8th International Workshop "Archetype Analysis in Sustainability Research" at Thünen Institute of Biodiversity in Braunschweig, Germany 29 September - 1 October 2025 (and hybrid)

We warmly welcome you to this year's Archetype Workshop! This document details the programme, practical information with contact details to the organisers, session links for remote participants, and the book of abstracts.

Content

Practical information

Links

- **Main Lecture Hall (Großer Vortragssaal)** Digital: Main Lecture Hall (password: A3UiGpuSR69), All plenaries as well as pitch and full paper session
- **Senate Hall (Senatssaal)** Digital: Senate Hall (password: FaaPCzUd943), Pitch, full paper and breakout sessions
- **President's Room (Präsidiumszimmer)** Digital: President's Room (password: BVmdq2syG83)**,** Pitch, full paper & breakout sessions

Google Drive: We use this folder to exchange all workshop-related materials:
Participant biographies: We use this document to shortly present yourself
Workshop folder: Here you will find a collection of all workshop material

Common workshop notes share for all sessions: You are all warmly invited to add notes to these documents during the sessions in which you present or which you attend. The notes serve to organise ad-hoc breakout sessions and the synopsis in the Closing Plenary. You will find template documents for each session in this folder

Organizers

Local organising team Responsible for questions around local practicalities and social activities

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Scientific programming team Responsible for the programme
Rongyu Wang, Zhejiang University, P.R. China
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Christian Kimmich, Institute for Advanced Studies, Vienna, Austria
Diana Sietz, Thünen Institute of Biodiversity, Germany

Formats

Sessions encompass **pitch presentations (15 minutes** in total for presentation and discussion), **full paper presentations (30 minutes** in total for presentation and discussion) or combinations of both. One discussant among the session presenters is assigned to lead the discussion for a selected presentation.
Themed breakout sessions and their formats are self-organised by the participants.

Workshop programme

Monday, 29 September 2025

Time (CEST)	Main Lecture Hall (Großer Vortragssaal) Digital: Main Lecture Hall	Senate Hall (Senatssaal) Digital: Senate Hall	Presidents‘s Room (Präsidiumszimmer) Digital: President's Room
12h – 13h	**Registration**		
13h – 14h	**Opening plenary** (Facilitation: Diana Sietz, Erika Angarita, Christian Levers, Markus Meyer, Rongyu Wang)		
14h – 14.15h	**Short break**, orientation to find rooms		
14.15h – 15.45h	**Session I (Part A):** Land-related archetype analysis	**Session II (Part A):** Archetypes in global change and governance fit	**Themed breakout session I:** Text as data in archetype analysis
15.45h – 16.15h	**Group Photo** at entrance of Forum Building Tea and coffee break		
16.15h – 17.15h	**Campus Tour:** Meeting point at entrance of Forum Building		
17.15h – 17.30h	**Day 1: Wrap up** - Update for tomorrow and dinner (Facilitation: Christian Levers)		
17.30h – 19h	**Free time** (commute to city, check-in in hotels etc.) **Links for some highlights** regarding the city of Braunschweig (for Englisch switch language at upper right-hand side of website)		
19h	**Dinner at Le Feu:** Alte Knochenhauerstraße 13, Braunschweig https://www.lefeu.de/le-feu-flammkuchen-braunschweig		

Tuesday, 30 September 2025

Time (CEST)	Main Lecture Hall (Großer Vortragssaal) Digital: Main Lecture Hall	Senate Hall (Senatssaal) Digital: Senate Hall	President's Room (Präsidiumszimmer) Digital: President's Room
9h–10.30h	**Session III (Part B):** Land-related archetype analysis	**Session IV:** Agriculture and forestry	**Flexible space** for ad-hoc discussion groups
10.30h–11h	**Tea and coffee break**		
11h-12.30h	**Session V:** Archetypes for tailoring policy and transformation pathways	**Session VI (Part B):** Archetypes in global change and governance fit	**Flexible space** for ad-hoc discussion groups
12.30h-14h	**Lunch at canteen**		
14h –15.30h	**Session VII:** Governing commons and urban community	**Themed breakout session II:** Re-visiting the agrarian question and agricultural policies in Sub-Saharan Africa	**Flexible space** for ad-hoc discussion groups
15.30h – 15.45h	**Tea and coffee break**		
15.45h – 17.15h	**Themed breakout session III (Part A):** Regenerative social-ecological systems archetypes	**Themed breakout session IV:** Archetypes in sustainability science: Navigating between buzzwording, added value and substance	**Flexible space** for ad-hoc discussion groups
17.15h – 17.30h	**Day 2: Wrap up** - Update for tomorrow (Facilitation: Rongyu Wang)		

Wednesday, 1 October 2025

Time (CEST)	Main Lecture Hall (Großer Vortragssaal) Digital: Main Lecture Hall	Senat Hall (Senatssaal) Digital: Senate Hall	President's Room (Präsidiumszimmer) Digital: President's Room
9h–10.30h	**Themed breakout session III (Part B):** Regenerative social-ecological systems archetypes	**Themed breakout session V:** Methods for developing archetypes for conservation governance	**Flexible space** for ad-hoc discussion groups
10.30h–11h	**Tea and coffee break**		
11h-12h	**Closing plenary** (Facilitation: Diana Sietz, Erika Angarita, Christian Levers, Markus Meyer, Rongyu Wang)		
12h-13h	**Lunch at canteen**		

Book of Abstracts

Session I: Land-related archetype analysis (Part A)

Type	Title	Presenter	Discussant
Full paper	Configurational pathways of proactive local government engagement in rural construction land marketization reform: A fsQCA study of 32 Chinese pilot regions	Rumei Hu	Rongyu Wang
Full paper	Archetypal land redevelopment patterns for rural industrial development in contemporary China: Linking biophysical conditions, community attributes and rules-in-use	Rongyu Wang	Briana Swette
Pitch	Mapping social-ecological public land archetypes to support strategic targeted grazing action and adaptive management	Briana Swette	Rumei Hu

Title: Configurational pathways of proactive local government engagement in rural construction land marketization reform: A fsQCA study of 32 Chinese pilot regions
Presenter: Rumei Hu

Abstract: This study investigates the conditional configurations and implementation pathways influencing local governments' proactive engagement in rural construction land marketization reform in China. Utilizing fuzzy-set Qualitative Comparative Analysis (fsQCA), we examine empirical evidence from the first batch of 32 pilot counties (excluding Qushui County in Tibet). Key findings reveal: (1) Local governments' reform implementation does not stem solely from their singular roles as agents of higher-level authorities, regional competitors, or social demand responders. Instead, it emerges through multifactorial interactions that generate equifinal pathways. While key-task pressures from higher governments are not a necessary condition, they appear in every configuration. (2) Six distinct causal configurations were identified, coalescing into three archetypal models: controlled fiscal risk experimentation, political-incentive driven prioritization, and social pressure-responsive implementation. These findings demonstrate that local governments' reform behaviors are characterized by the tripartite institutional logic of hierarchical accountability, interjurisdictional competition, and societal demand accommodation. The study provides theoretical and practical insights for optimizing rural land system reforms through differentiated policy design that accounts for regional governance contexts.

