PLANNING LAND USE STRATEGIES: MEETING BIODIVERSITY, CLIMATE AND SOCIAL OBJECTIVES IN A CHANGING WORLD

THEORETICALLY-INFORMED RESEARCH PROTOCOL (TIRP)

WORK PACKAGE 2 – TASK 2.2

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Table of Contents

Figures 1

List of Abbreviations 1

1 Introduction 2

2 Methods and data to be used in empirical research 4

3 Approach for determining the scope of application in each PC region 4

4 Analytical categories / variables to be studied (= draft of a template to be used) 7

4.1 Description of major land-use change ('outcomes') 7

4.2 Governance interventions (including policy and planning decisions) 9

4.3 Mechanisms by which the intervention shaped land-use change 13

4.4 Context under which the governance intervention shaped land-use change 13

5 Appendix 16

5.1 Theoretical background 16

5.2 Procedures for analysis 16

6 References 17

Figures

Figure 1. Research design for comparative analysis in Task 2.2. 3
Figure 2. "Context-mechanism-outcome" perspective developed by Pawson (2006) 16

List of Abbreviations

Term	Description
PC	Practice Case
TIRP	Theoretically-Informed Research Protocol
LUC	Land-use change

1 Introduction

PLUS Change Task 2.2 aims to enrich the understanding of the historical development of land use and land cover changes[1], issues, and conflicts, in parallel with explaining the role of policy and governance arrangements in those changes over time. Empirical studies examining the cumulative impact of spatial planning policies on land-use changes across different countries are rare (Balikçi et al. 2022). We have therefore limited knowledge of which main governance-related factors have shaped land use changes and how.

From a practitioner's point of view, there is no need to begin designing governance interventions responding to land-related challenges completely from scratch because many successful and failed examples of how governance interventions have historically shaped land-use over time and across regions already exist and can be identified. Therefore, an investigation into how governance –policies and policymaking, planning and administrative decision-making – has historically impacted land use change and under which conditions can help better tailor the future land-use policies to achieve sustainable land use. This would assist future land-use decision-making by choosing and using levers, improving trajectories, correcting failures and modifying the trade-offs.

Task 2.2 involves a "comparative analysis of governance arrangements, tenure and policy change in the 12 Practice Cases (PC), using a coherent research protocol, in collaboration with the PC leads" (PLUC Change Grant Agreement). Aiming at this, the TIRP is designed to guide empirical research in the 12 PC areas, and in particular to develop a rich understanding of the historical development of land use, contentious land use issues and conflicts, and the role of policy, tenure and governance arrangements in shaping land use changes that benefit climate and biodiversity objectives (see Figure 1 below). We will address the following research questions:

- Which governance interventions[2] (policies, institutional arrangements, regulations) work under which contexts to achieve a more sustainable land-use?
- Which governance interventions have the opposite effect?

[1] By land-use change / land-cover change, we generally refer to both physical changes of the land cover and the ways in which land is used or managed. For the sake of brevity, this document will mostly use the term land-use change (LUC), covering changes of land cover as well.

[2] By governance, we refer to the definition in the PLUS-Change Glossary, namely the complex and interactive processes through which societies organize, coordinate, and manage their affairs, and operate towards reaching societal goals. Governance involves the mechanisms, structures, and relationships that facilitate collectively binding decision-making, policy formulation, and implementation. By governance interventions we understand collectively binding decisions, such as laws, policies, plans, ordinances, contracts, regulations, instruments and so forth that may or may not have been produced in a collaborative or participatory way.

- Hence, we ask: What is the role of governance interventions in shaping major land-use change which works towards a sustainable (rather than non-sustainable) trajectory concerning climate change mitigation/adaptation and biodiversity?

