



## Data Article

# Metadata to describe the dataset on involved actors and their roles in the governance of innovative contracts for agri-environmental and climate schemes



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## ABSTRACT

Agri-environmental and climate schemes are an important policy instrument in the Common Agricultural Policy of the European Union to maintain biodiversity and safeguard ecosystem services provision for human wellbeing. In the presented dataset, we analyzed 19 innovative contracts for agri-environmental and climate schemes from six European countries, representing examples of four different contract types: result-based, collective, land tenure, and value chain contracts. Our analytical approach comprised three steps: In the first step, we used a method mix combining literature review, web search, and expert consultation to identify potential case examples for the innovative contracts. In the second step, we employed a survey, which was structured in accordance with Ostrom's institutional analysis and development

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framework to collect detailed information on each contract. The survey was either filled in by us authors, based on information retrieved from websites and other data sources, or by experts directly involved in the different contracts. Based on the collected data, in the third step, an in-depth analysis was conducted on the public, private, and civil actors involved from different governance levels (local, regional, national, or international) and the roles these actors perform in contract governance. The dataset generated through these three steps contains 84 data files, which includes tables, figures, maps, and a text file. The dataset can be re-used by all interested in result-based, collective, land tenure, and value chain contracts for agri-environmental and climate schemes. Each contract is characterized in great detail by 34 variables making the dataset suitable for further institutional and governance analysis.

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## Specifications Table

**Table 1**

Specifications table describing the dataset.

Subject	Nature and landscape conservation
Specific subject area	Inventory of actors involved in the governance of innovative contracts for agri-environmental and climate schemes and analysis of the different roles that each actor performs in contract governance
Type of data	Tables Figures Maps Text document
How the data were acquired	The data were acquired by conducting a survey in English with 34 questions (cf. data file: iad_data_survey_questions.xlsx). The survey was implemented in Excel (Microsoft, <a href="https://www.microsoft.com/">https://www.microsoft.com/</a> ). The survey questions were structured according to the institutional analysis and development (IAD) framework (cf. [3]), asking information about five different aspects for each sampled contract, namely: action situation, context conditions, interactions, outcomes, and evaluation criteria (cf. data files: iad_framework.pptx, iad_definition_5aspects.xlsx).
Data format	Raw Analyzed
Description of data collection	In total, 19 contracts were sampled employing purposive sampling (cf. [2]) based on a list of criteria differentiating between four contract types for agri-environmental and climate schemes (cf. data file: contracts_types.xlsx). For each contract, information on 34 variables was collected (cf. data file: iad_variables.xlsx). The information was either filled in by the authors by retrieving the information from websites and other data sources, or by an expert directly involved in the contract (cf. data file: iad_data_sources.xlsx). In a further step, information on the involved actors and their roles in contract governance was collected. To do so, the authors reviewed again the contract-related websites and consulted other available materials.
Data source location	Europe: Belgium, France, Germany, Ireland, Netherlands, United Kingdom
Data accessibility	Repository name: Zenodo ( <a href="https://zenodo.org">https://zenodo.org</a> ) Data identification number/Digital object identifier (DOI): <a href="https://doi.org/10.5281/zenodo.7806103">10.5281/zenodo.7806103</a> Direct URL to data: <a href="https://zenodo.org/record/7806103#_ZC7xjnZBw2w">https://zenodo.org/record/7806103#_ZC7xjnZBw2w</a>

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Related research article	Sattler, C., Barghusen, R., Bredemeier, B., Dutilly, C., Prager, K. (2023). Institutional analysis of actors involved in the governance of innovative contracts for agri-environmental and climate schemes. <i>Global Environmental Change</i> 80: 102668. <a href="https://doi.org/10.1016/j.gloenvcha.2023.102668">10.1016/j.gloenvcha.2023.102668</a>
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## Value of the Data