Title: Archetypal land redevelopment patterns for rural industrial development in contemporary China: Linking biophysical conditions, community attributes and rules-in-use
Presenter: Rongyu Wang

Abstract: This study elaborates on the diverse land redevelopment patterns for rural industrial development (RID) by linking biophysical conditions, community attributes and rules-in-use through archetype analysis. In total, 7 archetypal land redevelopment patterns are extracted from 35 first-hand cases in contemporary China. These archetypes identify the interactive mechanisms of various factors that formulate and implement land redevelopment to develop rural secondary and tertiary industries, including rural collective autonomy, suitable government intervention, and governance fits for small- and large-scale rural collective action. Specifically, decentralized decision-making rules based on transparent information formulate land redevelopment that exploits the rural advantages of location, landscape and industrial foundation. Local industrial policies guide land redevelopment formulation in line with advantageous locations and landscapes and alleviate shortages in rural economic capacity. Informal control and coordination rules implement small-scale land redevelopment. In contrast, the integrated rules of short- and long-term incentives, formal administrative or community control and formal coordination implement large-scale land redevelopment, while sufficient economic capacity and capable rural leadership favor the adoption of control and coordination rules. This study highlights the joint effects of biophysical conditions, community attributes and rules-in-use, providing context-dependent policy implications for China and other transitional countries to facilitate RID through land redevelopment.

Title: Mapping social-ecological public land archetypes to support strategic targeted grazing action and adaptive management
Presenter: Briana Swette

Abstract: As changing fire regimes and exotic plant invasions transform forests and rangelands across the globe, land managers are interested in understanding the potential role of livestock grazing to adapt to changing conditions and support resilient landscapes. In the American West, the United States Forest Service (USFS) plays a central role in wildfire, invasive plant, and livestock management, but the prescriptive use of livestock to manage fuels or invasive plants, also called targeted grazing, is limited. The USFS is interested in scaling up targeted grazing to address its most pressing management challenges, but such use of livestock requires flexibility to implement at the right time and place. Meanwhile, adaptive management on public lands in the American West remains an elusive goal. Research emphasizes that the opportunities to support adaptive management are at the local level, but top-down approaches continue to dominate policy in the agency. I propose to develop social-ecological archetypes of public land management in the western United States to inform where and how to utilize targeted grazing in a manner that is both socially and environmentally responsive. I am currently leading two surveys of 1) diverse USFS staff, including rangeland managers, fire staff, and leadership, and 2) livestock owners

that graze on National Forest lands in most of the western United States. These surveys will generate rich datasets of the social, institutional, and environmental factors that drive both agency manager and livestock owner decision-making, and their attitudes and willingness to participate in targeted grazing as an adaptive land management tool. I propose to utilize these survey datasets, coupled with relevant biophysical data, to develop and map land management archetypes at the local Ranger District (RD) level (n=203). RDs are sub-jurisdictional areas within National Forests, ranging between 465-8,650 km2. Hierarchical cluster analysis with sensitivity analysis will be used to develop and validate the archetypes. The analysis will avoid ad-hoc selection of key indicators by utilizing variables and causal relationships found to be significant during previous pilot interviews and through analysis of survey data. Survey results can be geo-located and aggregated to the RD scale. Available biophysical data includes vegetation cover, fire risk and fire history, and degree of weed invasion. The resulting land management archetypes will support communication with agency partners at scales that are relevant to their decision making, while also making inroads to promote adaptive land management in the American West.

Session II: Archetypes in global change and governance fit (Part A)

Type	Title	Presenter	Discussant
Full paper	Using archetype analysis to unravel mechanisms of transformative change in place-based projects from Europe	Simeon Vaňo, Zuzana Harmáčková	Klaus Eisenack
Pitch	Unpacking climate policy texts: Archetype analysis of national policy configurations	Yujie Zhu	Simeon Vaňo
Pitch	Urban climate action through archetype analysis: A city-matching approach	Klaus Eisenack	Yujie Zhu

Title: Using archetype analysis to unravel mechanisms of transformative change in place-based projects from Europe
Presenters: Simeon Vaňo, Zuzana Harmáčková

Abstract: Transformative change is increasingly recognized as essential for addressing the interconnected global environmental and social crises while achieving sustainability for both nature and humanity. Despite the fact that transformative change as a concept is becoming more and more anchored in theory and policy, there remains a limited understanding of how transformative change unfolds in real-world contexts, as well as the mechanisms and conditions that either enable or hinder it. Our previous research examined archetypes of transformative change processes in biodiversity-related case studies across Europe, identifying patterns of interventions and processes with transformative potential. However, these patterns alone did not fully explain the mechanisms underlying transformative change. Therefore, this study is to deepen our understanding of the mechanisms and patterns that drive sustainability transformations. Specifically, we analyzed the identified archetypes in relation to enabling and disabling conditions, the roles of key agents and stakeholders, and the scalability of transformative change for broader impact. To address these gaps, we systematically coded data from 31 case studies and supplemented our analysis with interviews from case study managers to bridge information gaps. We then applied Formal Concept Analysis (FCA) to identify recurring mechanisms including enabling and disabling conditions and key actors that contribute to transformative outcomes. We propose that these archetypes serve as foundational building blocks, enabling policymakers and practitioners to design tailored interventions, processes, and stakeholder engagement strategies suited to specific contexts. By identifying common archetypes, we offer a structured approach to understanding how different contextual factors interact to shape transformative change. Drawing on real-world European case studies, our research enhances the practical applicability of transformative change theory and grounds its often abstract concepts in empirical realities. Ultimately, this work advances our understanding of how transformative change manifests in diverse settings and informs the recognition of necessary conditions as well as the design of effective intervention strategies.

Title: Unpacking climate policy texts: Archetype analysis of national policy configurations
Presenter: Yujie Zhu

Abstract: In recent years, the frequency, speed, and scale at which climate records are being broken globally have been accelerating at an unsettling pace. There is growing recognition that without immediate and more effective climate action, no one will be spared from the devastating impacts of climate change. Climate change is a global and long-term public issue. Although there is no shortage of international cooperation on climate change, and countries have submitted their climate mitigation commitments (NDCs) following the Paris Agreement, there remains a disconnect between national-level climate pledges and their actual implementation, which constitutes a core obstacle to achieving the goals of the Paris Agreement. Existing research predominantly focuses on policy ambition or macroeconomic drivers, yet few studies systematically explore how "climate policy design features" interact with heterogeneous national conditions to shape emission reduction effectiveness. To address this gap, this study proposes a novel framework integrating computational text analysis and archetype analysis to decode the logic behind effective climate policy portfolios. Based on 443 climate policy documents from 141 countries, we employ a Structural Topic Model (STM) to quantify core policy themes and derive their relative contributions (document-topic distributions) within national policy texts. Preliminary analysis identifies key themes such as renewable energy technology development, fossil fuel phase-out, investments in low-carbon urban public transport, and carbon pricing. Furthermore, we systematically link these textual indicators with contextual data (e.g., GDP per capita, fossil energy dependency, institutional indices) and emission trajectories. Using fuzzy-set Qualitative Comparative Analysis (fsQCA), we identify causal configurations where specific policy theme combinations (e.g., "carbon pricing + fossil fuel phase-out") align with structural conditions to drive high-impact emission reductions. This study contributes twofold: 1. Methodologically, it develops a reproducible natural language processing (NLP) workflow to transform qualitative policy texts into quantifiable thematic metrics. 2. Theoretically, it moves beyond linear regression limitations, adopting a configurational approach to reveal how multifactorial policy-context interactions shape national climate target attainment. At a broader level, the research demonstrates the potential of computational social science to empower climate governance studies, offering actionable insights for designing context-sensitive, high-efficacy policy portfolios.