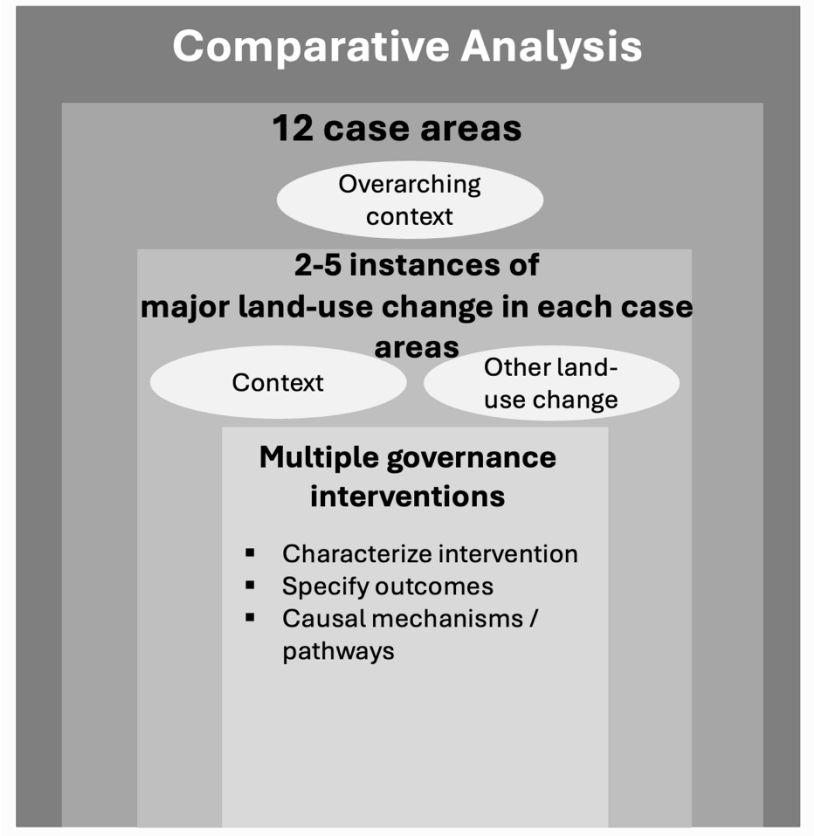


Figure 1. Research design for comparative analysis in Task 2.2.

The research and results from Task 2.2 will be aligned with other tasks of Work Package 2 and its shared focus on historical land-use changes, and with other Work Packages of PLUS-Change that concentrate on current land-use changes and future projections, in order to assist each PC to better understand their context and maximize the resource to achieve a sustainable land use management. Ultimately, knowledge on how governance has 'worked' in the past to achieve or maintain sustainability should help inform the current design of governance interventions – in the PCs areas, and beyond.

2 Methods and data to be used in empirical research

Empirical research in PLUS Change Practice Case (PC) areas can start after the adoption of the TIRP (deadline February 2024). All empirical data collection will be carried out in collaboration between the WP2 team and the PC leads (and potentially others involved in the PCs). All the data from the 12 PC areas, comprising multiple instances of historical land-use change per PC will contribute to a rigorous comparative analysis aimed at identifying how governance and policy interventions shaped (sustainable) land-use change in Europe.

The following data and methods will be used:

- Academic papers or grey literature (reports) on each PC area (e.g. by using ELICIT, Scite, or other sources). Standardized keywords and queries will be deployed to search for documents in each of the PC areas (as defined by the PC leads)
- Interviews with PC leads and with further key experts in each area
- Analysis of local, regional and national newspapers on land-use decisions in relevant locations (potentially in collaboration with VU Amsterdam)
- Analysis of local documents (e.g. plans, policies, etc.)

Note: Data that is publicly available (e.g. material produced by political parties at the national level), can be looked up by the Leuphana team and need not be provided by PC leads.

The Leuphana team will have kick-off meetings with each PC lead to discuss the division of labor, data availability, and scheduling of data gathering, anticipated over the autumn of 2024.

