



Participatory stakeholder approaches to and systemic thinking in agricultural production and resource use in Central Asia

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ABSTRACT

Rural development across the Central Asian states (Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan) is predominantly shaped by top-down decision-making in which powerful state bodies take centre stage. While their directives in agriculture and livestock production are informed by upgrade-inspired growth thinking, the social-environmental complexities inherent to agro-ecosystems receive less attention. The present special issue of the Central Asian Journal of Sustainability and Climate Research (CAJSCR), based on the stakeholder workshop organized by Germany's Eberswalde University for Sustainable Development (HNEE) and held at the German-Kazakh University (DKU) in Almaty in the fall 2024, explores different approaches to participatory stakeholder involvement in sustainable rural development. The compilation canvasses the corresponding methodologies, including their strengths and weaknesses, novel to the Central Asian Region (CAR). The articles of the special issue argue that the participatory engagement of smallholder farmers, students, pastoralists, and ordinary citizens in systemic thinking and participatory mapping processes augments their agency in decision-making and opens up fresh and so far untapped prospects for local development in the CAR, which provides a new angle of engagement not only for local-level state executive entities, but likewise for CSOs, international cooperation and applied research actors.

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1. Introduction

Since the end of the Soviet Union and five states (Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan) gaining independence more than three decades ago, Central Asia (CA) - a region rich in land and other natural resources - has faced numerous socio-economic and social-ecological challenges. With the Central Asian economies above still heavily reliant on oil, gas, and coal, the evolvement of a more sustainable renewable as well as a bio-based economy building on the region's agrarian and other natural resources in the face of pressing climate change issues is still at its outset. Top-down oriented authoritarian rule of varying degree still dominates governance and decision-making across Central Asia, leaving narrow manoeuvre margin for grassroots involvement in decision-making processes on behalf of local stakeholders, especially, but not exclusively, in rural settings away from the national capitals.

This CAJSCR's special issue stems from the workshop held in Almaty, Kazakhstan, in the fall of 2024 by the team of subject-matter experts from the TRANSECT¹ research group of HNEE (Eberswalde University for Sustainable Development) in collaboration with the Centre for Natural Resources and Sustainability of the German-Kazakh University [ger. Deutsch-Kasachische Universität, DKU] and funded by Germany's Federal Ministry of Education and Research (BMBF). The event brought together practitioners from civil society organizations (CSOs), international development agencies and state administrative bodies, as well as researchers exploring participatory approaches of stakeholder involvement and knowledge co-production in rural development, conservation, natural resource use, and food security. Hence, on the one hand, the workshop served as an effective platform for forging dialogue among various actors on the contexts and formats of applying participatory methods in sustainable development and planning processes locally; and highlighted the outcomes and lessons learnt of deploying such approaches, on the other hand. The event and the contributions to this CAJSCR's Special Issue investigate the following questions:

- How and in what fields of research and decision-making can participatory methodologies be considered meaning- and helpful tools for good governance and societal improvements in Central Asia?
- What are the (practical) strengths and weaknesses of such approaches, and how can the latter be minimised?
- What can be done in policy-making and rural development to enable broader participation in sustainable development planning in CA?

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The present collection of articles provides an overview of cases from across Central Asia, in which stakeholders and citizenry engaged in knowledge co-generation and more concrete planning and governance processes at the local or oblast (meso-) levels. Depicting the context, in which participatory methodologies were applied, the papers of the special issue furnish insights into the added value of participatory models at the grassroots level amidst top-down authoritarian regimes.

Firstly, the articles illustrate how participatory approaches can render a voice to politically underrepresented people like farmers, pastoralists, rural or urban dwellers in the CAR otherwise deprived of engagement in any decision-making setups. Secondly, the cases from Kazakhstan, Kyrgyzstan, Tajikistan, and Uzbekistan demonstrate application and transfer opportunities for the discussed methods to be applied in other socio-spatial contexts with natural resources under pressure and sustainability matters at stake. The lessons learnt underscore both the achievements and the shortcomings (weaknesses) that need to be addressed to ensure a more impactful application of participatory approaches in sustainable development planning in CA. Hence, this CAJSCR special issue may inspire policy-makers and representatives of CSOs, international development agencies and the academia leverage the apparatus to involve broader public in decision-making and participation processes more proactively and in a just way, and thus foster a higher degree of social-ecological sustainability.

2. Theoretical and methodological remarks

As universally framed in the plethora of national and international policy documents, the shift to sustainable development *inter alia* entails intensified land use patterns, on the one hand, and a significant increase in biomass (and food) production to abandon the carbon-dominated economic cycle and deal with the global hunger crisis, on the other hand. The lion's share of global biomass and food production boost in the coming years would need to come from the agrarian sector, where much of the global population still resides, and where productivity growth through technological upgrading appears to be the pathway of choice (Spies et al., 2022). To ensure its sustainability, this productivity upturn should be decoupled from negative environmental impacts (*ibid.*). Higher efficiency, smart farming solutions and other innovative (bio-) technologies like drip irrigation are proposed to minimise inputs, boost yields, and make production more resilient to mounting environmental stresses due to changing climate (e.g., OECD, 2018; EC, 2018; BMBF and BMEL, 2020).

In its current form, global agricultural, fish, and livestock production already exceeds several planetary limits (Spies et al., 2022). The premise behind decoupling production growth from excessive natural resource use has been criticised as unrealistic and wishful thinking, as well as virtually impossible from a biophysical

point of view (Giampietro, 2019; Backhouse et al., 2021). In this sense, sustainable development policies are shaped by what Backhouse (2021, 26) describes as strong ‘technology optimism’ framed by a rather linear view of biomass and food production, primarily relying on technical solutions and neglecting ecological limits and the complex social-ecological realities of rural production systems (also in Alff & Spies, 2020).

A key critique of sustainable development strategies in land and water management worldwide is their poor attention to the fact that the vast majority of rural populations are smallholder or landless farmers, pastoralists, and artisanal fishers. Similarly, agrarian - and rural development - policies in landlocked Central Asia tend to favour large producers or at least agricultural cooperatives (e.g. Alff et al., 2023). For small farmers and other stakeholders in resource management, many - if not most - of the ‘high-tech and smart’ solutions currently dominating the debate are not an option due to limited access to financial resources (Spies et al., 2022). Another frequently raised criticism is the lack of involvement of societal stakeholders in sustainable rural development and decision-making (Dieken et al., 2021; Lehmann, 2021; Pissarskoi et al., 2021). In particular, the perspectives, (locally adapted) knowledge and concerns of the majority of smallholder farmers and other stakeholders as well as ordinary citizens often remain neglected in designing and formulating visionary strategies, including by the authoritarian governments of CA transition economies. This, in turn, poses the risk of further marginalising them away by mainstream agricultural policy-making. The inequalities of ‘extractive knowledge production’, as Backhouse (2021, 33) puts it, not only reproduce or amplify existing social inequalities, but should be also regarded as a missed opportunity. As discussed in a rich body of literature on local and indigenous knowledge, development practice can gain a lot from diverse experiences of local stakeholders and their resource use practices adapted to local contexts (e.g., Berkes et al., 2000; Jiao et al., 2012). Willard and Ismailov (in this issue) share another fascinating example of high-school students in water and resource management, and what one can learn from their everyday experiences. Thus, bottom-up perspectives and acknowledging local land users as experts - alongside technical experts and scientists, whose knowledge is usually considered superior inside the sustainable development discourse - are desperately needed for expanding the debate’s scope and deriving alternative visions and trajectories for land and water use development. Some of these pathways may be less productivity-oriented, yet socially and ecologically more sustainable than those put forward and favoured by the dominant modernisation paradigm (Spies et al., 2022). For instance, in many regions of the world, smallholder farmers, pastoralists, etc. have developed heterogeneous agricultural landscapes rich in agrobiodiversity and capable of adapting to environmental threats (e.g., Padoch and Sunderland,

2013; Spies, 2019), with Zhumashev & Mestre's case study of pasture management in rural Kyrgyzstan in this CAJSCR issue being a good case in point.

Whereas much criticism has arisen around the pitfalls in current sustainable rural development discourses, policies and strategies, there is still a lack of concrete, practice-oriented suggestions on what can be done to address them (Spies et al., 2022), which is especially true for Central Asia.

The critical research has moved from quasi-rejecting the concept (Gottwald & Krätzer, 2014; Marsden & Farioli, 2015) to calling for a more constructive engagement with the field by outlining alternative futures and opening up the policy debate to society (Pissarskoi et al., 2021; Backhouse et al., 2021; Dieken et al., 2021). In addition, while top-down rural development policies are to remain dominant, there is a call from rural stakeholders to not only lobby for far-going and systemic shifts at the policy level, but also to mastermind meaningful and locally adapted tools and approaches for co-designing, evaluating and implementing tangible strategies on the ground (Spies et al., 2022). The latter is particularly relevant, since, in this novel debate, much more attention has been given to broadly defined policies than to the actual implementation of locally tailored strategies. This is especially true in the authoritarian context of CA, where decision-making is framed from the national to the local level almost exclusively by state actors - little scope remains for smallholder farmers, pastoralists and other actors to shape their socio-economic futures and elaborate instruments allowing them advance their views.

In this collection of articles, the interdisciplinary authors present and reflect upon the application of systemic participatory methods for elaborating, critically evaluating and implementing locally adapted rural development strategies in CA. The case studies intentionally look behind and go beyond strictly technology- or productivity-oriented efforts. By 'systemic' we mean that social-ecological systems characterising rural areas need to be regarded as complex (adaptive) systems, the dynamics of which are always driven by indeterminacy and non-linear feedbacks (Spies et al., 2022). In our view, these require a holistic understanding of the manifold factors and actors shaping developments on the ground (Spies & Alff, 2020). While primarily designed for local contexts, the approaches showcased in this special issue of the CAJSCR likewise enable structuring and 'formalising' local or citizens' knowledge to elevate it to an equal footing with the so-called 'expert knowledge', in order to better inform broader rural development policies.

3. Approaches to stakeholder participation in rural development in Central Asia - a discussion

Rural production systems in CA are embedded in complex social-ecological contexts that require thorough apprehension prior to implementing policy strategies

potentially bringing along unintended negative side effects. As the large body of critical agrarian and other resource-oriented research demonstrates (e.g. [Martínez-Fernández et al., 2023](#); [Garimella & Prakash, 2023](#)), this has been a shortcoming of multiple policies. For instance, the upsurge in soybean use, e.g., in Southeastern Kazakhstan, not only for human consumption, industrial food processing and animal feed, but also for biodiesel and other bio-based manufacturing, domestically and abroad, has forged inequalities and dependencies. What this and other examples of narrowly growth-oriented policy interventions share is not only their lack of systemic embracing of social-ecological circumstances, but also their marginalisation of certain stakeholder groups, who did not have a say in policy elaboration in the first place ([Spies et al., 2022](#)).