Title: Urban climate action through archetype analysis: A city-matching approach
Presenter: Klaus Eisenack

Abstract: Archetypes analysis started – since its early days – with the promise to ease the transfer (or replication) of solutions across cases. While this promise sounds intuitive to some, and although there are some studies which indicate that transfer by using archetype analysis is possible, we are still lacking general procedures for this purpose. This pitch takes the case of transferring successful climate action across cities as an example to sketch such a procedure. The example links to current

research on horizontal scaling of urban climate action, being a key to accelerating decarbonization and climate adaptation in cities. Current approaches to horizontal scaling revolve around matching leaders to followers, on the basis that the latter could learn from the former. However, evidence suggests that this logic is limited, even misleading, as it neglects the heterogeneity of biophysical, socioeconomic, and institutional conditions between cities. We argue that archetype analysis provides a methodological framework for urban climate action research that is cognizant of such heterogeneity to overcome the leader-laggard dichotomies. To develop our approach to transfer, we distinguish between matching as an adjective (e.g. if cities belong to the same archetype), and matching as a verb (when cities actually engage in matching activities). Since the latter can already be observed empirically, it can be used to better understand matching as an adjective. Transfer of solutions might also be possible between cities of different archetypes, if those archetypes match. We unpack this further by distinguishing whether archetypes share diagnostic attributes, or design attributes, or both. We currently aim to operationalize this approach, which might also be useful for other research areas than urban climate action.

Session III: Land-related archetype analysis (Part B)

Type	Title	Presenter	Discussant
Full paper	Archetypical action situations that influence forest social-ecological systems in western Africa	Frank Mintah, Chinwe Ifejika Speranza	Yuchao Chen
Full paper	Understanding local governments' incentives for farmland protection in China	Hongwei Hu	Frank Mintah
Pitch	Archetypical action situations in governing telecoupled land systems: Tracing the interaction between fundamental institutions and governance models	Yuchao Chen	Hongwei Hu

Title: Archetypical action situations that influence forest social-ecological systems in western Africa
Presenters: Frank Mintah, Chinwe Ifejika Speranza

Abstract: Increasing concerns about deforestation and the need for conservation have led to both policy and research agendas aimed at identifying strategies to address this challenge. Much research, particularly in land system science, has focused on tackling this issue through land use and land cover change analyses, as well as biophysical assessments. However, these approaches often lack a participatory dimension that integrates the perspectives of the people most affected. There is limited knowledge about how diverse factors interact to drive ecological changes and their feedback mechanisms. Consequently, instead of addressing the root causes, proposed solutions often serve as temporary fixes, inadvertently contributing to the continued rise in deforestation. Moreover, methodological approaches for applying archetype analysis to understand social-ecological interactions and feedback mechanisms in a systemic manner remain limited, particularly across multiple cases. Based on the conceptual framework of Social-Ecological Action Situations (SE-AS), this research adopts a systems-thinking approach to analyze changes in forest social-ecological systems. Specifically, the study aims to: (a) Identify and analyze the relationships among interacting factors that shape forest degradation and persistence from stakeholder perspectives; (b) Examine recurring causal loops (i.e., action situations) that explain forest change; and (c) Identify key leverage points for policy interventions. To achieve these objectives, the study will employ participatory causal loop diagrams (CLDs) co-developed with community members in 23 forest fringe communities across western Africa (Togo, Benin, Nigeria, and Cameroon). These communities use and manage forest patches (officially unprotected) for various purposes highlighting intricated human-forest interactions. The study will explore the use of the R software (DiagrammeR/igraph packages), Vensim software and formal concept analysis in visualizing, identifying and analyzing repetitive causal loops. The findings will provide insights on archetypical action situations that influence forest social-ecological systems - such as population and agricultural expansion nexus, productivity and investment patterns, livelihood

diversification, socio-cultural transitions, and resource extraction. In addition to informing potential policy directions, this study will contribute to advancing the application of archetype analysis in systems dynamics research.

Title: Understanding local governments' incentives for farmland protection in China
Presenter: Hongwei Hu

Abstract: Farmland protection in China exhibits significant regional disparities in policy implementation, with some local governments actively enforcing conservation measures while others strategically evade them. These variations stem from misaligned incentives under China's fiscal and administrative decentralization, fragmented land management responsibilities, and inefficiencies in farmland quota allocation. To systematically analyze these differences, this study employs a fuzzy-set qualitative comparative analysis (fsQCA) on over 300 prefecture-level cities, examining the structural relationships between key factors and identifying recurring patterns in local government behaviors. The research framework integrates three dimensions: capability (resource support), pressure (political, competitive, and societal forces), and mobility (political and economic incentives). This study elucidates the mechanisms through which local governments navigate the complexities of farmland protection, offering insights into their strategic choices under varying institutional and economic constraints. By identifying the necessary and sufficient conditions for effective policy implementation, this research contributes to a deeper understanding of local government roles in farmland protection and provides policy recommendations for aligning local incentives with national conservation objectives. These findings are critical for advancing sustainable land-use management and establishing a unified framework for farmland protection in China.

Title: Archetypical action situations in governing telecoupled land systems: Tracing the interaction between fundamental institutions and governance models
Presenter: Yuchao Chen

Abstract: Recent scholarship has developed a polycentric perspective for interpreting the governance of long-distance, interconnected land systems, focusing on processes of cooperation, competition and conflict to better explain the emergence, characteristics and performance of diversified models at the level of the governance system. Polycentricity provides a superficially structured lens on interconnected governance domains but remains largely unexplained in terms of the archetypical action situations that these models will follow as a result of why they emerge and how they change, in other words, how the fundamental institutions underlying the external political, economic and economic domains as drivers influence multiple models still absence the understanding of the interactions between the two. In this paper, we refer to this interacting archetypal action situation as the 'unity of plurality' between state and society, and divide it into two archetypes, 'society in state' and 'state in society'. This will better support the analysis and development of sustainable land governance in interconnected social-ecological systems. The Network of Action Situations

approach has been redeveloped to operationalise this interaction mechanism. To empirically illustrate this integrated approach, we analysed the cases of the Hangzhou-Taizhou high-speed railway in the eastern coastal region of China and the hydroelectric dam in the Trift region of the Swiss Alps. We identify the characteristics and processes of the network of action situations that influence the sustainability governance of land systems. Introducing an understanding of the 'unity of plurality' between state and society for telecoupled land system governance enables analysts to identify (1) the drivers behind each seemingly idiosyncratic governance model and (2) the pathways that can be followed to guide governance change.