Wherever possible and reasonable, data gathering in Task 2.2 will be closely aligned with other PLUS-Change tasks that work on policy, governance, and historical land-use change.

3 Approach for determining the scope of application in each PC area

1. The research design for the comparative analysis in Task 2.2 is shown in Figure 1. Following this, PC leads will first identify 2 to 5 instances of important land use change that occurred no earlier than 1950, with at least 1-2 that occurred post-1990. The LUCs identified for the purposes of this exercise, should, in part, be chosen because they can demonstrate an impact on biodiversity and/or climate change. To start with, it is suggested that each PC lead can review your Workshop 2 report to recollect which historical land use changes have been identified by local stakeholders.
    - **How to determine "major" land-use change**: A major land-use change refers to a significant alteration in the way land is used or managed, often resulting in a

transformation of its ecological, economic, or social functions. These changes can involve converting land from one primary use to another, such as transitioning from agricultural land to urban development, deforestation for agricultural expansion, or reforestation efforts to restore ecosystems. Major land-use changes can have profound effects on biodiversity, water resources, climate patterns, and human livelihoods, making them important considerations in environmental management and policy decision-making. In PLUS-Change, we focus on biodiversity and climate. In short, we are referring to "big" land-use changes referring in the PC-area that are of particular interest for study.

2. Focus on major outcomes (= results of major land-use change) in the area. Name at least one major sustainable land-use change (positive/+) and at least one unsustainable change (negative/-). For the other changes, if both positive and negative facets can be found, please detail and explain the mixed impacts/outcomes.

3. Please be aware that these instances of land-use change may or may not be driven by governance/policy interventions. If yes, we refer to these as "Type A" (Table 1); otherwise as "Type B" constellation.

4. Note that "major land-use change" may also be used to refer to instances where land-use changes were *prevented* by governance or policy interventions. For example, a forest may have been preserved due to a policy intervention that prevented it from being cut. This situation corresponds to Constellation "B" in Table 1 below.

5. The decision on identifying and selecting the major land-use changes for analysis will be made in close exchange between each PC and Leuphana team. The Leuphana team will host bilateral kick-off meetings with each PC lead to discuss the division of labor, data availability and scheduling of data gathering (modes of data collection, interviewee selections etc.) shortly after the respective local Workshop 2 has been held.
6. To describe the land-use changes, its drivers and the causal mechanism connecting drivers and LUC, a number of analytical categories / variables has been developed, as shown in Section 4 below.

Table 1: Constellations of major-land-use change (or the prevention of major land-use change) and its relation to policy-interventions.

	Governance intervention existing that led to LUC? Yes	Governance intervention existing that led to LUC? No
Major LUC observable? **Yes**	Type A Typical constellation where an observed LUC can be attributed (at least to some degree) to governance intervention/s	Type C LUC observable but cannot be attributed to by governance intervention/s (but perhaps through other dynamics, such as economic developments)
No	Type B There was a governance intervention that led to the *prevention of LUC*, so no LUC is observed in consequence e.g. policies preventing deforestation)	Not of interest