Thus, in this special issue, we argue that sustainable development strategies and their implementation in water and land use across the CAR require innovation in two paradigmatic ways. First, and as mentioned above, it is necessary to mainstream systemic approaches to local and regional development policy, which rigorously assess the potential social-ecological implications of interventions. Second, and interconnected with the first point, it is essential to design land and water use strategies not only in consultation with professional ‘expert bodies’ (e.g., research institutes, agriculture ministries, etc.) but also found them in knowledge co-production approaches that include the experiences of local producers and other stakeholders. Participatory approaches, we argue, proffer a range of instruments to make rural development strategies potentially more open, democratic, and just (*ibid.*). They also enhance public acceptability of related innovations promoting ecological regeneration, ensure long-term sustainability and, at minimum, reduce the risk of negative consequences of previous policy interventions. Last but not least, they provide a voice and agency to otherwise power-deprived groups like smallholder farmers, (agro-) pastoralists, etc.

Based on a recent systematic literature review on stakeholder perceptions, Dieken et al. (2021, 1713) concluded a ‘concerning lack of public involvement’ in sustainable rural development debates. The global literature on knowledge co-generation and participatory tools for scenario-building and strategy development is abundant, yet its reflection in rural development debate and research is limited (e.g., [Roue & Nakashima, 2018](#); [Díaz-Reviriego et al., 2019](#); [Sterling et al., 2019](#); [Pimbert & Barry, 2021](#)) - particularly relevant in the CA context. The field of agroecology is noteworthy in this regard, on the one hand, due to its emphasis on action-oriented research and, on the other hand, because of its holistic - i.e. systemic - perception of farming systems accommodating social, ecological and technical dimensions as inextricably linked (e.g., [Bergez et al., 2019](#); [Anderson et al., 2021](#)).

Practical guidance can be also drawn from a set of methods originally rooted in the natural sciences focusing on biodiversity conservation and ecosystem management. The widely used and continuously developing Conservation Measures Partnership's Open Standards for the Practice of Conservation ([Open Standards: Conservation Measures Partnership, 2013](#)) manifests an evidence-based research toolbox to propose design, implementation and learning from ecosystem-based adaptation interventions ([Spies et al., 2022](#)). Building on the Conservation Standards, another application has redeveloped the assessment of conservation planning, namely the Adaptive Management of vulnerability and RiSk at COnservation sites (MARISCO) contrived by the Centre for EConics and Ecosystem Management at Eberswalde University for Sustainable Development ([Ibisch & Hobson, 2014](#)). Underlying the contribution of Alff and his colleagues to this special issue, MARISCO views social and ecological services as equally contributing to well-being. Furthermore, by analysing and judging the systemic links leading to certain risks in local settings, the methodology developed by Alff and his colleagues emphasises a broader analysis of local social and ecological complexities, system dynamics and change. This MARISCO-based toolbox - entitled Participatory Strategy Development for Sustainable Biomass Production (PARSCO) ([Spies et al., 2025](#)) - thus facilitates formulating locally adapted strategies to make farming systems less risk-afflicted and more sustainable, as well as systematically and critically assessing the local impacts of existing or planned intervention strategies that may have significantly differing perspectives in mind.

4. Conclusion and Special Issue overview

As outlined above, there is an urgent need for systemic approaches that assess the social-ecological implications of natural resources-related interventions not only in CA, but at the global level more generally, in order to grasp the complexities of environmental transformations under accelerating climate change conditions. Through the engagement of the authors to this compilation in sustainable rural development research across CA, we have also established a demand for participatory approaches to sustainable development strategy formulation, in order to incorporate local perspectives, especially the viewpoints of those often sidelined from corresponding processes. This is especially important, we argue, under the conditions of authoritarian rule heavily dominated by state actors often down to the local level of governance. The current CAJSCR's special issue overviews the approaches applied and tested by various researchers and organisations across the region with the aim of connecting rural and urban stakeholders, including smallholder farmers, high-school students and pastoralists, in local-level participatory processes.

In their contribution, Robert Willard & Muzaffar Ismailov focus on Group Model Building (GMB) as a participatory method that empowers communities to develop a

shared understanding of the structures and linkages influencing systemic behavior. The authors assess GMB's viability in a resource-constrained situation, utilise GMB to define environmental degradation from the youth's perspective and understand barriers to effective resource mobilisation through "systems-thinking" based on the example of Janbasqala Village, Karakalpakstan, Uzbekistan - a settlement in the Amudarya River Basin facing rapid deterioration of water access. Through the involvement of students in workshop formats, they produced a local mapping of the Aral Basin's Social-Ecological System (SES). Similarly to Alff et al.'s MARISCO methodology, the SES framework applied by Willard and Ismailov highlights community-based interventions for tackling complex environmental challenges, as well as underscores the importance of engaging local communities in designing and implementing strategies that affect their well-being.

Irene Mestre, in her article, draws attention to community-based pasture management in the aftermath of the Law On Pastures adopted in Kyrgyzstan in 2009. Creating a community-based pasture management and governance system, the law introduced a divorce from the previous management style, arguing that it would contribute to limiting pasture degradation. In practice, the newly established pasture committees gathered livestock owners under the lead of an elected representative responsible for creating pasture management plans, collecting livestock tax, and external donor funding mobilisation. This decentralised management and governance model was assumed to drive fair and just decision-making in sustainable nature resource management. Yet, as Mestre outlines, the reformed pasture governance has not only referred to local-level planning, inter alia pointing to the impact of livestock mobility on resource depletion and emergence of coordination issues between pasture committees vis-à-vis state forest enterprises. The implementation of this decentralised management model, Mestre argues similarly to Alff et al., has become a multifarious process with systemic dimensions, competing historically embedded environmental approaches, and inherent power relations shaping policies and their consequences at the local level.

Thematically connected to Mestre's piece, in their joint paper Henryk Alff and the TRANSECT team offer a glimpse into a participatory systemic mapping and strategy-building tool based on the case study in Tajikistan's major cotton-growing area. The proposed Adaptive Management of vulnerability and RiSk at COnservation sites (MARISCO) offers a methodologically sound way to map the knowledge of various local stakeholders by contemplating and discussing a comprehensive model of ecological and social factors relevant to a specific local context. This is typically achieved by engaging a variety of stakeholders in a workshop-like format. By inditing an integrated knowledge map, Alff et al. emphasise, participants can trace the complex interconnections among human well-being targets, social and

environmental services, as well as respective provisioning systems, and - in the long run - identify the key attributes, threats, and factors relating to these systems. Alff and his colleagues argue that the methodology renders tools to plot out the effects of existing and future interventions by depicting the local context (Ibisch & Hobson, 2014; Blumroeder et al., 2018), and aims to co-create environmentally and socially adjusted future management strategies. The authors demonstrate that both social and ecological systems are defined by their emergent properties, yet they are likewise closely interrelated and subject to dynamic non-linear metamorphosis that always involves a multitude of social, ecological and political factors, as well as feedback loops. Thus, Alff et al. suggest that management strategies can only be sustainable if they take these principles seriously, which makes a holistic analysis indispensable.

In his single-authored contribution rather to the CAJSCR special issue, Henryk Alff lays out his observations as a co-facilitator of a methodologically related approach - Resilience Framework - based on the case of Western Kazakhstan. This workshop-based format, similar to MARISCO, was applied by a consortium of partners from the UK, Kazakhstan, Germany, and Mongolia to map land use and conservation issues in this part of Central Asia. The two workshops held in Uralsk, Kazakhstan, in the spring of 2025 focused particularly on the conflict between pasture users, i.e. the majority of the region's rural population, and the conservation interests around the migrating saiga antelope populations recently soaring up to 2.8 million and blamed for overgrazing. By engaging the stakeholders (representatives of farmers' associations, livestock holders, rural administrations, and conservation agencies), the approach sought to gain a systemic understanding of the local social-ecological context and to carve out sustainable development scenarios, including strategies to be pursued to stimulate them. In his essay, Alff examines certain key findings of the workshop cycle and pinpoints several epistemological issues regarding knowledge generation processes per se that might be worth of additional analysis.

Similarly to Alff for Western Kazakhstan, Murat Zhumashev & Irene Mestre in their essay investigate biodiversity conservation efforts in the Kyrgyz Republic. The authors focus on the Baiboosun Micro-Reserve, a community-driven initiative integrating pasture management and conservation. Zhumashev and Mestre - like Alff in his article focusing on land management and saiga conservation - draw on the challenges of balancing biodiversity protection with local livelihoods, particularly in the context of land use shifts posing threat to wildlife species. The study describes the establishment of a 14,000-hectare protected area and its community-based management plan, which emphasises anti-poaching measures, sustainable pasture management, and community engagement. The authors suggest that the prospects for scaling-up the initiative include developing legal frameworks, elaborating economic models to ensure financial sustainability, and valuing ecosystem services.

This model underscores the potency of community-led conservation for fostering multifunctional management strategies.

Last but not least, in a short communication Sergey Gulyayev - founder and head of Decenta Foundation in Northern Kazakhstan's city of Pavlodar - contemplates the outcomes of his decades-long work in stakeholder involvement. Gulyayev emphasises that so far participatory stakeholder approaches and citizen engagement in self-governance in Central Asia have been applied randomly. Based on the experience of Decenta Foundation, Gulyayev reflects upon participatory decision-making involving ordinary citizens ranging from participatory public budgeting to urban planning at the local level from numerous projects. In his brief essay, the author offers his insights on how participatory methodology at the local and oblast levels can improve decision-making in otherwise authoritarian states, hoping that they may encourage other constituencies, rural districts and municipalities in Kazakhstan, to invite similar initiatives.

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Group Model Building with Rural Youth for Social Ecological Systems in Karakalpakstan

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ABSTRACT

This paper describes the outcomes of a research aimed to assess the viability of Group Model Building (GMB) to catch the environmental degradation challenges in the Republic of Karakalpakstan (Uzbekistan) from the perspective of rural youth. In terms of methodology and approach, the corresponding workshops were conducted with 53 high school students in Janbasqala Village to map local factors affecting water quality and access. The Social Ecological Systems (SES) framework was applied as the working theory. The study's preliminary results indicate the need for a multi-faceted intervention to address current farming practices and water consumption trends. In this context, the GMB approach acted as a platform to train the youth in systems thinking and elicit their views regarding causal relationships and feedback loops contributing to their everyday challenges. The investigation was limited by the short time commitment allotted and the focus on only a youth cohort. The findings support the viability of using GMB for environmental education and capacity-building in resource-constrained rural settings. The social implications are that GMB fosters ecological awareness and cohesion among youth, helping them articulate pathways for community-based adaptation and innovation. The mapping indicates the general trends of solastalgia negatively affecting the SES adaptability. The study has uniquely utilized GMB as a participatory research method with youth in the Aral Sea Basin, mapping how local perceptions of water and land degradation can inform SES resilience strategies, as well as has explored how solastalgia may be a factor in human-nature relations.