Session IV: Agriculture and forest

Type	Title	Presenter	Discussant
Full paper	Unveiling archetypal patterns in forest and mangrove governance innovation: Insights from Colombia's Vida Manglar and European case studies	Stefan Sorge	Karla Vergara Rodríguez
Full paper	Forest change dynamics in deforestation frontiers in the Peruvian Amazon	Karla Vergara Rodríguez	Ricardo Perez-Alvarez
Pitch	Archetypes for predicting natural pest control in agricultural landscapes	Ricardo Perez-Alvarez, Emily Poppenborg Martin	Stefan Sorge

Title: Unveiling archetypal patterns in forest and mangrove governance innovation: Insights from Colombia's Vida Manglar and European case studies
Presenter: Stefan Sorge

Abstract: In the face of escalating climate change and biodiversity loss, forest management approaches require adaptation to ensure the sustainable provision of forest ecosystem services (FES). This study applies the SETFIS analytical framework to examine a hybrid governance model for mangrove conservation, reforestation, and compensation in Colombia's Caribbean coast. The "Vida Manglar" case study combines market, hierarchy, and network components to manage natural resources and overcome social dilemmas, aiming to strengthen local governance, manage FES, promote sustainable development, and provide community and biodiversity benefits. By categorizing innovation patterns into archetypal formulations, we explore the interconnectedness and influences among actors and factors within and across system dimensions. This approach helps identify recurring themes and variations in governance innovations, highlighting successful strategies and areas for improvement. Our research integrates the exploration of archetypal dynamics within forest governance innovations, uncovering deeper insights into the systemic drivers that shape forest governance. Key findings reveal that governance approaches are strongly influenced by their context and vice versa. While common patterns of influencing factors play key roles across cases, archetypal dynamics interact with these factors to shape the design and implementation of novel governance strategies. The study develops a topology of archetypes emerging through processes between subsystems of actors, institutions, innovation processes, forest management, and the ecosystem. The combination of key influencing factors and proposed archetypes organizes the complexity of governance innovations in social-ecological forestry systems. This approach offers insights into processes and patterns, identifying potential to foster innovation development and create required innovation conditions. The interplay between the SETFIS analytical framework and archetypes is complementary: SETFIS application helps understand governance innovation,

archetypes classify individual innovation processes, and results guide forest management and policy responses. This research provides a nuanced understanding of the complex interplay between influential factors, informing more effective approaches to sustainable forest management. By examining the underlying archetypal patterns that govern the emergence and evolution of governance approaches, we offer a basis for steering effective innovation development to address challenges in the supply and demand for forest ecosystem services in the face of environmental challenges.

Title: Forest change dynamics in deforestation frontiers in the Peruvian Amazon
Presenter: Karla Vergara Rodríguez

Abstract: Deforestation severely threatens Tropical Moist Forests (TMF) in the Amazon, impacting biodiversity and the well-being of local populations. Despite being the region's second largest area of TMFs and a hotspot of biocultural diversity, the Peruvian Amazon has been under-researched regarding historical and current forest change dynamics and their impacts on social-ecological systems. The deforestation frontiers in the Peruvian Amazon present a unique situation in which large-scale agriculture such as oil palm and cocoa cultivation are temporally and spatially contained as opposed to Brazil or Bolivia, where extensive agriculture such as soy and cattle ranching for export leads deforestation. Instead, the factors driving changes at the deforestation frontiers in the Peruvian Amazon include the construction of logging roads, small-scale agriculture, grazing, and gold mining. The interplay among these drivers raises concerns about sustainable development, particularly in addressing rural poverty and combating illegal practices such as coca cultivation and unauthorized gold mining. This study employs archetype analysis (AA) to examine deforestation frontiers and identify patterns of forest change. This approach allows a thorough understanding of these dynamics over time and the factors that influence them by highlighting the essential roles of different actors and activities. Through nested typologies, we construct deforestation frontier archetypes (DFA) and social-ecological frontier archetypes (SEFA). First, we derive six metrics (i.e., forest condition, speed and fragmentation) to build three typologies. These are then combined to create DFA, which are further integrated with proxies for the leading causes and activities of forest change to establish SEFA. Our study identifies five distinct deforestation frontier archetypes: suspended frontiers (17.8%) are primarily located along northern Amazon fluvial networks, linked to oil activities, forestry concessions, and production forests. Slowed (9.8%) and gradual (16.2%) frontiers near roads and rivers are driven by smallholder farming. Fragmented frontiers (4.9%) in the Andes-Amazon transition zone feature smallholder farming and road expansion, while rampant frontiers (4.0%) are represented by large-scale agriculture, cattle ranching, and mining. Emergent frontiers (13.9%) appear in regions like Ucayali and Madre de Dios, influenced by farming, mining, and commercial logging. Our research indicates that archetype analysis deepens our understanding of deforestation dynamics and their drivers in this region. Deforestation patterns evolve with the emergence of new actors and factors, revealing a complex interplay that influences these dynamics over time. This approach could also be applied to other areas facing similar changes in tropical moist forests

(TMFs), providing valuable insights for conservation efforts.

Title: Archetypes for predicting natural pest control in agricultural landscapes
Presenters: Ricardo Perez-Alvarez, Emily Poppenborg Martin

Abstract: Natural pest control is a crucial ecosystem service that supports sustainable crop production, yet its provision and stability are highly variable across agroecosystems. While multi-trophic interactions and food web dynamics have been extensively studied, the complexity and context-dependency of natural pest control systems pose significant challenges to developing generalizable predictive models. Existing frameworks often fail to integrate cross-scale processes, limiting their applicability to dynamic agricultural landscapes. In response, we propose leveraging archetype analysis as a novel approach to systematically classify and predict natural pest control dynamics across diverse agroecosystems. Archetype analysis offers a middle-ground between species-specific models and overly generalized frameworks by grouping pest control systems based on functional traits, ecological interactions, and landscape structure. Previous work has demonstrated that trait-based archetypes can capture consistent patterns in pest control responses to land use change by identifying key characteristics—such as life cycle requirements, dispersal potential, and host specialization—that mediate species' interactions with their environment. Building on these insights, we are compiling a comprehensive database of functional traits of pests, natural enemies, and their interactions to refine archetype definitions. This effort consolidates empirical and theoretical knowledge to classify pest control systems based on functional and mechanistic characteristics, drawing from literature synthesis and expert input. In this pitch, we will present our methodological approach to translating system-specific information into generalizable archetype-based models. We will discuss how integrating trait-based analyses with mechanistic modeling can enhance transferability and predictive power across heterogeneous systems, landscape contexts, and biogeographic regions. Our approach moves beyond correlative assessments by incorporating mechanistic relationships between landscape structure, species traits, and pest suppression dynamics, improving the ability to anticipate how natural pest control services respond to environmental change. By bridging empirical observations with predictive modeling, this framework advances the integration of ecological understanding into decision-making processes. The application of archetype analysis has the potential to inform land management policies by identifying context-specific drivers of natural pest control and providing robust, evidence-based strategies for designing resilient and multifunctional agricultural landscapes.

