or DataCite standard).

31. Which [licence/terms of use](#) will be applied to the data?

- Restricted access (custom licence text or data sharing agreement is required, dictating restrictions of access and reuse). When a data sharing agreement is required, the Privacy Officer or Information Security Officer is consulted.

H. Data management costs

33. What resources (in time and / or money) will be dedicated to data management, data archiving or publication, and ensuring that data is reusable? Indicate as well how these costs will be covered.

- The PhD candidate and supervisor will spend at least 10% of their time on research data management to approach the FAIR principles as much as possible.
- All costs for 10 year data storage and access management to that data after journal publication or report are covered by the research group / project.