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1. Introduction

1.1. *The Aral Region*

Once one of the world's most immense inland water bodies, the Aral Sea is now 10% of its former size due to the unsustainable use of water from its two major tributaries, i.e. Amu-Daryo and Syr-Daryo Rivers, for agricultural purposes (Micklin, 2014). The urgency of the situation is underscored by the fact that during the early 1960s, the lake occupied around 67,500 km², making it the fourth largest on the planet (Deliry et al., 2020). Soil deterioration, desertification, water scarcity, and biodiversity loss threaten the sustainability of natural resources in the surrounding region. Detrimental ecological factors resulting from desertification, water salinization, and extended heat waves significantly contribute to preventable diseases like anemia, asthma, and cancer (White, 2013).

As Jarylkasinova & Mavlyanov (2020) note, nearly 85% of children under 16 and around 80% of reproductive age women in Karakalpakstan suffer from anemia due to folic acid and iron deficiencies. Reports of tuberculosis in the region are likewise twice the national average. Alongside a decline in economic opportunities, climate change manifests the primary reason for the emigration of Karakalpaks to nearby Kazakhstan or Russia in recent years (United Nations, 2017).

In light of the escalating climate crisis, this paper explores how participatory modelling exercises can contribute to unravelling the variables involved and simultaneously motivate community engagement with potential solutions.

1.2. *Theoretical framework*

The Social-Ecological Systems (SES) framework comprises interacting subsystems for natural processes, institutional governance, and resource users. It remains one of the most empirically applied and cited conceptual models because of its adaptability and flexibility in diverse social contexts. It employs nested subsystems of resource units, governance structures, actors, and users, all interconnected within socio-economic and political ecosystems (McGinnis & Ostrom, 2014).

Understanding the vulnerability and assessing the consequences of climate change is key to SES analysis. Vulnerability refers to a community's capacity to adapt to various scenarios of climate-related hazards. The International Panel on Climate Change (IPCC) defines vulnerability "as a function of exposure, sensitivity, and adaptive capacity $V_f(E, S, C)$." (Lam et al., 2014, p. 474). A more nuanced study of vulnerability within SESs considers how existing power relations, cultural practices, and social psychology affect the behavior of a dynamic nonlinear system (Andries et al., 2004). There is a growing consensus that vulnerability should also encompass social

factors that amplify the hazards of environmental degradation to human and natural systems, such as inequality, marginalization, and access to healthcare.

The resilience factor in a SES is its adaptive capacity to diminish vulnerability faced by climate-affected populations. This implies that more resilient social-ecological systems can absorb shocks and reorganize without compromising their basic structure (Leslie & McCabe, 2013; Czucz et al., 2011; Folke et al., 2002). Resilience-building measures such as community engagement, leadership training, community empowerment, and advocacy can boost the capacity of a SES (NASEM, 2019).

Within this framework, this research additionally suggests solastalgia as a threat to an SES's resilience. Solastalgia is a mental health diagnosis for personal distress caused by the deterioration of one's native ecosystem (Albrecht, 2005). In areas of rapid ecological degradation, like the Aral Sea Region, Lake Urmia area, or the Colorado Basin, solastalgia may become pervasive across an entire community. Alterations in familiar landscapes, threats to traditional livelihoods, and deteriorating quality of life affect these SESs' ability to enhance adaptive potency toward shocks and vulnerabilities.

1.3. Group Model Building

Group Model Building (GMB) is a method for analyzing the behavior of complex systems allowing to zero in on causal connections through participatory research via the lens of community-based system dynamics (Hovmand, 2014). This approach involves participants as expert stakeholders by encouraging systems thinking and emphasizing the cause-and-effect relationship of the group-elicited variables. It requires a facilitation team of minimum three serving the distinct roles of lead facilitator, note taker, and modeler (Rich et al., 2018). In this project, the authors utilized GMB to elicit causal maps and combine them in a system dynamics model to define ideas for a shared problem understanding. Many studies have applied GMB as a non-linear methodology to apprehend sophisticated socio-economic and environmental issues, as well as specify interventions in system dynamics (Hernantes et al., 2012; Hovmand, 2014).

GMB is a process of focusing group discussions organized by a series of "scripts" and phases in the facilitation process, helping participants draft a model. This participatory process renders a practical means of building a shared understanding and common ownership of 'wicked problems' in the system (Luna-Reyes et al., 2006). Wicked problems are self-perpetuating and intertwined challenges to a system's resilience that are hard to pinpoint and resolve (Craig, 2020). GMB employs participatory modelling as a collective method of research that reveals complex relations among stakeholders and resources involved in a wicked problem, motivating unexpected approaches to their solution.

In this sense, GMB is an action research process, since it empowers participants to formulate a problem and identify potential solutions through participatory learning and commitment based on a shared vision in mediated modelling. The dynamic behavior of system elements is communicated through causal loop diagrams (CLDs), which visualize relationships between and among variables, loops, and trends. The final CLD is not necessarily the most accurate or exhaustive mapping of a given system, but rather a co-created baseline for further modeling (Hamza et al., 2014; Hovmand, 2014). In this way, GMB exercises help non-experts grasp overall system dynamics through a method with a low barrier to entry (Hovmand, 2014).

1.4 Objectives

In Janbasqala, a rural community facing water scarcity, the study team inquired about the validity of GMB as both a research and education method. The authors sought to understand how GMB training can be adapted for high schoolers as a method for: i.) spurring interest in environmental advocacy; ii.) capacity building in framing local challenges as an SES, and iii.) understanding the wicked problem of water access from the youth's perspective. Specifically, the authors made the attempt to dissect the problem into its underlying variables and their relationships.

In rural communities in Karakalpakstan, like Janbasqala, high schoolers are actively integrated into small-scale farming and directly affected by water scarcity, as it relates to public health and soil quality.

The paper provides a brief survey of the GMB exercises employed and an aggregate map of the factors the participants identified. The map was categorized by thematic domains, and the key loops were identified. The data were then used to assess how GMB could serve as an educational method and to analyze the SES's wicked problem of water scarcity. The hypothesis was that the problem was a reflection of solastalgia, for which GMB's mode of community engagement presented a potential solution.

2. Methods and materials

The goal of the GMB workshops was not a holistic assessment of the community's views, but rather to gauge the young generation's understanding of the issue. The trainers focused on building a general grasp of the Social and Ecological System via case studies and activities from the GMB Scriptopedia (Appendix A). All lessons were centered on the theme of water access.

The exercises were conducted in two schools in Janbasqala, a remote village 70 km from the regional center bordering the encroaching desert. It is a new settlement primarily populated by Kazakh and Turkmen ethnic groups. Fifty-three students

participated in a 10-day group model-building training. Of the students, 20 were males, and 33 were females, ranging between 14 and 17 years old. The facilitation team consisted of the co-authors and two research interns. The study team utilized a systems analysis approach that followed a structured participatory method in five distinct phases:

1. **Hopes & Fears:** Participants were asked to identify key variables as desirable outcomes and potential risks in water access inside the SES (Fig. 1). That activity gauged the participants' attitudes towards environmental degradation and created a collaborative atmosphere.

2. **Graphs Over Time:** Participants refined the dynamic behavior of a single variable by drafting its time series under various scenarios and interventions (Fig. 5). That helped them systematically consider the long-term implications of their decisions and interventions.

3. **Prioritization Using Dots:** Participants used stickers to rank the preliminary variables by importance. Each participant identified his/her top three variables (Fig. 2).

4. **Connection Circles:** The cognitive mapping activity enabled participants to think systemically about the causes and consequences of water scarcity and soil degradation (Fig. 3). The students connected the variables in positive and negative casualties along a circle.

5. **Causal Loop Diagrams:** The participants mapped variables' interaction over time and their emergent behaviors (Fig. 4). The high school students thus visualized the complex dynamics of their local SES in reinforcing (positive) and balancing (negative) feedback loops, as well as identifying corresponding interventions (Zhang et al., 2019).

The curriculum methodology was assessed via four consecutive surveys at different stages of the GMB workshop between March and May 2023. The surveys evaluated students' retention of concepts in systems dynamics and their motivation to address local environmental concerns. In the year following the workshop, formal interviews were conducted with parents and teachers to triangulate and cross-reference the variables, linkages, and interventions proposed by the students. In January 2024, a follow-up focus group was held with the target high school students to assess ex-post behavioral changes among the cohort.



Figure 1. Phase 1: Hopes and Fears.

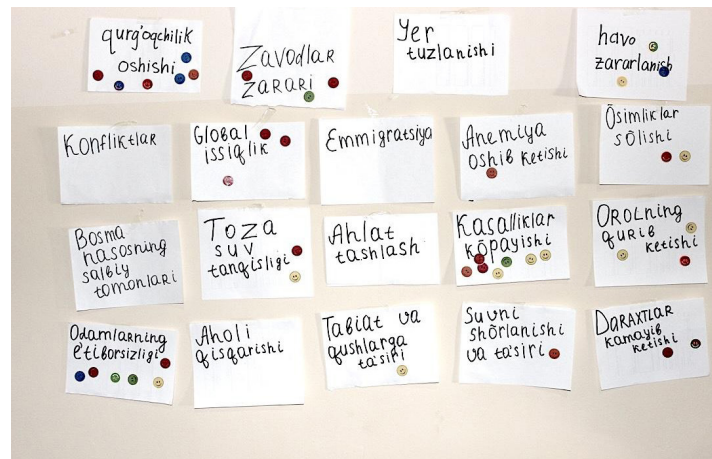


Figure 2. Phase 2: Prioritization Using Dots.

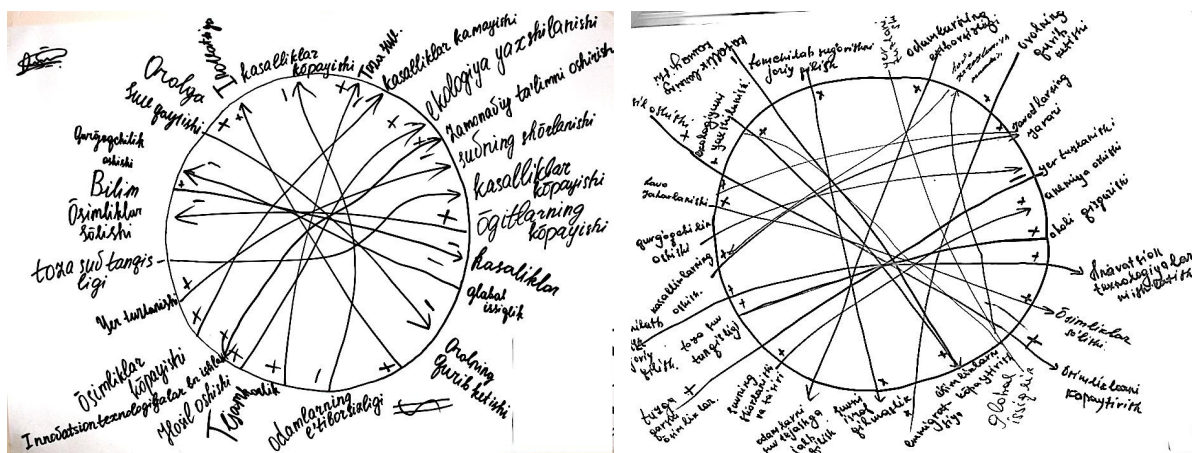


Figure 3. Phase 3: Connection Circles.