Session V: Archetypes for tailoring policy and transformation pathways

Type	Title	Presenter	Discussant
Full paper	Mapping human-nature archetypes to guide global biodiversity, food security and land use policy	Diana Sietz	Dennis Baulechner
Pitch	Socio-ecological land use and landscape archetypes for tailored multi-actor transformation of agricultural and food systems	Dennis Baulechner, Emily Poppenborg Martin	Tomas Vaclavik
Pitch	Farm typologies based on IACS data to tailor agricultural policies	Tomas Vaclavik	Diana Sietz

Title: Mapping human-nature archetypes to guide global biodiversity, food security and land use policy
Presenter: Diana Sietz

Abstract: Reconciling biodiversity conservation, food security and sustainable agriculture at global scale requires a clear understanding of regional social-ecological opportunities and challenges. This understanding helps untap regional contributions to better achieve global policy targets, such as those framed in the Kunming-Montreal Global Biodiversity Framework (GBF). Yet, previous global syntheses of social-ecological interlinkages remain limited in thematic and spatial detail restricting the discussion of regional contributions and targeted policy implementation. Here, we present 25 human-nature archetypes derived from clustering of global social-ecological data revealing regional opportunities and challenges for meeting global policy targets. Our results differentiate regions with large conservation opportunities from those well-suited for ecological restoration or ecological intensification. They highlight the widespread need for improving governance to enhance food security and re-design agricultural systems. Overall, our analysis supports international and national decision makers in tailoring GBF targets to regional specificities in order to more effectively achieve global sustainability goals.

Title: Socio-ecological land use and landscape archetypes for tailored multi-actor transformation of agricultural and food systems
Presenters: Dennis Baulechner, Emily Poppenborg Martin

Abstract: Targeted agroecological approaches are readily available for transforming agricultural land systems to enhance farmland biodiversity, improve climate resilience in food production, and reduce environmental pollution. However, effective transformation requires tailoring pathways to the specific characteristics of agricultural land systems to leverage opportunities, address challenges, and align with stakeholder expectations. This demands a deep understanding of the processes

driving interactions between biodiversity, food production, and pollution, as well as the conditions for agroecological effectiveness. Equally crucial is ensuring that agri-environmental measures account for regional variability, including soil and climate conditions, to maximize both ecological impact and farmer acceptance. Archetype analysis can reveal patterns in integrated processes across diverse spatio-temporal and socio-ecological contexts. It identifies recurring characteristics of certain agricultural land-use systems - combinations of processes and conditions that interact similarly across regions. This helps assess the transformative potential of agroecological approaches, clarifying which strategies work where, why, in what combinations, and for which stakeholders. Recent studies have used archetype analysis to categorize agricultural land use in Europe based on land use intensity, production factors, agroecological adoption potential, and social learning processes in natural resource management. However, they often overlook key socioeconomic and socioecological constraints, such as crop rotation choices, farming systems, actor preferences, historical and cultural contexts, and the effectiveness of locally relevant agroecological measures. These factors are crucial in shaping how land use archetypes and their stakeholders respond to transformative change. In this pitch, we will suggest how to integrate existing and emerging datasets to advance the identification and mapping of land use archetypes across Europe by incorporating socioecological and historical contexts, ecosystem service multifunctionality, and the application of agroecological measures. We aim to leverage these socioecological archetypes to develop participatory pathways for transformative change tailored to each archetype. The archetypes will encompass variations in land use intensity, crop composition and rotations, landscape elements including landscape features, and the involvement of local actors. With this approach we aim to create the foundation for a regionally adapted, participative design of agri-environmental measures that (i) are ecologically effective, (ii) optimize stakeholder compensation processes and (iii) enhance ownership of landscape transformations by the farmers and other actors who manage them.

Title: Farm typologies based on IACS data to tailor agricultural policies
Presenter: Tomas Vaclavik

Abstract: Farm typologies are crucial for tailoring agricultural policies, such as agri-environment-climate measures (AECMs), to the diverse characteristics of farming systems. By grouping farms with similar structures and behaviors, typologies offer a framework for designing more targeted and effective policies. However, tailoring policies remains challenging due to limited spatial data or reliance on extensive farm surveys. This pitch presents a typology of Farming System Archetypes (FSAs) developed using field-level data on farms' economic size and specialization, derived from the Integrated Administration and Control System (IACS), in case studies from Germany, Czechia, and the United Kingdom. The typology identifies groups of farms likely to respond similarly to policy measures and demonstrates its potential to capture and explain patterns of AECMs adoption. The recent availability of harmonized IACS data for most EU Member States creates new opportunities for similar archetype analysis at a pan-European scale. This dataset enables the identification of FSAs

across Europe, facilitating the analysis of AEM adoption and other agricultural policy effectiveness at a continental level. Insights from this archetype-based approach can support policymakers in designing more diverse, precise, and effective measures tailored to the complexity of European farming systems.

Session VI: Archetypes in global change and governance fit (Part B)

Type	Title	Presenter	Discussant
Full paper	Environmental sustainability beyond ecological processes	Kakha Nadiradze	Thomas Timberlake
Full paper	Generating test data for qualitative methods	Klaus Eisenack	Kakha Nadiradze
Pitch	Archetypes of desertification vulnerability in Mediterranean drylands and pathways to a more resilient future	Thomas Timberlake	Elizabeth Díaz-General
Pitch	Unravelling the socio-cultural dimensions of biodiversity pressures in the land system: a global analysis	Elizabeth Díaz-General	Klaus Eisenack

Title: Environmental sustainability beyond ecological processes
Presenter: Kakha Nadiradze

Abstract: The interconnection between human emotion, symbolic narratives, and ecological processes is vital for understanding and addressing complex environmental challenges. This study delves into these intersections through a pre-feasibility study for ecosystem restoration in the Rustavi Iagluji range in Georgia—a site selected for combating desertification, land degradation, and climate change by implementing reforestation projects and constructing carbon sink forests. Through the lens of archetypal analysis, this research emphasizes how symbolic associations and emotional narratives shape environmental responses and restoration strategies. Archetypes, as universal symbols and patterns of experience, provide insights into the ways humans interpret environmental challenges. Using the green bicycle as a central archetype, the study examines its symbolic and emotional resonance—representing exploration, freedom, change, and discovery. Inspired by emotional journeys rooted in personal histories, these narratives reveal how shared symbols can influence environmental action and perceptions of restoration efforts. The green bicycle serves as a metaphorical lens for exploring themes such as resilience, loss, opportunity, and the human relationship with nature. The Rustavi Iagluji range serves as a case study illustrating how innovative methods such as reforestation, the use of seed balls, and carbon sink development intersect with these archetypal emotional narratives. Through a qualitative exploration, this research identifies how symbolic experiences (e.g., cycling as a pathway to freedom and discovery) can inspire cooperative engagement with restoration efforts. This conceptual approach highlights the importance of considering socio-cultural drivers and emotional archetypes alongside ecological strategies to create effective, inclusive, and sustainable interventions.