- The small-n-dataset ( $n = 19$ ) contains examples of innovative contracts exemplifying result-based, collective, land tenure, and value chain contracts for agri-environmental and climate schemes currently tested with, based on the assumption that they can improve schemes' environmental effectiveness, cost efficiency, and participation options for all relevant stakeholders at the landscape level.
- It presents a very detailed account of each contract, using 34 variables per case, which can be grouped based on the five aspects of Elinor Ostrom's institutional analysis and development (IAD) framework: action situation, context conditions, interactions, outcomes, and evaluation criteria (cf. [3])
- The dataset is useful for all analytical purposes related to institutional and governance analysis, with a particular focus on the analysis of involved governance actors from different societal spheres (public, private, and civil), who can be engaged from different governance levels (local, regional, national, and international)
- The dataset is deemed informative and beneficial for every party (e.g. researchers, practitioners such as farmers or non-governmental organizations, or policy makers) interested in exploring novel solutions for agri-environmental and climate schemes, which deviate in their characteristics from the currently prevailing individual and action-based contracts that only involve farmers and government agencies as contractual parties.
- The dataset is applicable for all methods suited to the analysis of small-n-samples, such as qualitative comparative analysis (e.g. [5]) or other qualitative methods.
- When further enlarged, possibly narrowing down the number of variables considered per contract, the dataset might also become suitable for quantitative methods and statistical analysis.

## 1. Objective

The dataset was generated to allow for an institutional analysis of existing innovative contracts for agri-environmental and climate schemes in Europe, focusing on the involved actors and their roles in contract governance [6] (Table 1). It was compiled in the context of the Horizon 2020 research and innovation action 'Contracts 2.0' (<https://www.project-contracts20.eu>) dedicated to investigate four contract types in particular: result-based, collective, land tenure, and value chain contracts. The dataset presents the underlying data basis for all results presented in a companion research paper entitled 'Institutional analysis of actors involved in the governance of innovative contracts for agri-environmental and climate schemes' published in *Global Environmental Change* ([10.1016/j.gloenvcha.2023.102668](https://doi.org/10.1016/j.gloenvcha.2023.102668)). It adds value to the research paper as it presents more detailed information than could be accommodated in the article. The dataset also offers the possibility to be re-used and/or enlarged by other interested parties for additional research on agri-environmental and climate schemes.

## 2. Data Description

The dataset includes a sample of 19 agri-environmental and climate contracts from six European countries (cf. `contracts_country_info.xlsx`) listed in table `contracts_abbreviations_hybridity.xlsx`. The selected contracts represent four contract types described in table `contracts_types.xlsx`, including five result-based, five collective, four land tenure, and five value chain contracts. For each contract, a short case narrative is presented in the text file `contracts_case_narratives.pdf`. The case narratives also include a location map for each contract (cf. `contracts_map_*.jpg`).

In table `contracts_x_variables_[matrix].xlsx` each contract is described in great detail, based on 34 variables (cf. `iad_variables.xlsx`) which can be linked to the five aspects of Elinor Ostrom's institutional analysis and development (IAD) framework (cf. `iad_definition_5aspects.xlsx`, [3]). The IAD framework is visualized in figure `iad_framework.pptx`. An account to which data categories and data types the single IAD variables can be assigned to is given in table `iad_data_categories_types.xlsx`. The information for all variables was compiled with the help of a survey with 34 questions listed in table `iad_data_survey_questions.xlsx`. Table `iad_data_collectors.xlsx` lists all individuals involved in the data collection, also indicating for which contracts they contributed in compiling the data. For data collection multiple data sources were used (cf. table `iad_data_sources.xlsx`). Table `contracts_variations.xlsx` then presents how individual contracts differ regarding selected key variables.