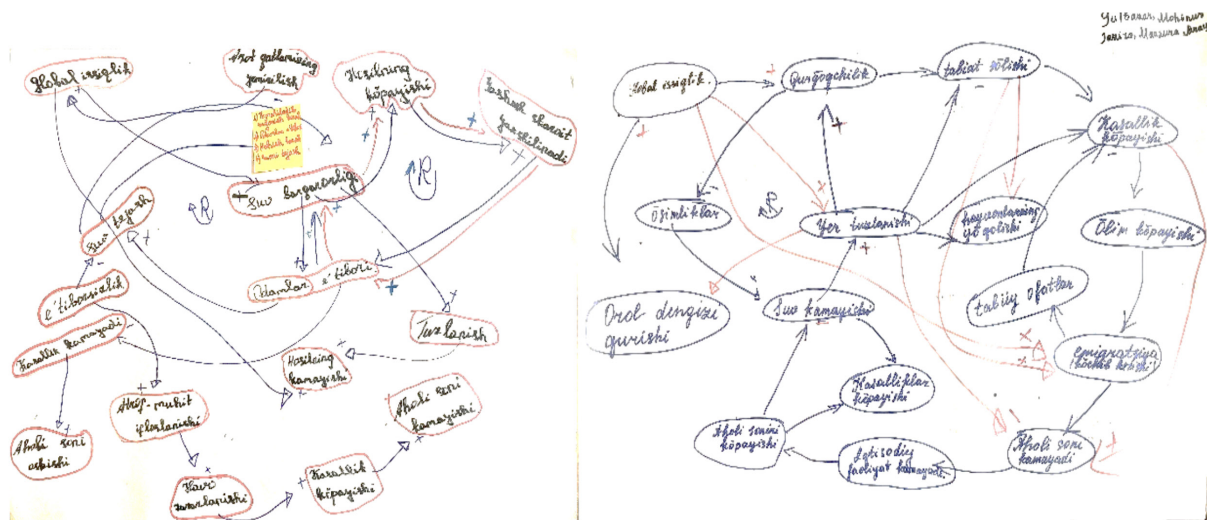


Figure 4. Phase 4: Causal Loop Diagrams.

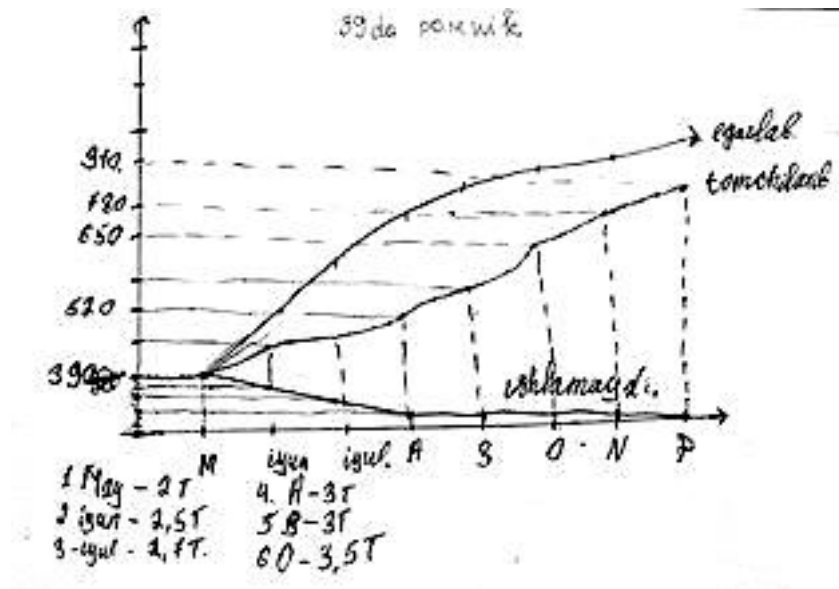


Figure 5. Phase 5: Graphs Over Time.

The group model-building workshop first identified 22 variables in “Hopes and Fears,” that were later ranked by importance during the “Prioritization” exercise. In subsequent teams, students drew 9 connection circle maps and drafted 13 causal loop diagrams. Team sizes varied in the following two exercises, resulting in a differing amount of diagrams. The variables and interlinkages the high school students identified were categorized and combined into a single causal loop diagram, translated into English from Uzbek and Kazakh.

The interventions and feedback loops identified by the students were included in the final causal loop diagram (CLD) in Fig. 6, featuring the most frequently identified variables and relationships. Repeated variables were included only once within

the mapping using the Vensim software tool. The high school students' responses were compared to a survey conducted among 30 other members of the Janbasqala community, 18 years and older, as an approximated benchmark.

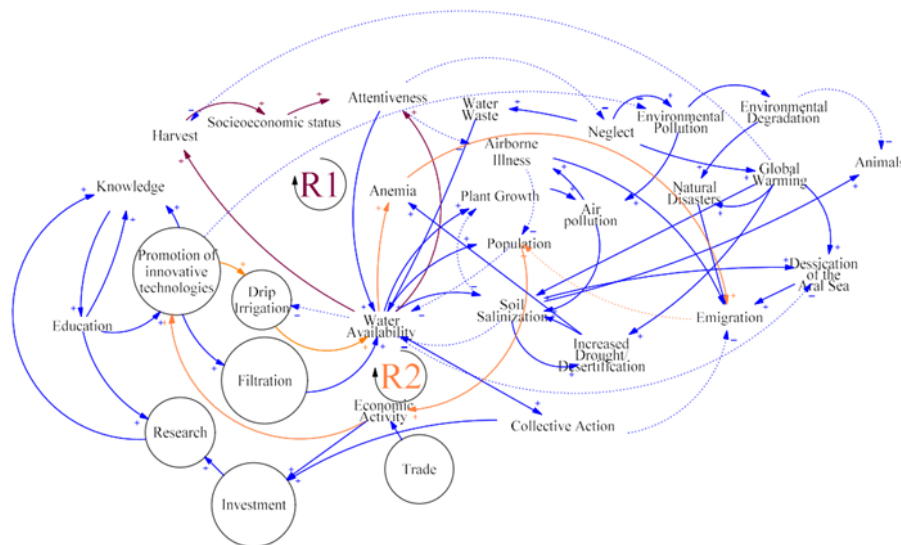


Figure 6. Overall Causal Loop Diagram of the Janbasqala SES (solid lines signify positive correlation; dotted lines signify negative correlation; two key reinforcing feedback loops are labeled R1, in purple, and R2, in orange).

3. Results

The high school participants used GMB methodology to understand their local SES's vulnerabilities. According to their causal loop diagrams, the fall in water availability from the Amu Darya had amplified the adverse effect of seasonal leaching practices, leading to soil and irrigation water salinization. In turn, that affected the quality of potable water in aquifers and heightened the risk of illnesses. Hence, the students linked the variable soil salinization to anemia, as shown by Jarylkasinoва & Mavlyanov (2020) and White (2019).

Low water supply has been forcing Janbasqala communities to order water tankers from the upstream regional center of Turtkul for \$10/ton. In many areas of Uzbekistan, irrigation water is government-subsidized, but drinking water poses an additional expense, ranging between 300 and 500 UZS/liter.

The students also highlighted social leverage points for adaptive capacity - research, knowledge, and education positively reinforce each other, as well as contribute to designing new techniques and technologies that may allocate water more efficiently.

Emigration turned out the most interconnected sociological variable within the CLD. The high school students identified anemia, airborne illnesses, natural disasters, decline in harvest, and environmental degradation as the “push factors” for emigration. Conversely, they viewed collective action as a “social glue” within their community mitigating the “push factors.”

3.1 Analysis by domain

Akin to Groundstroem and Juhola (2021), the map may be further analyzed sectorally (Fig. 7). Table 1 lists all the variables mentioned in five GMB exercises categorized by domain.

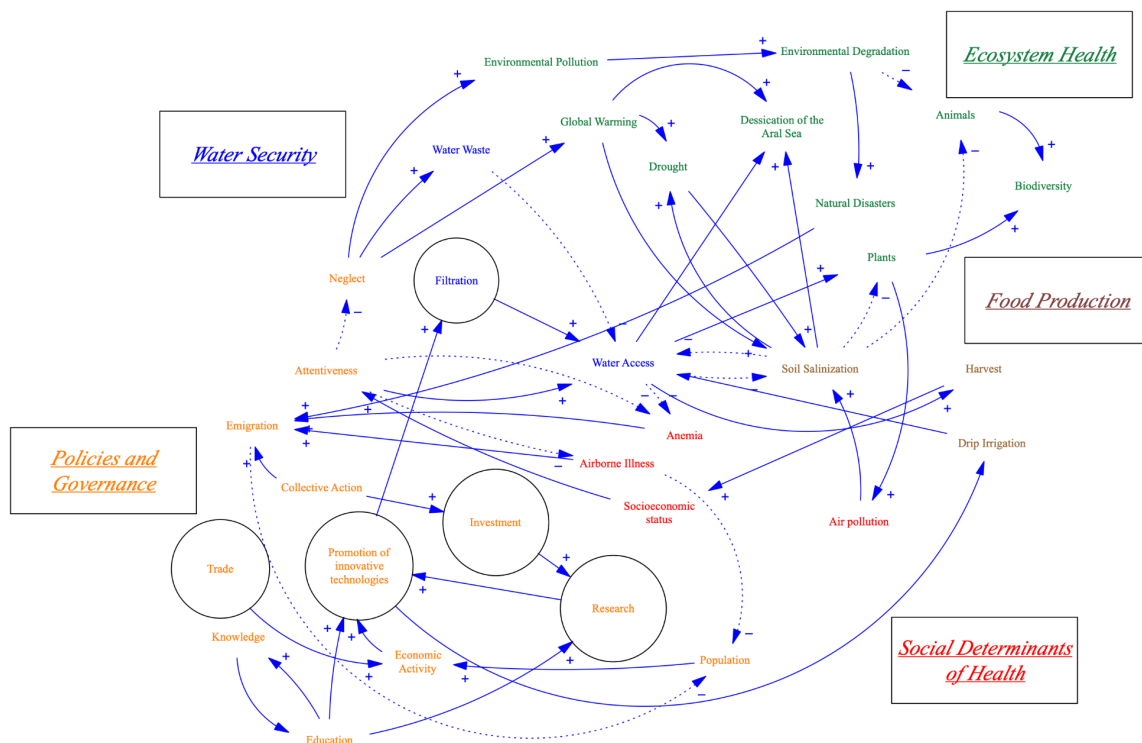


Figure 7. Causal Loop Diagram by domains
(variables re-arranged into five interacting domains of the SES with water at the primary resource).