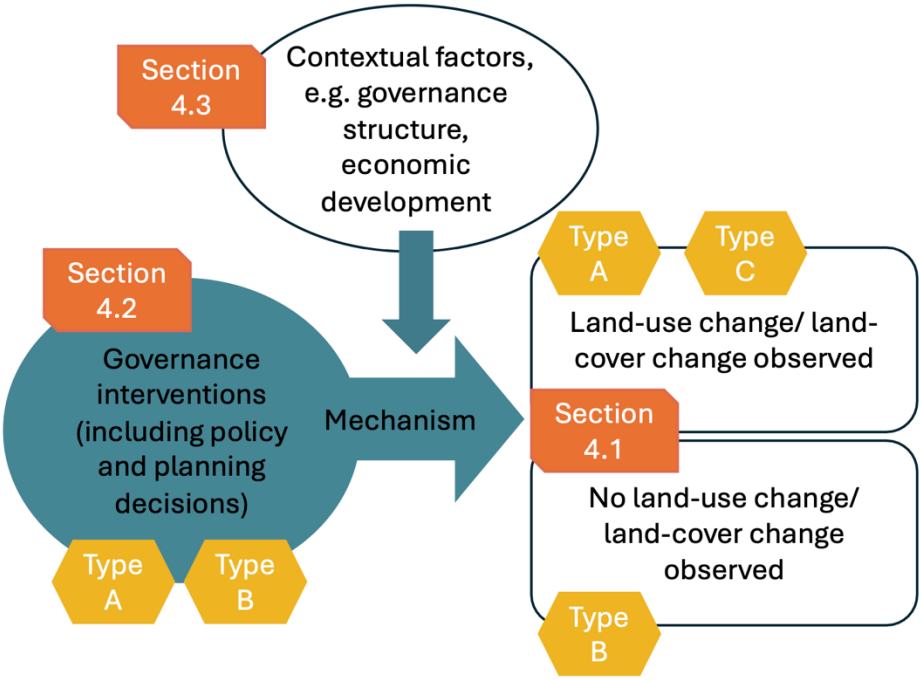


Figure 2. Outline of analytical categories in Task 2.2

4 Analytical categories / variables to be studied (= draft of a template to be used)

For every major land-use change identified, data is required for the following four categories, each of which contains several 'variables'.

4.1 Description of major land-use change ('outcomes')

4.1.1 The spatial extent of the observed land use (rough estimate in km²)

4.1.2 Timeframe within which the land-use change occurred.

4.1.3 Describe the kind of change, and how it is / was furthering sustainability (or not)

4.1.4 Select the kinds of land-use cover from a list of pre-defined land cover categories by the European Environment Agency[3]

(1) Artificial surfaces

(2) Agricultural areas

(3) Forest and semi-natural areas

(4) Wetlands

(5) Water bodies

(6) Others, please describe:

4.1.5 Select the land-use patterns existing at the time before the intervention with pre-defined land cover categories by European Environment Agency[1]

(1) Artificial surfaces

(2) Agricultural areas

(3) Forest and semi-natural areas

[3] https://www.eea.europa.eu/data-and-maps/dashboards/land-cover-and-change-statistics

(4) Wetlands

(5) Water bodies

(6) Others, please describe: ✍

4.1.6 Select from the following kinds of land cover change by European Environment Agency[4]

(1) Urban land management

(2) Residential expansion

(3) Expansion of economic sites and infrastructures

(4) Agricultural internal conversions

(5) Conversion from other land cover to agriculture

(6) Increase in forest land cover and other semi-natural areas

(7) Forest internal land cover changes

(8) Water body and wetland creation and management

(9) Land cover changes due to natural and multiple causes

(10) Other, please describe: ✍

4.1.7 If applicable, describe other relevant impacts of these land-use changes (social, political, ...)

✍

4.1.8 Describe **the direction of these land-use changes** in terms of impact on biodiversity and climate change.

(1) Positive/+ (achieving a sustainable land use change in terms of impact on biodiversity and climate change)

(2) Negative/- (not achieving a sustainable land use change in terms of impact on biodiversity and climate change)

(3) Both, and please define (e.g., the +/-might happen at different time points, unexpected results, including the plus side or side effects, etc.)

✍

4.1.9 Please describe **any other narratives** that are worthwhile to note for telling the story.

✍

[4] https://www.eea.europa.eu/data-and-maps/dashboards/land-cover-and-change-statistics

4.1.10 Please describe the main drivers of the LUC (e.g. economic developments, policy/governance, societal change, ...)

4.1.11 List important involved institutions and actors involved in driving the LUC and briefly explain their roles.

4.1.12 Did governance intervention lead to this land-use change you are describing? Please select the quadrant that best describes your constellation.