A full inventory of all identified 179 actors and their roles in contract governance, assigning them one or several out of 16 possible roles, is presented in table `actors_x_roles_[matrix].xlsx`. A data value of '1' was entered for all roles assumed by a specific actor, while a data value of '0' was entered for all roles not performed by this actor. A description of the identified roles which actors can assume in contract governance is presented in table `roles_descriptions.xlsx`. Nineteen network graphs (`actors_x_roles_*.png`) visualize the identified actors per contract and which roles they perform in contract governance. The underlying data files to create the network graphs are also included in the dataset (`actors_x_roles_*.csv`). In table `actors_x_roles_[matrix].xlsx` also additional attribute data per actor is given, grouping actors into three categories as described in table `actors_categories.xlsx`, four actor types as detailed in table `actors_types.xlsx`, and linking them to four different governance levels, as differentiated in table `actors_governance_levels.xlsx`. Based on actors' attribute data it is possible to filter and aggregate data to show how the performance of different roles may be dependent on certain attribute data of the involved actors (cf. table `roles_actor_categories.xlsx`, table `roles_actor_types.xlsx`, and table `roles_governance_levels.xlsx`). How certain governance roles may be more relevant for specific contract types or individual contracts is shown in table `roles_contract_types.xlsx` and in table `roles_contracts.xlsx`, respectively. Table `roles_correlations.xlsx` then presents the calculated correlation coefficients between different governance roles. Different relational patterns can be observed as described in table `role_pattern.xlsx`, where their observed frequency differs across identified governance roles as shown in table `roles_patterns_actors.xlsx`.

The file `dataset_complete.zip` comprises all 84 data files with a total size of 23,6MB.

In Table 2 all available data files are listed in alphabetical order and briefly described. They are all available for download through the Zenodo open research data repository (<https://zenodo.org>) which was developed under the European OpenAIRE initiative (Open Access Infrastructure for Research in Europe) and which is hosted by CERN, Switzerland and France.

Fig. 1 shows the thematic links between the individual data files in the dataset. In the core are the two data matrixes: `contracts_x_variables_[matrix].xlsx` and `actors_x_variables_[matrix].xlsx`. All other data files contain either explanatory information or present aggregated data generated from the two core datasets. The figure can serve as a data pilot which allows for better navigating between the different data files.

**Table 2**

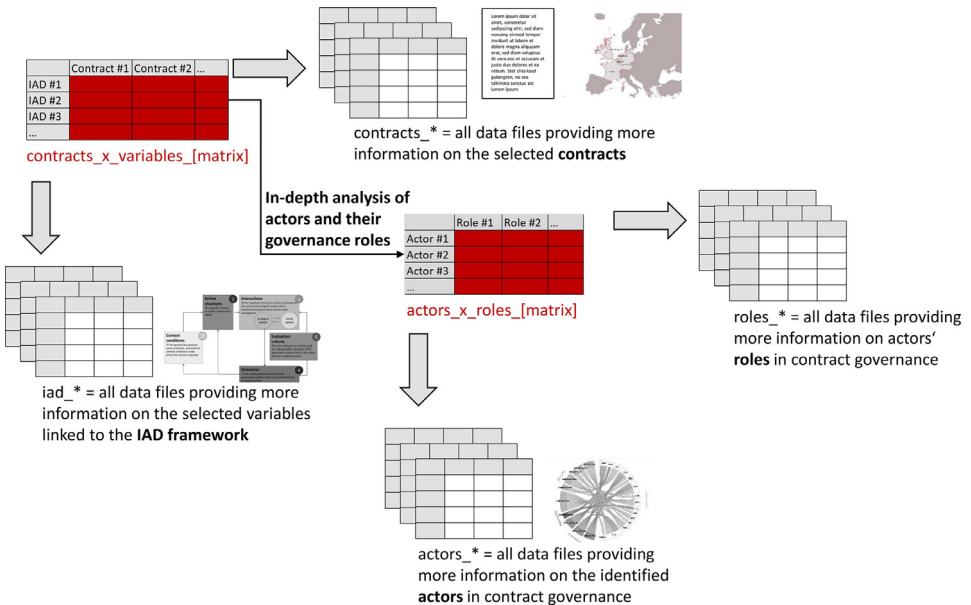
List and short description of all available data files in the Zenodo open research data repository.