Title: Generating test data for qualitative methods
Presenter: Klaus Eisenack

Abstract: Testing new methods before engaging in costly data collection could be immensely beneficial. While it is common practice for statistical methods to use simulated quantitative data, social sciences still lack robust simulated reference data for evaluating qualitative and mixed methods, particularly for archetype analysis. While large language models (LLM) have been explored as research assistants, their potential for producing qualitative reference data remains underutilized so far. We propose the use of LLMs to simulate qualitative data. Our paper focuses on how to control and ascertain the quality of such data. Specifically, we simulate communications among players involved in game-theoretic interaction in a trust game. We set up different archetypal configurations of the game structure and the players' roles. In each game, players' decisions are made by an LLM, which is accompanied by a simulated text messages to the other player. Their chat communications may influence later game moves through signaling. Our findings demonstrate the possibility to generate a large amount of good qualitative reference data through an LLM using dedicated prompts. The simulated chats are similar to chats from humans playing the same game, along several qualitative and quantitative standards (such as inter-rater reliability, word frequency, sentiment analysis). The simulated data sets can be used to test various qualitative methods. In particular, we conclude that for archetype analysis our approach enables verification of a method's ability to recover original archetypes from data.

Title: Archetypes of desertification vulnerability in Mediterranean drylands and pathways to a more resilient future
Presenter: Thomas Timberlake

Abstract: Land degradation is a global challenge that threatens ecosystems, livelihoods, and food security, particularly in drylands, where it is known as desertification. The Mediterranean basin is experiencing rapid land degradation driven by climate change and the unsustainable use of natural resources such as soil, water, and biodiversity. This poses a major threat to the region's communities, ecosystems, and economies. However, vulnerability to desertification is highly context-specific, shaped by a complex interplay of social, political, and environmental factors that vary across socio-ecological systems. While many of these drivers are well understood, they occur in different combinations across the region, making it difficult to identify highly vulnerable areas and scale up local solutions. To address this challenge, we must be able to map these determinants of desertification vulnerability onto real socio-ecological systems and identify areas with shared attributes where local knowledge and solutions can be exchanged. In this study, we use a cluster analysis approach to define broad archetypes of desertification vulnerability in the Mediterranean drylands. We map the distribution of these vulnerability archetypes across the region, examine the common challenges they face and explore potential strategies for building resilience. To validate these findings, we engage local land management stakeholders—including farmers, foresters, and local authorities—in five pilot areas to

gather their perspectives on what a desertification-resilient future would look like. By comparing these locally envisioned futures with the characteristics of their corresponding vulnerability archetypes, we assess whether similar resilience strategies apply within each archetype. This approach not only validates the archetypes locally but also highlights opportunities to share knowledge and scale solutions, helping communities across the Mediterranean build resilience to desertification.

Title: Unravelling the socio-cultural dimensions of biodiversity pressures in the land system: a global analysis
Presenter: Elizabeth Díaz-General

Abstract: Biodiversity is fundamental to sustaining life on Earth, as it supports diverse ecosystems, human well-being, and economic activities. Preserving biodiversity is crucial for the future, prompting the global policy agenda to establish conservation targets while scientific research focuses on exploring and assessing the drivers of biodiversity loss and co-designing actions of change. Although most of these drivers are anthropogenic, there remains limited understanding of the underlying socio-economic and cultural factors that contribute to them and bring both positive and negative consequences for biodiversity. Addressing these root causes is essential for developing effective conservation strategies that integrate human-nature relationships and social equity considerations. A comprehensive approach to biodiversity conservation requires analysing the interactions between ecological and socio-economic systems. Using spatially explicit indices of biodiversity pressure in the land system, we will randomly select cases from various regions worldwide associated with different levels of environmental stress. To contextualise these pressures, we will collect socio-economic, cultural, and political data specific to each selected area. This dataset will include indicators such as population demographics, education levels, income distribution, economic activities, land-use conflicts, traditions, human-nature interactions, among others. A particular emphasis will be placed on equity and justice dimensions, as these aspects can significantly shape conservation outcomes. By employing methods of archetype analysis, we aim to identify distinct socio-cultural profiles or archetypes that characterize human and social systems associated with varying degrees of biodiversity threats. This methodological approach enables us to detect patterns and recurrent dynamics across different contexts, facilitating a deeper understanding of the socio-economic and cultural conditions that drive biodiversity loss. Recognising these archetypes can provide valuable insights into the potential for sustainable interventions and socially inclusive conservation measures. The expected outcomes of our global analysis can contribute to generating policy actions that are consistent with their context. By linking socio-economic and cultural factors to biodiversity pressures, our research can inform policymakers about priority areas where conservation efforts should be complemented by targeted social interventions. Strengthening the integration of human-nature relationships within biodiversity policies can enhance the effectiveness of conservation strategies, ensuring that environmental sustainability aligns with social justice and economic development. Ultimately, our findings aim to support decision-makers in designing more holistic and equitable

approaches to biodiversity preservation, fostering a balance between ecological integrity and human well-being.

Session VII: Governing commons and urban community

Type	Title	Presenter	Discussant
Full paper	Assessing the heterogeneity in management approaches voluntarily chosen by recreational angler communities in Germany under private fishing rights: An archetype approach	Hadjer Smati	Sabine O'Hara
Pitch	Unveiling restoration archetypes: A machine learning approach to mapping ecological and socio-economic restoration potential across European landscapes	Ayushi Kurian	Hadjer Smati
Pitch	Enhancing sustainability research through simulated test data and archetype analysis	Klaus Eisenack	Ayushi Kurian
Full paper	Archetypes of land-use: Exploring water cities	Sabine O'Hara, Jaleel Shujath	Klaus Eisenack

Title: Assessing the heterogeneity in management approaches voluntarily chosen by recreational angler communities in Germany under private fishing rights: An archetype approach
Presenter: Hadjer Smati

Abstract: Inland fishing rights in Germany are private, where approximately 10,000 angler communities ("clubs") actively use and manage local freshwater fisheries as rightsholders. In this position, angling clubs have certain autonomy in decision-making and implement diverse management approaches such as harvest regulations, stocking and habitat improvement. The objective of this study was to investigate the heterogeneity in the management actions chosen by angling clubs using an archetype approach. We randomly surveyed (n=1,222) decision-makers from German angling clubs and gathered detailed information on the management approaches chosen across the club's water bodies. Five angling club archetypes were identified. All five relied on fish stocking to support their local management. Stronger differences emerged in the reliance of other management tools. Holistic Control clubs (28.8% of all clubs) used a variety of output-related harvest regulations on top of stocking in a mixture of lakes and rivers, regularly extending the harvest controls beyond the minimal standards as specified in state-fisheries laws and also implementing input-related effort controls; habitat management was also used in some occasions, and the stocking intensity (in terms of kg released per ha of water) was moderate relative to other clubs. Output Control clubs' (27.5% of all clubs) focused almost entirely on output-related harvest controls in addition to stocking, in club waters which were overwhelmingly small artificially created lakes. The Laissez-faire archetype (17.8% of all clubs) did only rarely implement proactive management actions beyond the standards set by state fisheries legislation and showed the lowest stocking intensity of all; this club type differentiated strongly from the other ones by having non-exclusive property rights under a governance system by regional umbrella angler associations

at the state level, mostly in Eastern Germany. The Habitat archetype (12.3% of all clubs) relied on intensive stocking, but additionally was the club with the greatest use of habitat improvement activities, both small-scale and large-scale renaturation. This club type managed predominantly rivers, and decisions-makers showed higher bio-centric value orientations compared to most other club types. Finally, the Do-it-all clubs' archetype (13.7% of all clubs) combined all management tools intensively under mostly exclusive fishing rights; managers in these clubs were also more biocentric than in the other club types. It is concluded that that German angling clubs vary strongly in how they manage local resources, which is caused by a combination of structural conditions, resource availability, property rights and psychological disposition of the decision-maker. Keywords: Angler communities, Archetype analysis, Club heterogeneity, Fish stocking.