	Governance intervention existing that led to LUC?	
	Yes	**No**
Major LUC observable? **Yes**	Type A Typical constellation where an observed LUC can be attributed (at least to some degree) to governance intervention/s	Type C LUC observable but cannot be attributed to by governance intervention/s (but perhaps through other dynamics, such as economic developments)
No	Type B There was a governance intervention that led to the *prevention of LUC*, so no LUC is observed in consequence e.g. policies preventing deforestation)	Not of interest

Please briefly explain your choice.

4.2 Governance interventions (including policy and planning decisions) and Mechanisms by which the intervention shaped land-use change

For every major land-use change identified, there can be multiple governance interventions. Please describe up to **3 different governance interventions that shaped this land-use change**. For each intervention, provide information/data on the following 'variables'. In addition, the assumption is that there might be multiple interventions behind each land-use change, but

possibly occurred in different ways, so please **describe the mechanism on how each governance intervention shaped the land-use change.**

4.2.1 - Intervention #1
(Sections 4.2.2 and 4.2.3 for potential interventions #2 and #3 are identical to 4.2.1 and are only included in the web application in Google Forms).

Please firstly describe the most important and direct-leading intervention using the questions below.

4.2.1.1 Name of the intervention (policy, plan, strategy, regulation, regulatory framework, etc ...e.g., XYZ land reform)

4.2.1.2 Initiating bodies: Who initiated the intervention? Name of the institution that issues the intervention: (e.g. Spatial Planning Authority X; Slovakian parliament; European Union; NGO; etc.) Were several institution(s) involved in "issues the intervention"? If yes, please describe the relationship, competence, division of power, functioning and responsibility among those institution(s).

4.2.1.3 Implementer: Who implemented the intervention(s)? Were several institution(s) involved in "implementing the intervention"? If yes, please describe the relationship, competence, division of power, functioning and responsibility among those institution(s).

4.2.1.4 Time / date of intervention. Was the LUC caused by a single intervention or multiple interventions? If there were multiple interventions, did they occur at different times? Is the intervention still ongoing? How long did the implementation take? (in years, approx.).

4.2.1.5 Scope of intervention (spatial, sector, actors...): What and who is addressed by the intervention?

4.2.1.6 Level (city, local planning region, regional, national, EU, or other), if there are multiple interventions from several levels, please list them.

4.2.1.7 Briefly describe the relevant policy goals /targets in terms of climate and biodiversity and other (can be multiple), and by when they should be achieved?

(1) Land use (Real landscape utilisation and management plan)

(2) Urban development (Master plan)

(3) Rural development

(4) Suburbanization?

(5) Nature/Biodiversity protection (Preserving and enhancing ecosystem functions and services; Natural site/area; Protected site/area);

(6) Natural resources protection and management (soil, water, forest, ...)

(7) Sectoral documents (agriculture, water management, forestry, economy, transport, energy, infrastructure, recreation...)

(8) Climate change adaptation/mitigation

(9) Social wellbeing/Health

(10) Cultural heritage

(11) Other, please describe:

4.2.1.8 Describe the policy instruments (zoning, density control, subsidies, incentives, redistribution of land rights, etc.) *(Spyra et al., 2021).*

(1) regulatory instruments that aim to directly control specific aspects related to particular spaces (e.g., land use zoning)

(2) economic instruments, including market-based instruments that are related to economically oriented approaches (e.g., taxes, charges or fees, emission trading schemes)

(3) informational and motivational instruments aiming at raising awareness and educating social actors giving them a free choice related to specific issues

4.2.1.9 If the intervention is a planning instrument, characterize it according to the ESPON COMPASS scheme (*Nadin et al. 2018*):

(1) Strategy/Visionary (defines the long-term vision and pathways to reach this vision)

(2) Planning (defines framework and criteria for, e.g., land use development in a mid-term)

(3) Regulation (legally binding commitments or decisions to steer the implementation of plans and/or strategies)

(4) Programme/Action plan (a concrete plan/project implemented in short-term)

(5) Other, please describe:

4.2.1.10 Bindingness of the intervention. How strict is the intervention in terms of legal bindingness and sanctioning mechanisms?