Data file name	Short description of the content of each data file	Format/s
actors_categories	Table listing and describing the three differentiated actor categories (contracting: contracted, and third parties).	.xlsx
actors_governance_levels	Table listing and describing the four differentiated governance levels (local, regional, national, and international) from which actors can be involved.	.xlsx
actors_types	Table listing and describing the four differentiated actor types (public, private, civil, or hybrid) based on the societal sphere actors can be associated with.	.xlsx
actors_x_roles_[matrix]	Table listing all identified actors for the analyzed 19 contracts (including their attribute data), indicating which role/s each actor performs in the governance of the respective contract (data matrix, containing $179 \times 16 = 2,864$ data points, plus additional data columns to show actors' attribute data).	.xlsx
actors_x_roles_*	A collection of 19 figures presenting network graphs (*.png) of all identified actors per contract (shown on the left side of the graph) and the roles these actors perform in contract governance (shown on the right side of the graph). The suffix of the file name (*) indicates to which contract the network graph belongs (cf. data file: contract_abbreviations_hybridity.xlsx). The graphs are color-coded based on the contract types: green = result-based, blue = collective, red = land tenure, and lilac = value chain contracts. The underlying 19 data files necessary to create the network graphs (*.csv) are included as well.	.png, .csv
contracts_abbreviations_hybridity	Table listing all 19 selected contracts, including their abbreviations used, indicating their linked contract type/s and their hybrid nature in case they can be linked to more than one contract type.	.xlsx
contracts_case_narratives	Text document containing a short case narrative for each selected contract, which includes a location map (cf. data files: contracts_map_*.jpg) and a network graph showing the involved actors and their roles in contract governance (cf. data files: actors_x_roles_*.png/.csv).	.pdf
contracts_country_info	Table listing additional information on the countries from which the 19 contracts have been selected for the analysis.	.xlsx
contracts_map_*	Location maps indicating the potential implementation area of each contract within the respective country.	.jpg
contracts_types	Table listing and describing the four differentiated contract types (result-based, collective, land tenure, and value chain) based on their key characteristics.	.xlsx
contracts_variations	Table listing all 19 selected contracts and showing their variation regarding a selected number of key variables.	.xlsx
contracts_x_variables_[matrix]	Table listing all selected variables linked to the five aspects of the institutional analysis and development (IAD) framework and the respective information which was retrieved for each of the selected contracts (data matrix, containing $34 \times 19 = 646$ data points).	.xlsx
iad_definition_5aspects	Table listing the definitions for the five aspects (action situation, context conditions, interactions, outcomes, and evaluation criteria) of the institutional analysis and development (IAD) framework.	.xlsx
iad_framework	Figure presenting the institutional analysis and development (IAD) framework graphically.	.pptx
iad_variables	Table listing the 34 variables, grouped into the five aspects of the institutional analysis and development (IAD) framework, also indicating the linked survey questions through which information was collected, the associated data categories, data types, unit of measurements (if applicable), and their possible data values.	.xlsx

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**Table 2** (continued)

Data file name	Short description of the content of each data file	Format/s
iad_data_categories_types	Table listing and describing the differentiated data categories and types, also giving some examples for each data type.	.xlsx
iad_data_sources	Table listing the different data sources used for data collection.	.xlsx
iad_data_collectors	Table listing the names and affiliations of the data collectors (sorted alphabetically by surname) involved in data collection per contract.	.xlsx
roles_actor_categories	Table indicating the number of actors per role aggregated by actor category.	.xlsx
roles_actor_types	Table indicating the number of actors per role aggregated by actor type.	.xlsx
roles_contract_types	Table indicating the number of actors per role aggregated by contract type.	.xlsx
roles_contracts	Table indicating the number of actors per role aggregated for each contract.	.xlsx
roles_correlations	Table indicating the correlations between the identified roles in contract governance.	.xlsx
roles_descriptions	Table describing all identified roles in contract governance and listing their abbreviations.	.xlsx
roles_governance_levels	Table indicating the number of actors per role aggregated by governance level.	.xlsx
roles_patterns	Table listing and describing the observed relational patterns (1:1, 1:n, n:1) in the performance of roles by governance actors.	.xlsx
roles_patterns_actors	Table indicating the number of actors per role aggregated by observed relational pattern.	.xlsx
dataset_complete	Zip file comprising all data files listed above.	.zip