Table 1. Categorizations of variables into domains.

<u>Ecosystem health</u>	<u>Food production</u>	<u>Policies & governance</u>	<u>Social determinants of health</u>	<u>Water security</u>
Animals; Climate conditions; Deforestation; Drying of the Aral Sea; Ecological pollution; Ecosystem health; Effect on nature and birds; Global warming; Natural disasters; Plants; Poaching; Return of Water to the Aral Sea; Rubbish; Salinization; Salt-resistant plants; Saxaul trees; Trees	Desertification; Drip irrigation; Fertilizers; Harvest; Irrigation; Plant wilting; Soil salinization	Access to tools; Anger; Business growth; Collaboration; Saving resources; Education; Electric cars; Factories; Illnesses; Immigration; Innovation; Innovative technology; Knowledge; Money; New technologies; People's neglect; Recycling; Roads; Trash collection and disposal; Working together	Air pollution; Anemia; Chemical pollution from factories; Dust and sandstorms; Ecological pollution; Illnesses; People getting shorter; Population; Sicknesses	Drought; Fresh water; Not wasting water; Participation in water saving; Return of water to the Aral Sea; Water; Water deficiency; Water salinity; Water waste

“Water Security” represented the variables affecting water availability and access. Access was determined by the volumetric water supply (aquifer, surface, and utilities), and its quality. Filtration was identified as a viable intervention. In the students’ CLD, most variables with a causal effect on water security fell in the “Policies and Governance” domain. Water, in turn, affected the “Social Determinants of Health”, “Food Production”, and “Ecosystem Health” domains, that fed back into the “Policies and Government” variables.

The variables under “Policies and Governance” represented the social infrastructure for managing resources within the SES and related emergent effects, which aligns with Andries’ (2004) conception of an SES. In particular the high schoolers related economic activity and investment to social patterns of engagement, i.e., attentiveness, collective action, and neglect. The participants discussed how collective action could pool funds for filtration improvements and secure stable water access. Economic activity was likewise a function of the size of the population and the strength of trust networks via collective action. The lack of attentiveness towards sanitation, public health, and pollution could increase illnesses, decreasing the population and its corresponding economic activity. Severe illnesses, as observed in

Karakalpakstan, debilitate non-disabled community members, cut into free income, and push people to emigrate.

The “Social Determinants of Health” included anemia caused by malnutrition and salinization of potable groundwater, and airborne illnesses caused by the intermixing of toxic sediment in sandstorms. The community survey corroborated the concerns regarding prevalence. Its respondents ranked anemia and water scarcity as the two top issues their community faced. That corresponded to the 2017 region-wide poll conducted by UNICEF, where air and water pollution were the main concerns reported by Karakalpakstan residents (United Nations, 2017).

In the domain of “Ecosystem Health”, depletion of water supplies was linked to degradation of the Aral Region’s biosphere. According to the students, neglect within the community also had a long-term effect on global warming.

The domain of “Food Production” contained variables related to crop production in the target agricultural community, which the high schoolers represented with the harvest variable determined by water access, land quality (soil salinization), and water delivery efficiency (drip irrigation). The effect of harvest, according to the students, was primarily on the socio-economic status, i.e. quality of life. They plotted the relationship as follows: Harvest $-(+)\rightarrow$ Socio-economic status $-(+)\rightarrow$ Attentiveness $-(-)\rightarrow$ Neglect $-(+)\rightarrow$ Water waste $-(-)\rightarrow$ Water access. Greater wealth due to better harvest affected the community’s willingness to be more attentive to ecological concerns.

3.2 Key reinforcing loops

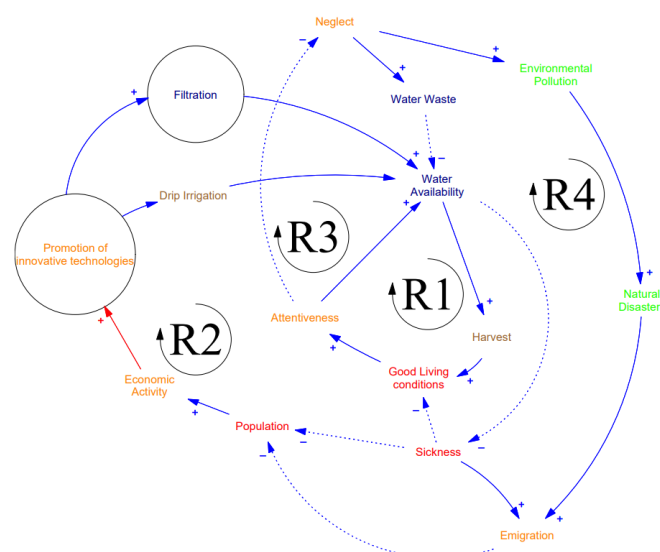


Figure 8. Key SES loops in the Causal Loop Diagram.

In Fig. 8, the high school students’ CLD is isolated to four reinforcing loops mapping falling surface and groundwater quality.

These may be interpreted as long-term trends. The R1 and R2 are the “optimistic” loops, with R3 and R4 as the “wicked” loops. R1 and R2 demonstrate mechanisms that ameliorate access to clean water. According to the high schoolers, the fall in living conditions had brought about the fall in the population's interest in caring for the environment. R3 and R4, as wicked loops, show that environmental neglect reinforces the SES's vulnerabilities. The loops are summarized in Table 2.

Table 2. Description of reinforcing loops.

R1	Water Availability -(+)-> Harvest -(+)-> Socio-economic status -(+)->Attentiveness -(+)-> Water availability
	The Diagram's foundational causal loop. Water availability allows for a greater harvest and a higher socio-economic status. A prospering community, in turn, has the time, energy, and psychological support to invest attention in the ecological well-being of their SES, avoiding excessive flood irrigation, for example. This, in turn, enhances water availability.
R2	Promotion of innovative technologies -(+)-> Drip irrigation/filtration -(+)-> Water availability -(-)-> Sicknesses -(-)-> Population -(+)-> Economic activity -(+)-> Promotion of innovative technologies
	This is an “optimistic” positive feedback loop, where investment and promotion of innovations that address water quality and supply allow for greater water access. Hence, fewer sicknesses and a growing robust population. In turn, community's growth promotes increased economic activity and further research and interest in water-sustainable innovations.
R3	Attentiveness -(-)-> Neglect -(+)-> Water waste -(-)-> Water availability -(+)-> Harvest -(+)-> Good living conditions -(+)-> Attentiveness
	This loop links the population's neglect of the environment with poorer living conditions. The resulting fall in prosperity, as proposed by the high school students, leads to a further fall in attentiveness and neglect. Community members fall into a cycle of learned helplessness and desperation. As a result, they are not interested in improving environmental conditions.
R4	Neglect -(+)-> Environmental pollution -(+)-> Natural disasters -(+)-> Emigration -(-)-> Population -(+)-> Economic activity -(+)-> Promotion of innovative technologies -(+)-> Drip irrigation/filtration -(+)-> Water availability -(+)-> Harvest -(+)-> Good living conditions -(+)-> Attentiveness -(-)-> Neglect
	The loop implies that the environmental hazards provoked by neglect lead to growing emigration. This, in turn, hurts the dwindling population's innovative potential through the loss of intellectual, entrepreneurial, and financial capital. As in loop R3, this leads to desperate communities uninterested in adjusting behaviors and addressing environmental challenges. Instead, as the loop suggests, even more community members choose emigration as the optimal decision.

Table 2 shows a synthesis of the underlying feedback structure and summarizes the proposed leverage points to balance the effects of ecological hazards via sustainable farming and water management. Specific factors such as promoting innovative technologies, drip irrigation, water filtration, and attentiveness, were identified as the potential intervention points. More specifically, the high schoolers identified

certain social resilience interventions driven by investment, i.e. healthy rural economies, capacity building in adaptive technologies, and attentiveness to ecosystem needs.

4. Discussion

4.1. Assessing the validity of students' systems thinking

Whereas GMB mappings are traditionally drafted by a cohort of stakeholders with years of experience, the mappers within the framework of this research were younger community members. In assessing GMB as a research method, the study team recognized the limitations of producing a valid SES analysis based on the data produced exclusively by the youth. For example, the aggregate CLD emphasized direct personal agency on the natural processes. The variables representing localized factors, like soil salinization and socio-economic status (many students called it good living conditions), intermingled with regional-scale variables, like natural disasters, desiccation of the Aral Sea, and trade. The students argued that local neglect led to environmental pollution, degradation, and natural disasters. In Uzbekistan's context, where decisions in basin management are streamlined towards the center, such a conception indicates the students' idealism. It may also represent an error of scale.

Nevertheless, the students' mapping also indicated an intimate knowledge of their community's challenges within the local SES. For instance, in the connection circles, airborne illnesses were linked to air pollution, ecological degradation, and improper trash disposal. Though often overlooked in the development narrative of ecological degradation in the Aral Sea Basin, waste management challenges were identified as a top concern in multiple rural communities in Uzbekistan (UNDP, 2024). Likewise, the students, many of whose families were small-scale commercial farmers, did not view harvest as a matter of subsistence, but rather as a guarantee of income. Increased income, in turn, could create a robust community capable of mobilizing resources towards a resilient SES in Janbasqala.

Involving a youth cohort with a different generational outlook on the ecological health of their SES, may therefore reveal boundary conditions and feedback loops in the system that older participants would otherwise overlook.

4.2 GMB as an education tool

We hypothesized that GMB could widen young people's boundary conditions in approaching an SES, encouraging them to think more broadly about the factors leading to ecological degradation in their own community. Previous applications of GMB in a school setting - focusing directly on students' educational experiences -

demonstrate how GMB offers young participants new ways for dealing with wicked problems (Trani, 2019; Hovmand, 2014). Applying GMB to teach about water scarcity, this study's team looked at how high-schoolers' perceptions of the problem and motivation to address it changed.

A pre- and post-survey was distributed on March 20 and May 28. It included qualitative and quantitative prompts on systems thinking and readiness to engage in ecological advocacy. Between the start and end of those sessions, on a scale of 1 to 10, the students reported a 2.5-point increase in concern for local ecosystems and a 2.8-point increase in concern for Janbasqala's water resources. The distribution of responses was 99% significant under the heteroskedastic Student t-test. Likewise, the students reported a 1.0-point increase in their self-assessment for the question "How ready are you to create an environmental project to help Janbasqala?"