Title: Unveiling restoration archetypes: A machine learning approach to mapping ecological and socio-economic restoration potential across European landscapes
Presenter: Ayushi Kurian

Abstract: Ecosystem and Landscape Restoration (ELR) initiatives are critical for addressing biodiversity loss, enhancing ecosystem functions, and promoting sustainable land management. With the recent adoption of the Nature Restoration Regulation and the emphasis of the UN Decade for Ecological Restoration, there is an increasing need for structured, data-driven approaches to identify areas with high restoration potential. This study employs an archetype analysis framework to classify land systems based on their environmental, socio-economic, biophysical, biodiversity, and landscape characteristics. By leveraging machine learning techniques, specifically Self-Organizing Maps (SOM), we identify land system archetypes that demonstrate significant restoration potential across diverse contexts. Through the integration of ecological modeling, remote sensing data, and predictive analytics, we analyze the spatial and temporal dynamics that influence the transferability and long-term sustainability of restoration measures. Key environmental drivers such as precipitation patterns, solar radiation, and climate moisture index are analyzed to quantify hydrological and climatic constraints. Biophysical conditions are assessed using topography, soil properties, and vegetation productivity, while landscape dynamics are evaluated through habitat heterogeneity and fragmentation metrics. The integration of socio-economic dimension such as farm economic size and farm specialization with biodiversity indicators like species richness, pollinator diversity, and habitat quality also provides a comprehensive framework for evaluating land restoration efforts. The archetypes offer valuable insights into key drivers such as land-use history, governance structures, biodiversity richness, and environmental stressors, which collectively shape the success of restoration efforts. Furthermore, we examine the transferability of identified restoration patterns across varied European landscapes, ensuring that restoration strategies are adaptable to different ecological and socio-economic conditions. The findings of this study provide a robust foundation for developing decision-support tools that optimize ELR strategies, balancing ecological integrity with socio-economic feasibility. By employing archetype-based analysis, this study provides specific regional characteristics that influence restoration

potential, helping to identify areas where interventions can maximize ecological recovery. Integrating these insights into planning ensures that restoration efforts are not only targeted but also resilient to environmental and economic shifts, ultimately supporting sustainability and ecosystem stability. The outcomes are particularly relevant for regions grappling with land degradation and climate change, ensuring that restoration initiatives are not only effective but also adaptable to evolving challenges.

Title: Enhancing sustainability research through simulated test data and archetype analysis
Presenter: Klaus Eisenack

Abstract: Archetype analysis promises to successfully analyze heterogenous data sets which contain multiple patterns. In that, it aims to balance between the ideographic and nomothetic trap. Yet, this promise is often hindered by challenges such as limited data availability and methodological constraints. The need for innovative tools to enhance archetype analysis has long driven researchers in this field. But how can we develop and test new methods without being mired in empirical limitations? Thus, this pitch presents a suggestion for a future methodological paper to improve archetype analysis. It is based on previous efforts in the archetype community to simulate qualitative test data with AI tools. Our paper seeks to leverage large language models (LLMs) to generate simulated data for archetype analysis. Despite concerns about LLMs reproducing stereotypes, we propose turning this limitation into an advantage, using it to simulate a range of archetypes effectively. Then, we explore to what extent common methods can recover the original archetypes from simulated data. Our approach is to define a set of abstract game scenarios (e.g., prisoner's dilemma, assurance game, battle of the sexes, trust game) and players' roles. Prompts on the roles also reduce some bias in the LLM's training data. Each combination of game and roles establishes an archetype. Building on previous work on designing prompts to simulate qualitative data, and using both Chinese and American LLMs, we simulate thousands of games, generating quantitative decision and payoff data, together with textual communications. Then, we randomly reassemble the data and test different data-analytical methods—such as cluster analysis, formal concept analysis, interpretive methods—to determine their effectiveness in recovering the original archetypes. We vary the amount and distortion of data to assess method robustness. Our paper offers several key contributions: First, we contribute to the experimental game-theoretical literature by better understanding the role and effectiveness of cheap talk. Second, we advance the methodological toolkit of archetype analysis: By utilizing simulated data, we offer a practical solution to the challenges of testing and refining methodologies in sustainability research.

Title: Archetypes of land-use: Exploring water cities
Presenters: Sabine O'Hara, Jaleel Shujath

Abstract: This presentation summarizes an introduction to archetype analysis held during the recent conference of the International Society of Ecological Economics

(ISEE) and the Degrowth Society. Archetype analysis questions the one-size-fits all explanation to land-use and economic development strategies and suggests instead that a range of determinants and context conditions shape development and land-use pathways and patterns. Archetype analysis therefore offers a meso-level of analysis that is situated between generalized assumptions and a case study level of analysis. The International Society for Ecological Economics and the Degrowths movement share similar commitments to focusing on social and environmental context conditions. Understanding the diversity reflected in distinct archetypes of development is crucial for policymakers and stakeholders seeking to address the specific needs and challenges associated with a successful development or land-use pattern. This can inform more targeted policy initiatives and foster more successful options especially for disinvested communities who lack the resources to conduct their own case study analysis. The special session held in Oslo in June 2025 introduced the archetype analysis approach to ISEE conference participants using the example of water cities. The session explained how characteristics that capture social and environmental context conditions, including institutional characteristics, can be leveraged to identify distinct archetypes using a cluster analysis approach. To illustrate the approach, the session presented an application of archetype analysis to identify distinct types of water cities. The session generated useful questions and feedback from both researchers and practitioners interested in exploring archetype analysis for their own research questions and policy decisions.

Themed breakout session I: Text as data in archetype analysis

Convenor: Eve Castille

Abstract: Text as data is growing as a research field enabled by website produced data like Wikipedia and Google, digitalization of historical and administrative records, and advances in computer hardware and software. This growth has been accelerated by the institutional responses to the COVID-19 pandemic and the recent advances in large language models and the promise of AI. Text mining and natural language processing have both been applied to sustainability research and the IPCC is exploring how to use them for evidence synthesis. In this themed breakout session, Dr. Eve Castille will convene a round table discussion to identify how text as data approaches are being used in archetype analysis and opportunities for new applications. This discussion will be motivated by 3-5 lightning talks demonstrating the application of text mining and natural language processing methods to archetype analysis. Outputs of this session will be a description of how text as data approaches contribute to AT analysis, areas to develop, and a community of practice.