**Fig. 1.** Data pilot showing the thematic links relations among the individual data files.

### 3. Analytical Approach, Materials and Methods

#### 3.1. Analytical approach

Our analytical approach was divided into three steps (cf. [7]):

In the first step, we identified and selected case examples in order to represent the different innovative contract types for agri-environmental and climate schemes (result-based, collective, land tenure, and value chain) in our sample. The output of this step was a sample of 19 innovative contracts (4-5 per contract type) from six European countries (cf. data file: `contracts_abbreviations_hybridity.xlsx`).

In the second step, we used Elinor Ostrom's institutional development and analysis (IAD) framework (cf. [3]) for a structured data collection per selected case, employing a survey. The survey contained 34 questions to collect information on the same number of variables. We linked each variable to one of the five aspects of the IAD framework, describing:

- (1) the general characteristics of the contract,
- (2) the biophysical, socio-economic, and political context conditions under which the contract is applied in a given country and region,
- (3) the targeted interactions within and between the social and ecological system, i.e. which social actors are targeted in the social system to be involved in the contract, and which ecosystem services are targeted in the ecological system, suggesting certain land use measures to increase their provision,
- (4) the (measurable) outcomes of these interactions, both in the social and the ecological system, and
- (5) the indicators/criteria used for evaluating the outcomes.

The output of the second step was a structured description of each contract by 34 variables linked to aspects 1-5 of the IAD framework, creating a data matrix with 646 data points (cf. data file: `contracts_x_variables_[matrix].xlsx`).

In the third step, we zoomed in on the social system as part of aspect (3) 'interactions' of the IAD framework to conduct an in-depth analysis of the involved actors and their roles in contract governance. Informed by the institutional design of contracts for agri-environmental and climate schemes in general (cf. [4]:8), we grouped actors into three categories: contracted, contracting, and third parties or intermediaries. Further, we differentiated four different actor types: public, private, civil, and hybrid actors, and also considered from which governance level the actors are involved: local, regional, national, or international. For assigning each identified actor's roles in contract governance we build on the work of Westerink and others ([8]:178), who distinguished 12 governance tasks for collective agri-environmental and climate schemes. As a result of our analysis, we complemented these roles with another four (which emerged from the analysis of our selected cases that also included other contract types than collective), resulting in overall 16 possible roles. The output of the third step was a full inventory of 179 identified actors and their respective role/s in contract governance assigning each actor one or more out of the 16 possible roles and creating a data matrix of 2,864 data points (cf. data file: `actors_x_roles_[matrix].xlsx`).

#### 3.2. Materials and methods

Methods and materials used for the first step in our experimental design: To identify potential cases we employed a method mix combining literature review, web search, and expert consultation (cf. [1]). For expert consultation, we approached team members of the Contracts2.0-project (<https://www.project-contracts20.eu/>), under which umbrella the research related to the described dataset was conducted, to list possible case examples for result-based, collective, land tenure and value chain contracts for agri-environment and climate schemes. The final selection of cases for our sample was then guided by the rationale to have several contracts to compare

for the same contract type and also different contract types for the same country under similar context conditions. We also aimed to represent the diversity of the institutional design of existing contracts, e.g. in terms of bottom-up vs. top-down initiated contracts, contracts related to the Common Agricultural Policy (CAP) of the European Union vs. CAP-independent contracts, small- vs. large-scale contracts, still young vs. mature contracts, private vs. publicly funded contracts, contracts targeting the provision of single ecosystem services vs. contracts targeting bundles of different ecosystem services (cf. data file `contracts_variations.xlsx`). Furthermore, we intended to only include existing and mainly still ongoing contracts. To this effect, we did not include any contracts in the planning stage or hypothetical cases constructed for economic experiments. For the assignment of the selected cases to the four contract types (result-based, collective, land tenure, and value chain) we elaborated a list of criteria considering:

- I) payment specifics,
- II) how land use measures were defined to deliver targeted ecosystem services, and
- III) the range of different actors involved.