As shown in Fig. 9, the students reconsidered what activities were relevant for addressing environmental challenges in their community. Whereas in March they had preferred exclusively physical solutions, like planting trees and saving water, in May they noted socially-driven proposals, like mobilizing a team and raising awareness. This suggests that - apart from motivating the students to be more involved in ecological projects - the GMB exercises in Janbasqala Village made the youth consider more, oftentimes less anticipated, factors in water scarcity.

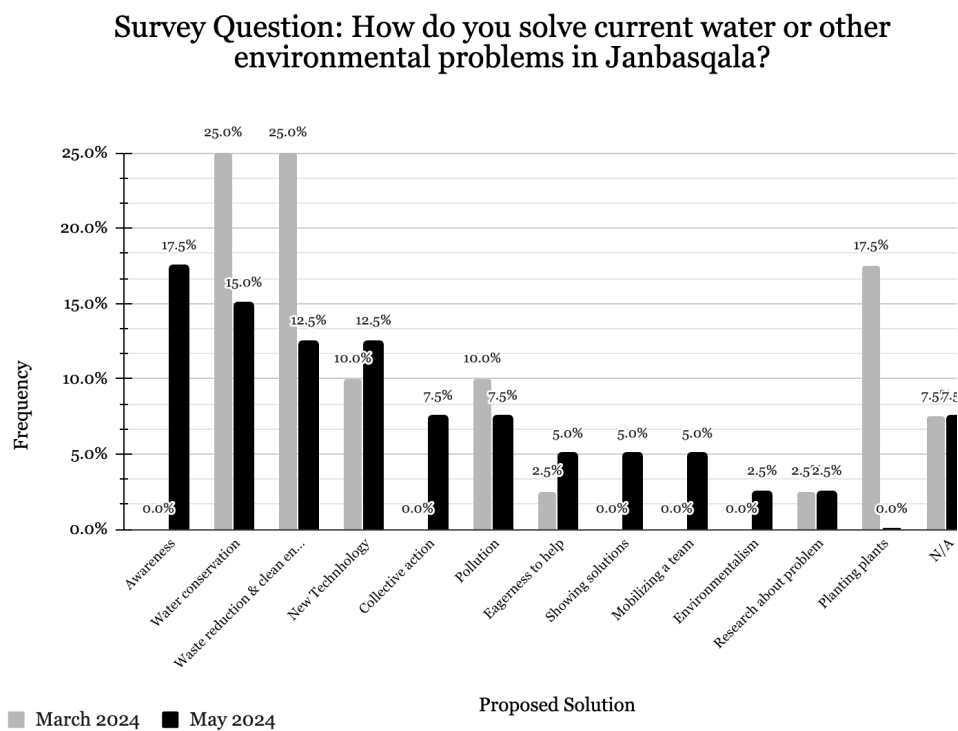


Figure 9. Written participant survey responses.

4.3 Solastalgia and a social psychology-driven perspective

One such unanticipated element is the CLD's suggestion that a community cannot adjust to environmental degradation in conditions of socio-economic adversity and emigration (Fig. 8). When viewed within the SES framework of [Andries \(2004\)](#) and [Huggins et al. \(2023\)](#), this is a symptom of vulnerability characterized by rates of water salinization, soil erosion, and biodiversity loss. These conditions drive farming communities deeper into poverty and push them towards unsustainable agricultural practices contributing to the wicked loop of environmental degradation, and exacerbate climate change effects.

In a similar case study of desertification around Lake Urmia in Iran, [Zhenko & Menga \(2019\)](#) observed how emergent social challenges, including emigration, illegal water abstraction, and heightened resource competition, interacted with escalating ecological degradation. They analyzed such trends through the lens of solastalgia and learned helplessness, when community-wide stress suppresses impulses for ameliorating emergent challenges. The individuals surveyed in the Urmia communities shared feelings of hopelessness, social isolation, and anxiety regarding their livelihoods, health, and the environment. Hopelessness, in turn, fueled neglect, reinforcing a vicious loop of negative behaviors like overexploitation of aquifers, neighbor conflicts, and general apathy toward equitably conserving scarce resources.

In the workshops under this study, the students viewed the psychological aspect of the SES as crucial to resilience. Variables such as neglect and attentiveness were subject of intense discussion amongst the group. The students ranked neglect as the second most important variable, as well as argued for the need to create a motivating environment for water saving on a local scale. Indeed, in Uzbekistan, local farmers have little agency over water distributed to secondary canals and aim to maximize their exploitation of any allocated water ([Brite, 2016](#)).

The solastalgia framework also explains the emerging trend of emigration. [Zhenko & Menga \(2019\)](#) described how out-migration weakened existing support networks (informal agreements and extended-family arrangements for water sharing) and economic activity within the community. Since 1995, there has been a wave of emigration from Karakalpakstan, with Kazakhstan as a large recipient of Karakalpak immigrants claiming Kazakh ethnicity. Between 2000 and 2015, climate change-induced resettlement was particularly acute. Recent data (2021-2023) indicate a new emigration uptick ([Embergenov et al., 2023](#)). Within one year of the project's commencement, multiple involved families moved to Kazakhstan as a chance to break out of poverty.

The high schoolers identified a relationship between emigration and water-efficient technologies. They argued that emigration curbed economic activity and in-

terest in pooling funds for solutions. While water availability and remittances may certainly grow with emigration, its net result is an outflow of SES's finances, intellectual capital, labor, and other support nodes. As a result, effected communities cannot cope with the escalating degradation of water and soil.

Socio-economic and demographic factors, therefore, drive the key wicked problem in the high schoolers' SES. A thriving population with stable networks of trust and finances is more capable of withstanding systemic and aleatoric shocks to the system's stock and water quality.

As a solution, the students identified economic activity, investment, and harvest as indicators of socio-economic welfare, that could promote resilience via pooled water procurement arrangements, investment in precision irrigation, sustainable desalination techniques, and insurance schemes.

How may stakeholders within the community and policymakers induce the growth of the aforementioned social capital? After 50 years of deteriorating natural and socio-economic conditions, what interventions make sense for solastalgic communities? The high schoolers under this study suggested the interventions of increased investment, research, and economic activity for promoting water-efficient technologies, like precision agriculture and desalination. Such interventions may be viewed as large-scale nationwide policies. Research and investment in water efficiency would trickle down and promote education and development in rural communities like Janbasqala. Indeed, in a 2017 UNDP survey of community needs, the respondents in Karakalpakstan indicated the need for more intensive environmental education ([United Nations, 2017](#)).

If the resilience of a SES and the trickle-down of investment projects depend on community motivation and attentiveness, how may it be induced? In answering these questions, the authors consider GMB - particularly with young people just stepping into fully-fledged membership of their communities - as a viable methodology for addressing the challenges and triggering the interventions identified in the CLD (Fig. 6).

Group Model Building, as this study shows, motivated the youth in Janbasqala to reconsider their role and relationship to water. It opened a dialogue on how they personally could assist the community in seeking new opportunities for water-efficient irrigation and mobilize resources towards their implementation. Even more so, GMB should not be implemented as a one-time intervention, but as a continual pedagogical exercise for reinforcing systems thinking among participants. GMB is a template for practical environmental education, with actionable results.

4.4 Limitations

One significant limitation of utilizing GMB with youths in rural Karakalpakstan was the relatively high time spent explaining instructions through an interpreter in Kazakh and Karakalpak languages. That created a risk of both acquiescence and selection bias among the participants and the perception of hierarchy during interactions with adults. The team had to verify that issue through pre-post surveys and focus group discussions to validate youth perspectives on environmental degradation in Janbasqala. There were likewise challenges in implementing connection circles, as the participants quickly realized that the problems may have multiple causes. As such, the concepts of feedback, cause, and dynamic hypothesis as part of the system's thinking had to be reiterated several times. Although the adolescents seemed motivated during the workshops, the GMB process required considerable commitment from the participants, in-depth knowledge of the context, and experienced workshop facilitation (Hovmand, 2014).

Similarly, the project used self-reported perspectives of the participants within one geographic location, making it hard to validate the scope of ecological hazards throughout the region externally. The study is mainly descriptive and does not include computer simulations of system behavior based on the identified leverage points and feedback loops.

While community mobilization and socio-economic wellbeing are associated with sustainable farming practices and water-saving technologies, designing interventions can be difficult without engaging local authorities and adults (Rich et al., 2018). Finally, the participatory research using the GMB process was conducted with the youth that resulted in a strong power differential which, despite the team's efforts to give participants independence, influenced the CLD mapping (Hovmand, 2014). Separate GMB sessions with parents and local authorities could enhance the external validity of this study and produce actionable collective interventions.

5. Conclusion

Within the framework of this study, GMB enabled the participants to create a shared mental model and understand the wicked complexity of ecological degradation, along with the ways to mitigate it within a resource-limited environment. The final CLD indicated the need for creating the “right environment” to motivate local interest in saving water, such that technologies and techniques have a more significant staying potential within the community. Socio-economic welfare has to be guaranteed to reap the benefits of exogenous resilience and capacity-building development programs. Otherwise, neglect, emigration, distrust, and helplessness will dampen the gains a project offers.

In addition to socio-economic conditions, the students identified the education variable as another key to positive change in their local SES. Group Model Building, as a method for capacity building and participatory research, offered educational system dynamics that contributed to grassroots innovation and advocacy for rural communities like Janbasqala.

Areas for improvement include the time commitment required for participation in the complete workshop, ensuring the representation of the participant group, and external validation of the causal map with a broader audience that may include parents of the youth and educators. Engaging a wider range of stake-holders could also enhance the design of culturally appropriate and gender-specific interventions.

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Bottom-Up Approaches to Knowledge Coproduction in Pasture Management: The Case of Kyrgyzstan

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ABSTRACT

This paper examines how local-level actors in Kyrgyzstan's community-based pasture governance system have organised themselves to influence knowledge generation and policy-making. It explores the sophisticated interplay between decentralisation, stakeholder coordination, and power dynamics in pastoral resource management. The paper describes the findings of the qualitative embedded multiple case study conducted between 2011 and 2019. Six municipalities in Naryn and Jalal-Abad oblasts were studied through 99 semi-structured interviews, participatory observation within NGOs, and engagement with national stakeholders. Ostrom's principles of sustainable community management were used as the analytical framework, complemented by literature on governance and social learning. Kyrgyzstan's decentralisation reform created new governance entities, notably Pasture User Associations (PUAs) and their executive bodies, as well as Pasture Committees (PCs), operating within a fragmented institutional environment. PCs adapted flexibly but faced challenges in terms of coordination with state agencies and local actors. The establishment of the Kyrgyz Federation of Pasture User Associations (KFPUA) created a platform for political representation, knowledge sharing, and legitimacy building, fostering bottom-up influence on national policy. However, legislative inconsistencies and reliance on donor funding remain the key constraints. This research highlights the importance of local agency in shaping sustainable resource governance and promoting participatory policy processes.