4.2.1.11 Does the intervention prescribe monitoring mechanisms? If yes, how often do the monitoring mechanisms happen? Who is responsible for the monitoring?

4.2.1.12 Describe the targeted actors and their obligations & capacity (available resources, whether the dominance of the centre/particular actors, the predominant interests of actors)

4.2.1.13 If applicable, describe the **governance procedures adopted to implement the intervention** (e.g. adaptive learning; public participation and consultation, collaborative governance; institutional arrangements incl. new decision-making bodies; incorporation of scientific evidence, monitoring and evaluation, etc.)

4.2.1.14 Categorize the intervention according to EDGE-SCAPE (Newig et al. 2013, pp. 47, 50): Introduction of new technology? Awareness raising? Economic measures? Reorganisation of competencies? Creation of new institutions? Does it follow an adaptive, learning approach? Does it consider long-term aspects?

4.2.1.15 Governance processes foreseen for further implementation of the policy: involved actors, etc.

4.2.1.16 External supports (particularly from the European level: rules, funds or expert knowledge, inspired by ESPON COMPASS*, Nadin et al., 2018*).

4.2.1.17 Supplementary information: e.g., for the formulation and implementation of the intervention, was it conflictual (among actors and/or between sectors)? Was it developed in a participatory way?

4.2.1.18 Describe *how* the intervention led to outcomes (or not)? You may use (or not) the following categories.

(1) By convincing people

(2) By incentivizing desired behaviour

(3) By clear implementation procedures

(4) By other means (please detail)

(5) Data not available

(6) Other, please describe:

4.2.1.19 Please describe the effectiveness of the interventions on the land-use change.

(1) Objectives of governance interventions were (mostly) achieved.

(2) Objectives of governance interventions were (mostly) not achieved.

(3) Objectives of governance interventions were (mostly) not achieved, plus adverse effects occurred.

4.3 Political, societal, economic and biogeophysical context

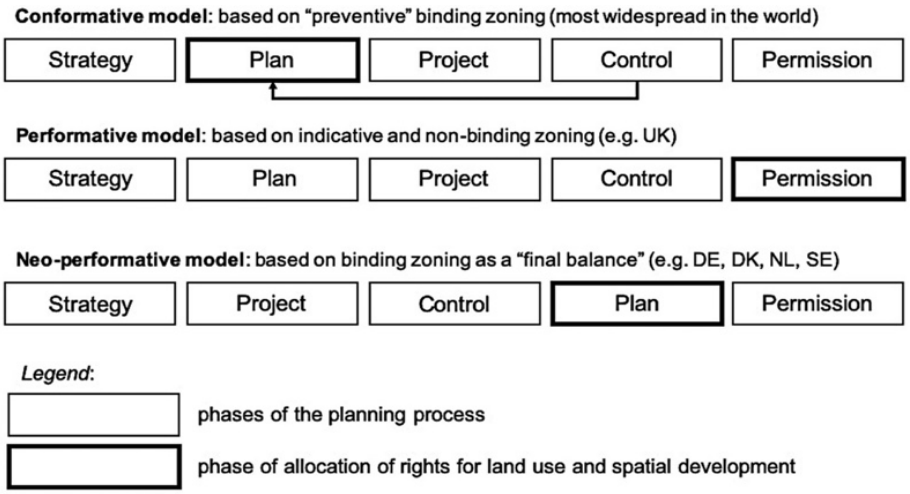
4.3.1 Political / governance system: Describe the relevant political system (including major ruling political parties, e.g. 'green', 'conservative', 'liberal', 'nationalist', etc.) during the time period from when the intervention was issued to when the major land-use change occurred.