Nevertheless, several contracts showed a hybrid nature combining elements of more than one contract type (cf. data file: `contracts_abbreviations_hybridity.xlsx`).

Our final sample included 19 case examples representing the four contract types. We focused our selection on European case examples only to keep the overall workload linked to data collection and analysis manageable.

Methods and materials used for the second step in our experimental design: For the structured data collection based on the five aspects of the IAD framework we designed a survey in Excel (Microsoft). The information for the survey was collated from different data sources. We included both freely accessible materials and materials with limited accessibility. Mostly, we looked for contract-specific websites, websites of different actors involved in a specific contract, media websites (e.g. from newspapers) which reported on a specific contract, or websites of different research projects conducting research on innovative contracts. We also included materials retrieved from the respective websites, such as flyers, booklets, reports, project videos. Materials with limited accessibility included internal documents available through the Contracts2.0-project, such as internal milestones, notes from work meetings, and interviews conducted with experts directly involved in a specific contract. During the interviews, we filled in the survey together, or the survey was sent to experts involved in a specific contract who volunteered to fill in the survey themselves. We primarily analyzed information available in English, but also included materials in the local languages. For languages one of us co-authors was familiar with (i.e. French and German) we translated the information ourselves. For materials in local languages neither of us was familiar with (i.e. Dutch and Flemish), we first used DeepL (DeepL) and Google Translate (Google LLC) and then asked native speakers involved in the Contracts2.0-project to check if we understood the information correctly. Whenever possible, the completed data matrix was again reviewed by an expert involved in the contract to verify entered data and close last data gaps.

Methods and materials used for the third step in our experimental design: Based on the information already retrieved for variables no. 9, 11, 13, 15, and 32 (cf. data file: `contracts_x_variables_[matrix].xlsx`), asking about the involved contracted party (variables no. 9 and 11), the contracting party (variable no. 13), as well as any other third parties or intermediaries involved (variable no. 15), and which party specifically was responsible for the monitoring (variable no. 32), we looked for additional information explaining what roles exactly each actor performed in contract governance. For the assignment of roles, we started with the list of 12 governance tasks identified by Westerink and others [8] for collective agri-environmental and climate schemes. But whenever the description of an actor suggested a new role, we created a new column and reviewed the cases already analyzed once again, if this new role also applied to the involved actors there. Alongside the analysis we elaborated a description of each role (cf. data file: `roles_descriptions.xlsx`). When possible, we consulted again an expert directly involved in the contracts to verify the information and to make additions or corrections if they felt something was not yet accurate.



For the documentation and visualization of the results, we used Excel and Word (both Microsoft), Tableau Public (Salesforce), ArcGIS (ESRI), and Chordial (Gumroad).

## Ethics Statement

The authors confirm that the participants in the data collection survey have given their informed consent to participate. Each participant was informed that their participation was voluntary and that they could withdraw at any point. They were also informed about the intended purpose of the data collection and had the opportunity to ask questions about the planned study.

## Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## Data Availability

[Dataset on involved actors and their roles in the governance of innovative contracts for agri-environmental and climate schemes \(Original data\)](https://zenodo.org/) (<https://zenodo.org/>).

## CRedit Author Statement

**Claudia Sattler:** Conceptualization, Methodology, Formal analysis, Investigation, Data curation, Visualization, Writing – original draft, Funding acquisition; **Rena Barghusen:** Formal analysis, Investigation, Writing – review & editing; **Birte Bredemeier:** Formal analysis, Investigation, Writing – review & editing, Funding acquisition; **Céline Dutilly:** Formal analysis, Investigation, Writing – review & editing, Funding acquisition; **Katrin Prager:** Formal analysis, Investigation, Writing – review & editing, Funding acquisition.

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