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1. Introduction

Kyrgyzstan has been often described as an agrarian country rich in pastures and livestock (Sacken & Morgan, 1869; Van Veen, 1995; Severcov, 1873). Pastures and agropastoralism continue to be portrayed as a vital element of Kyrgyz ethnic identity, associated with indigenous knowledge and values (Féaux de la Croix, 2011; Jacquesson, 2010a; Žaparov, 2011). During the Soviet period and prior to independence, agriculture served as a pillar of the republic's economy (Duncan, 1994; Fitzherbert, 2006; Kerven, 2006; Kyrgyz Soviet Socialist Republic, Encyclopaedia [rus. Kirgizskaja Sovetskaja Socialičeskaja Respublika, Ėnciklopedija], 1982; Mogilevskii et al., 2017), and was a priority of policy-making. After gaining independence and until 2009, pastures were divided into categories as per their seasonal use and administrative subordination (i.e. management at different territorial levels), although the actual management was rather limited to renting out the land, and even that was hardly implemented but still had a strong legacy of the Soviet management model (Lerman & Zedik, 2009; Petric, 2015; Steimann, 2011).

With the support of international actors, in 2009 the country adopted the *Law on Pastures* creating a community-based pasture management and governance framework and breaking away from the previous management style. Livestock owners started forming Pasture Committees with elected representatives. The PCs were vested with the authority to draft pasture management plans, collect livestock tax, as well as mobilize external funding from donors. The then created and still operating decentralised management and governance model builds on the assumption that involving users in decision-making can lead to fair and environmentally sustainable natural resource management (Ostrom, 1990), and hence limit pasture degradation (Mestre, 2019a; Murzabekov, 2017). Yet, as the PCs started to emerge and operate, it became clear that pasture management and governance was not only about what they were planning or implementing locally, i.e. inside the territories of corresponding municipalities - a clear need and demand appeared for understanding the actual way “pasture management and governance” was framed. In the Soviet Central Asia (CA) and subsequently in independent Kyrgyzstan, a significant line of research focused on pasture degradation with the aim of apprehending how official degradation assessments were carried out (Robinson, 2016; Robinson et al., 2003, 2012), the role of factors like livestock mobility on resource depletion (Crewett, 2012; Hoppe et al., 2016; Kirch et al., 2016; Zhumanova et al., 2016, 2021), as well as stakeholder perceptions of change in different resource conditions (Jacquesson, 2010b; Kerven et al., 2011; Levine et al., 2017). In parallel, researchers examined the emergence of coordination issues, as the newly established PCs had to deal with each other and vis-à-vis state forest enterprises (Dörre, 2012; Kasymov et al., 2016; Mestre et al.,

2013). The deployment of such a decentralised management model has become a complex process shaped by several competing environmental approaches (Mestre, 2017a), revealing the importance of pasture management history as well as inherent power relations configuring policies and exerting local consequences (Murzabekov, 2017). The relatively low performance of the decentralisation of agricultural services has been documented by Wibke Crewett (2015a) who highlighted weak integration of municipality-level stakeholders in policy design. In this paper, the author examines how in a community-based governance setting and supported by higher-tier organisations local-level stakeholders have self-organised to influence knowledge production. This research complements the analysis of the top-down dynamics and power relations.

This study's main question reflects the ongoing debate in academic literature on knowledge generation in natural resource management and governance. The author sees governance of natural resource as "norms and rules of interaction between actor groups involved in natural resource use, and the resulting power relationships between these groups" (Hurni & Wiesmann, 2014; Meadowcroft, 2009) (also in Rist et al., 2007, p. 23). To investigate knowledge generation dynamics in the community-based pasture governance context, the author applied Ostrom's (1990) principles of sustainable community management, as revised by Cox, Arnold and Villamayor (2010). Stemming from the natural resource management concept focused on technical knowledge, the understanding of the role of knowledge builds on the importance of social learning to create connections between internal and external knowledge (Pahl-Wostl et al., 2007; Rist et al., 2007).

2. Methods and materials

This PhD¹ thesis research was conducted between 2011 and 2019, and was based on embedded case studies (Yin, 2011). A total of, six case studies were explored, three in Naryn Oblast (municipalities of Emgekčil, Emgek-Talaa, and Žerge-Tal), as well as three in Jalal-Abad Oblast (municipalities of Ala-Buka, Terek-Saj, and Kanyš-Kyâ (Fig. 1). The selection of case studies was guided by the aim of capturing the broadest possible diversity of rural municipalities, where - in addition to agro-pastoral activities - residents may or may not have access to mining-related income, as well as in terms of their distance from urban centers. Ninety-nine semi-structured interviews were conducted in the selected municipalities, inter alia with herders,

¹ The PhD research was supervised by Prof. Anne Honegger at the University Jean Moulin-Lyon III, Mixed Research Unit Environment-City-Society (5600) and supported by the French Institute for Central Asian Research (IFEAC), Fondation Maison des Sciences de l'Homme and Center for Research in Geography and Land Planning.

livestock-owners, elected representatives of pasture committees and municipality councils, as well as at district, oblast and national levels with the representatives of KFPUA, NGOs, administration staff and governmental officials (18 interviews and four workshops). The interviews were complemented by ten months of participatory observation in an NGO actively implementing the pasture reform and four months in the villages and summer pastures.

The qualitative methodological approach used in this study differs from that used by Ostrom, Cox and Agrawal, who conducted their quantitative research based on large case study corpora. Case studies are particularly important as they enable deep insight into the processes across different scales of socio-ecological systems (SES). They therefore manifest an entry point for investigating the systems' complexity and can be synthesised when integrated into large corpuses (Poteete & Ostrom, 2007). The application of a common conceptual framework makes it possible to analyse these corpora, as well as utilize concepts complementing these suggested by Ostrom, Cox and Agrawal, in turn making it possible to elaborate an approach that is open to the dynamics on the ground, which otherwise may escape conceptualisation through community management (Poteete et al., 2010). The author chose a multiple nested case study allowing a comparison among three rural communities and likewise exploring the dynamics between local and national tiers as suggested by Agrawal (2001). The qualitative analysis of community management requires shaping as per each object of study and each field. Each of the principles undergoes analyses in relation to its context. Furthermore, in a qualitative approach, it appears more relevant to use them to highlight the governance-related arrangements and processes with regard to these principles than to assess them in a binary way - presence versus absence (Delgado-Serrano et al., 2017). The comparative approach is essential because it makes it possible to identify causal links, which are more difficult to pinpoint in single case studies (Poteete & Ostrom, 2007).

The definition of 'community' is still open to debate. Whereas it was defined in the early 20th century as a population living in a given territory and sharing agricultural activities (Galpin, 1915), its definition subsequently evolved to adopt a relational approach in the middle of the century. In the field of community-based natural resource management research and projects, 'community' has been defined as a set of individuals, institutions and actions, whose interactions within the community differ in intensity and nature from interactions with individuals or groups outside the community. This definition is deliberately broad, as the diversity and complexity of communities require examination beneath the surface of immediately visible processes. Thus, the community approach should not mask the divergence of interests and powers among stakeholders. In this research, communities were investigated at the scale of *ayil aimak* (rural administrative territory) and comprising the *ayil ökmötü* (local self-governance bodies). Further details on the methodolo-

gy and results can be found in the PhD thesis and separate papers (Mestre, 2017a, 2017b, 2019a, 2019b).

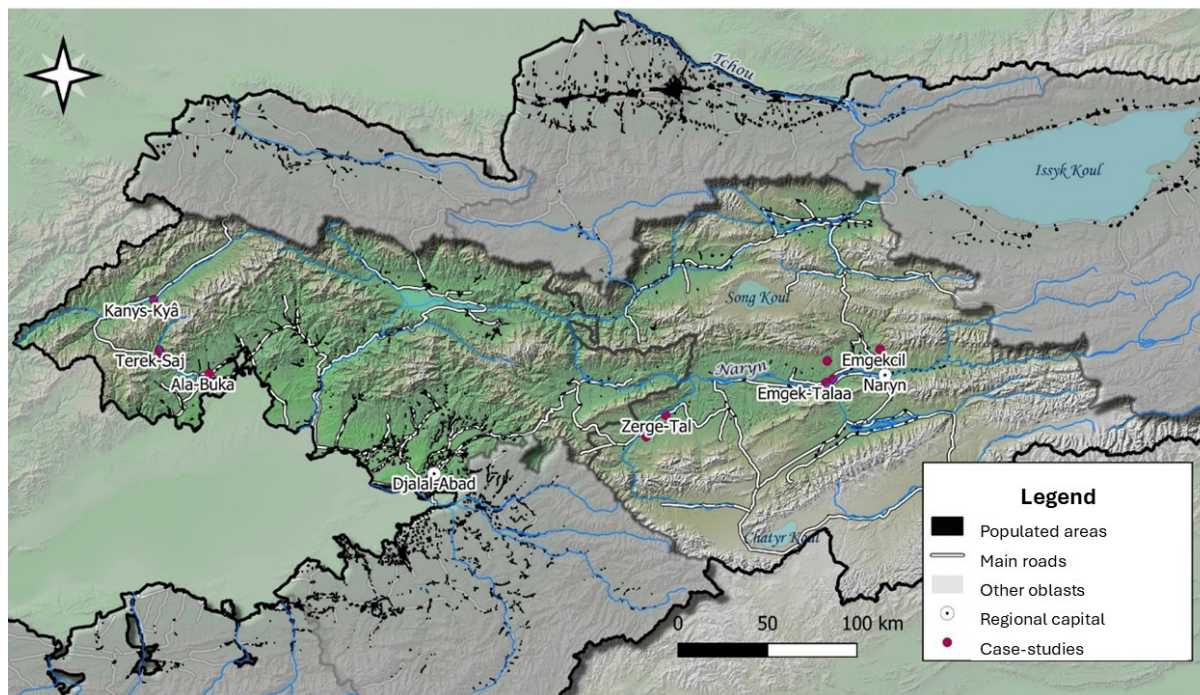


Figure 1. Case studies in Jalal-Abad and Naryn Oblasts (source: Mestre, 2019; Université Lyon 3 - UMR 5600 EVS, QGIS; data: Abdiev et al., 2017, and Open Street Map).

3. Results and discussion

3.1. Conceptual framework of community-based natural resource management

Ostrom (1990) identified eight principles that enable a user-composed institution to organize natural resource management in a robust way and to sustain itself, i.e. to function despite disturbances. These eight points were later enriched but are still considered the determining elements (Ostrom, 2009; Cox et al., 2010):

1A. Clearly defined boundaries: individuals or households which are allowed to withdraw resource units from the common-pool resource are clearly defined.

1B. Clearly defined boundaries: boundaries of the common-pool resource are clearly defined.

2A. Congruence between appropriation and provision rules and local conditions: appropriation rules limiting time, place, technologies and quantity of resource units correspond to local conditions.