4.3.2 (Do be done by Leuphana.) If applicable, categorize the intervention using the below scheme by categories of "Three models of spatial governance and planning systems as institutional technologies" by *Berisha et al. (2021)*, with further details in *Berisha et al. (2023)*.

(1) Conformative model (the rights are allocated through a preventive binding zoning)

(2) Performative model (the rights are assigned contextually)

(3) Neo-performative model (the rights are assigned as a "final balance" after developing the project)



4.3.3 Governance structure (below national level), particularly for the formulation and implementation of the described intervention– see e.g. *Colsaet et al. (2018)*.

(1) Select the words best describing the governance structure in your area:

Horizontally: Polycentric or fragmented?

Vertically: Multi-level or hierarchical? Centralized or decentralized.

(2) Describe the collaboration and competition between and among administrative bodies, allocation of power and the capacities of administrative in charge of

4.3.4 Demographic (population density and dynamics, age distribution)

4.3.5 Social (e.g. conflicts, public attention, social injustices, land tenure...),

4.3.6 Economic (available funds, unemployment rate, ...),

4.3.7 Environmental (environmental problems, natural resources protection/utilisation (?), ...),

4.3.8 How would you describe the **environmental aspects** in the relevant area before the LUC occurred, e.g., important natural resources, relevant protection, utilization, or destruction.

4.3.9 Biogeophysical – How would you describe geo-bio-physical aspect in the relevant area, e.g., climate, geographic conditions?

4.3.10 (Do be done by Leuphana.) Alternatively, **if applicable,** refer to: *Spatial planning systems in Europe as outlined in Nadin and Stead, 2008; Nadin and Fernández-Maldonado, 2023, Schmitt et al., 2013.*

5 Appendix

5.1 Theoretical background

We study how important land-use change in the case areas has been shaped by governance interventions. To this end, we draw on a "context-mechanism-outcome" perspective (Pawson, 2006), as depicted in the graph below. This means that we are particularly interested to understand how precisely – i.e. through which causal mechanisms of change – governance interventions shaped land-use change ('outcomes'), and within which contexts.

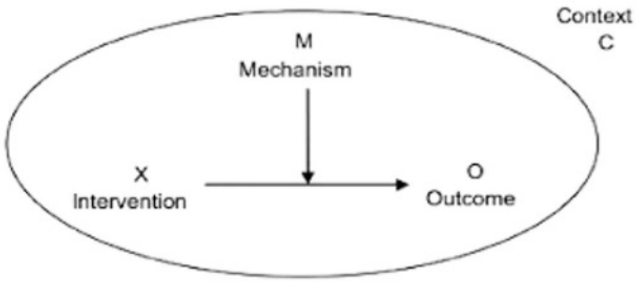


Figure 2. "Context-mechanism-outcome" perspective developed by Pawson (2006)

We are looking at policy/governance/planning interventions (X) that produce certain outcomes (O) (manifested by certain land-use changes or key decisions that will/would lead to land use changes). In a complementary perspective, we are also looking at major land-use changes and then try to identify those governance interventions that caused these land-use changes. For both perspectives, we want to identify the causal mechanisms (M) explaining why and how governance interventions lead to land-use changes. We also consider the context (C) under which these mechanisms operate.

The analytical categories of TIRP are informed by Ostrom's (2009) Social-Ecological-Systems (SES) framework that was developed to foster cross-case comparison (Oberlack, 2017; Oberlack et al., 2016; Villamayor-Tomas et al., 2020), while not applying the framework directly.

5.2 Procedures for analysis

We will use qualitative and structured (partly quantitative) methods for analyzing the twelve PC areas in comparison. We will use a multi-level model to account for the fact that within every PC area, there will be multiple instances of major land-use change.

6 References

Note: All texts are available as PDFs for download via the PLUS Change consortium shared platform.

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