Themed breakout session II: Re-visiting the agrarian question and agricultural policies in Sub-Saharan Africa

Convenor: Lizah Makombore

Abstract: This proposed workshop will explore the use of archetype modeling to analyze time use among smallholder farmers in Tanzania, aiming to provide actionable insights for agricultural policymakers. The proposed workshop inquiry will build upon a current study that employs statistical analysis using panel data from World Bank microdata to examine the relationship between time use (dependent variable) and key independent variables such as age, gender, number of household members, number of dependents, land use, and off-farm wages. Current models reveal that time allocation is significantly influenced by demographic factors—particularly age, gender, and number of dependents—rather than by land area alone and in most cases number of household members. A key finding of the current study is the notable differences in time use between male-headed and female-headed households, which suggests that gender dynamics play an important role in shaping farming activities. Additionally, the study investigates the intensity of land use versus the extensiveness of land use, highlighting how these factors impact time allocation across diverse farmer profiles. The proposed archetype modelling workshop is aimed at critically exploring the limitations of the AGRA, or the Alliance for a Green Revolution in Africa, a continent-wide initiative focused on improving agricultural productivity and food security across sub-Saharan Africa, While this policy is grounded in science and has worked in other regions it is only beneficial for some, it inadvertently neglects the needs of marginalized communities, such as female and elderly farmers. These groups remain underserved, as AGRA's focus on land productivity and market integration does not sufficiently address their unique socio-economic challenges. By integrating demographic, socio-economic, and land-use data, archetype modeling offers a comprehensive framework for informing inclusive agricultural policies that address the

diverse needs of smallholder farmers, especially those from marginalized backgrounds. Participants will engage in discussions on how this approach can promote more equitable policy design and resource allocation for all farmer archetypes.

Themed breakout session III: Regenerative social-ecological systems archetypes

Convenors: Manuel Pacheco-Romero, Marina Frietsch, Sam J. Buckton, Roman Isaac, Joern Fischer

Abstract: The global sustainability crisis is driven by rapid changes in social and ecological relationships, including numerous reinforcing feedback cycles. Whereas degenerative dynamics that compromise a sustainable future have received attention for decades, interest is now growing within multiple domains in the opposite phenomenon: regenerative dynamics that lead to ongoing improvements in the health of social-ecological systems. Regenerative social-ecological dynamics occur when improvements in outcomes reinforce one another across multiple biophysical and social domains. A regenerative system is thus defined by exhibiting long-term internal regenerative dynamics while also supporting, and at the very least not degrading, the regenerative capacity of the systems it is nested within. Fostering such positive cross-domain dynamics offers a new, hopeful way of approaching sustainability challenges and could help to accelerate a sustainability transformation. Whereas several recent studies have worked on the identification of archetypical degenerative dynamics in social-ecological systems with multiple domains, research on archetypical regenerative dynamics remains scarce. In this breakout session, we will focus on systems that exhibit regenerative dynamics across multiple social-ecological domains and scales, with the aim of identifying archetypes of such systems and their dynamics. In the first block of the session, we will start by presenting two examples of generalised frameworks for the conceptualisation and analysis of regenerative social-ecological systems and dynamics. Based on this, we will then share insights from empirical studies on regenerative systems and compare their findings. In these systems, diverse social-ecological domains have been observed to exhibit positive, reinforcing dynamics, and the domains also reinforce one another. We will invite participants to share their own empirical examples of regenerative systems that have broadly similar dynamics. In the second block of the session, we will then work with participants to identify archetypes of regenerative systems and to collectively develop stylised representations (e.g., by using causal loop diagrams) of archetypical regenerative dynamics that include multiple interacting social-ecological domains. We expect this activity can help to develop new minimalist representations of archetypical regenerative systems and their dynamics, thereby inspiring novel understandings and empirical research in different sustainability-relevant settings.

Themed breakout session IV: Archetypes in sustainability science: Navigating between buzzwording, added value and substance

Convenors: Christoph Oberlack, Tobias Kuemmerle

Abstract: Since the initiation of the Archetype workshop series in 2017, the word ”archetype” has increasingly been used in sustainability science. While interest and fields of application have further grown, there is a risk that the notion of archetypes might become a buzzword, loosing its precise meaning, or being used as a simple synonym for ”cluster” or ”type”. This session aims to (a) discuss the current usages of ”archetypes” in sustainability science, (b) deepen reflections on what makes archetype thinking “more” than a classification, (c) reflect on good practices of using the notion of archetypes (ensuring meaning, preventing buzzwording), and (d) conduct a horizon-screening whether a theory of archetypes of sustainability (similar e.g. to Jung’s archetypes in psychology) might be emerging in the future. The session will be opened by a short input by the session co-chairs, followed by moderated group discussion.

Themed breakout session V: Methods for developing archetypes for conservation governance

Convenor: Markus Meyer

Abstract: Biodiversity loss continues at an alarming rate, with recent global assessments—such as the IPBES Global Assessment Report on Biodiversity and Ecosystem Services—highlighting the increased loss rate of species. Despite international commitments like the Kunming-Montreal Global Biodiversity Framework, the challenge remains in translating high-level policies into effective, context-sensitive governance strategies that deliver tangible conservation outcomes. To bridge this gap, governance approaches must integrate multiple policy instruments and stakeholder perspectives while addressing urgent environmental threats such as habitat degradation, climate change, and land-use conflicts. However, translating these policies into actionable strategies requires context-sensitive and scalable governance approaches. Archetype analysis offers a powerful method for identifying recurring patterns in addressed environmental planning goals and outcomes and may provide insights that can enhance policy design and implementation. This breakout session will serve as a collaborative working space to develop key research questions on how archetypes can be used to structure research on conservation governance. Potential aspects for developing and using an archetype approach could be exploring how to integrate different governance approaches for a holistic picture covering nodal, authoritarian, treasure-related and organizational governance measures such as the following examples : • Nodal: advisory for conservation-oriented land management • Authoritarian: integrated spatial planning including protected areas • Treasure: funding mechanisms for conservation (e.g., agri-environmental schemes) • Organization: participatory development of conservation and land-use strategies A starting point could be considering the European Union with multiple governance instruments such as the recent Nature Restoration Regulation (NRR) and Biodiversity Strategy for 2030 as frameworks for ecosystem restoration, sustainable land use, and biodiversity

conservation. However, depending on the expertise and interest of workshop participants, the approach should be made transferable to consider conservation governance worldwide (e.g., the Escazú Agreement (2021) in Latin America, which strengthens participatory governance and Indigenous land rights in conservation or the Great Green Wall Initiative (African Union, 2007) in the Sahel, integrating land restoration with UNCCD Land Degradation Neutrality goals. The goals of the session will be to explore pathways for a methodology to include the conservation governance goals and outcomes with a conceptual publication and followed by an application for further funding (e.g., through the EU).