2B. Congruence between appropriation and provision rules and local conditions: benefits obtained by users from a common resource, as defined by appropriation

rules, are proportional to the investment required in terms of labor, equipment, and financial means, as determined by the provision rules.

3. Collective-choice arrangements: individuals affected by the rules related to resource use have access to the decision-making process.

4A. Monitoring: monitors are present and actively monitor the state of a resource and its use.

4B. Monitoring: monitors must be accountable to the users, or the users themselves conduct the monitoring.

Graduated sanctions: it is common for sanctions applied to users who violate the rules of use to be graduated according to the severity and context of violation. Sanctions are applied by other users, by authorities accountable to users, or by both.

Conflict-resolution mechanisms: users and their representatives have access to rapid and low-cost conflict-resolution platforms to resolve conflicts between users or between users and the authorities.

Minimal recognition of rights to organise: rights of users to define the operational rules of their institutions are not challenged by external governmental authorities.

Nested enterprises: appropriation, provision, monitoring, enforcement, conflict resolution, and governance activities are organized at multiple scales within nested structures.

The first five principles are interconnected. They constitute the structure of operation in order to organize response to internal disturbances and strengthen the management system. The subsequent two (6 and 7) concern support from actors at higher tiers, and the last (8) highlights the importance of coordination across scales.

Ostrom also identified recurring factors that may contribute to management system failure:

- rapid changes to which the management system cannot adapt,
- lack of transmission of management principles between generations,
- implementation of community-based management systems via standardized international programs with associated funding,
- “opportunistic” behavior (including corruption),
- absence of an institution capable of collecting and disseminating information,
- lack of means to cope with natural risks.

These principles were analyzed as fields of knowledge production in the construction of a new community-based pasture governance model, rather than in an assessment perspective to determine the congruence between the implementation and the theoretical framework.

3.2. Community pasture management: towards a decentralised system?

The supporters of the pasture management and governance reform had presented it as a measure to simplify processes and improve the overall system's sustainability by limiting the number of involved players. Yet, while the allocation of grazing land among PCs and agro-pastoral users in the same municipality is now done directly, many other management functions cannot be performed without implication and coordination with other bodies (Fig. 2). This forces PCs to steer the process of establishing new interaction mechanisms, through negotiation and mobilization, and then ensure the longevity of such mechanisms. In practice, the processes have not led to stable agreements, with the most important aspects of negotiations concerning the definition of priorities for PCs and the allocation of income generated by PCs to ensure proper grazing land use.

As Dörre (2015) points out, the decentralisation of grazing management responsibility down to the municipal level has led to a reduction in the state's prerogatives, with the latter reducing engagement and, thus, subsidies. However, given their limited resources and great needs, this poses a challenge for local administrations. In addition to management functions, the reform has given pasture committees a coordinating role between different types and levels of actors. The PCs set up at the level of smallest local authorities should therefore liaise, negotiate and cooperate with state forest enterprises pursuing an hierarchical top-down relationship with the PCs, and pushing pasture committees to adopt environmental approaches and modes of action (Mestre, 2017a; Murzabekov, 2017).

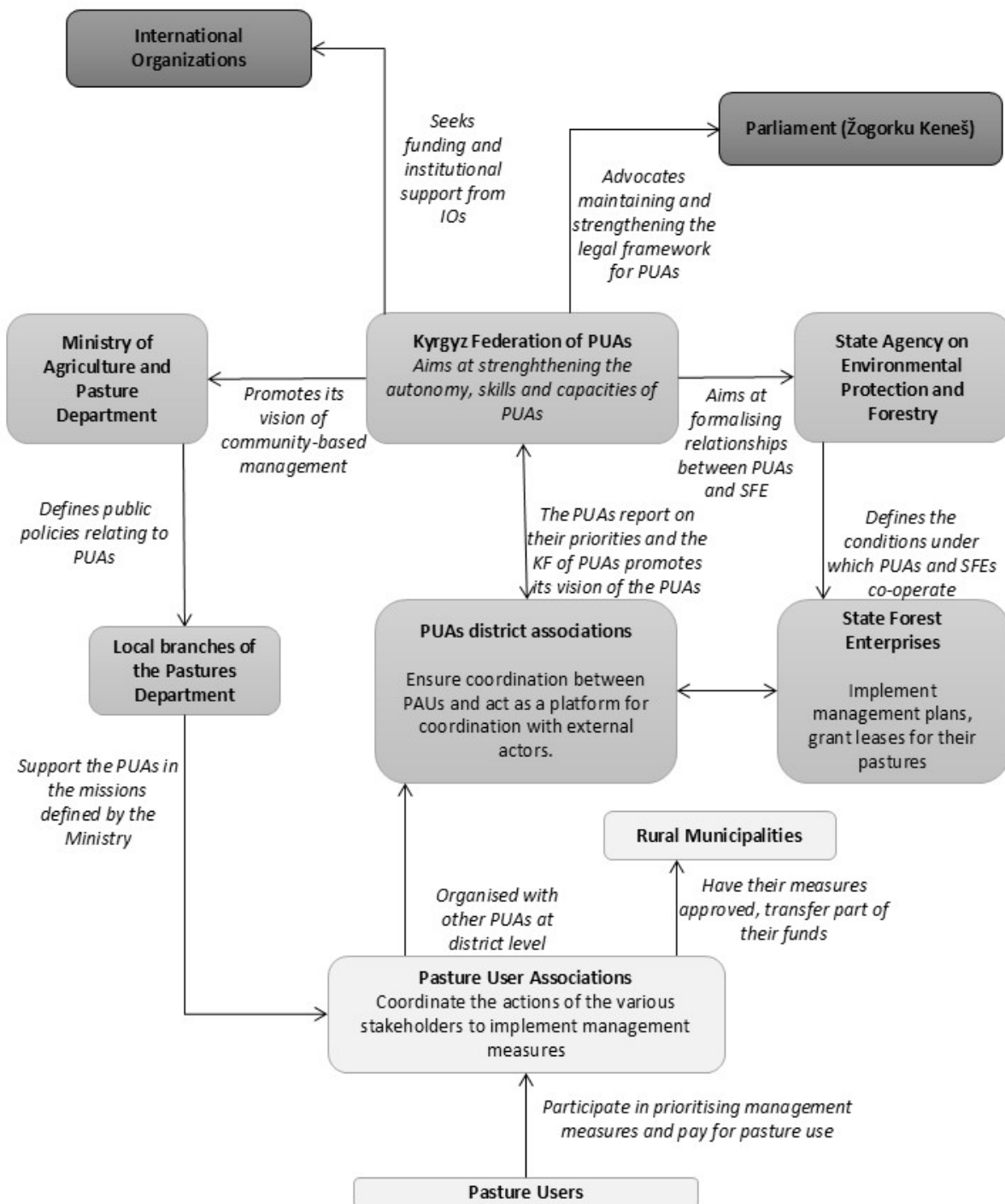


Figure 2. Main interactions among pasture management and governance stakeholders (source: author).

Community management of pastoral resources is largely shaped by national actors. The legal framework is mainly defined by the Ministry of Agriculture (MoA) with the support of international organisations. However, pastoral resource management and governance are cross-cutting, linking agriculture, ecosystem protection, and economy. Hence, although the MoA is the main national player, the State Agency for Environmental Protection and Forestry (SAEPF) plays a significant role as well.

The MoA and Pasture Department are limited in their resources, which hampers the application of the guidelines and regulations adopted. Because of this weakness, the MoA closely collaborates with international actors capable of providing funding. Yet, the corresponding organisations promote diverse community-based management approaches and tools. With the domestic players mobilizing these different paradigms, as well as forced to somehow relate to each other, this leads to an ‘institutional bricolage’ and negotiations.² In other words, the resulting plurality at the national level translates into a loose legal framework not providing a clean-cut regulation for all aspects of community grazing land management, particularly in the case of non-agropastoral use. As a result, the PCs have considerable room for manoeuvre, e.g., in negotiating non-agropastoral use payments.

The diversity of actors and approaches, in the case of community-based management of pastoral resources, gives room to the PCs to adapt the regulatory framework to local needs and conditions. The local branches of the Pasture Department support infrastructural projects, but do not oppose measures developed locally by the pasture committees. The diverging approaches to the environment and the resulting stakeholder strategies have an impact on the operation of PCs, which are at the heart of the reform aimed at decentralising pastoral resource management. The difference between how various stakeholders define the ‘environment’ represents a crucial underlying element of pasture management, as it guides the subsequent definition of resources and users. Depending on the adopted concept of the environment, the PCs may lean towards infrastructure management - as is the case with Water User Associations (Schmitt, 2015) - or towards a management mode taking natural resources into account.

The high adaptability of pasture committees and stakeholder fragmentation at the national and international levels curbs the elaboration of a common framework for defining the priorities of community-based pasture management and governance. Due to this great diversity, no institution has formulated specific community pasture management evaluation criteria. In turn, in the absence of a framework common for all stakeholders, the performance evaluation of pasture committees has been solely based on a particular approach utilized by a given evaluating agency, which gives rise to divergent approaches, and none of the stakeholders recognised by all the others

² See also Crewett (2015b) for more information on the ‘institutional bricolage’ related to local-level implementation of pasture committees.

(Dörre 2015). Hence, the risk of an institution employing its in-house criteria to question the performance of pasture committees. The lack of a single framework likewise poses challenges related to national-level monitoring of pastoral uses and resources, especially in terms of secondary pasture uses, e.g., tourism, bee-keeping, hunting, and mining (Mestre, 2017b).

3.3. The Kyrgyz Federation of Pasture User Associations: a leverage for knowledge coproduction?

The PUAs are often perceived as lacking legitimacy due to their community status as opposed to the status of highly-valued experts and specialists. Thus, they are regularly at loggerheads with respective municipalities over the allocation of funds obtained from the grazing land use tax.

In addition to local appropriation strategies at the municipal level, PCs have also organised themselves to acquire the necessary legitimacy to be part of the negotiations with district- and oblast-level players. They have also sought to influence national-level decisions binding for them. The corresponding initiatives have emerged in the country's south, particularly in Jalal-Abad Oblast. In 2013, on their own initiative, the Terek-Saj PUA and other PUAs inside the same district formed an association to coordinate management actions and gain greater influence over government agencies. In particular, district associations seek to facilitate the organisation of transhumance routes between the territories of several communities.

In 2013, the nationwide Kyrgyz Federation of Pasture User Associations was set up, with the membership of PUAs and associations of PUAs. The KFPUA aims to protect the interests of its members at the national level and capitalise on their experiences. Since 2015, the Federation has been headed by the former director of the national Pasture Department, who had previously led the actual reform. Despite being a former representative of the administration, his commitment also means that his legitimacy as the Federation's head is undisputed among the PUAs, staff of local Department branches, as well as politicians. He had overcome opposition and ensured the involvement of international actors during the process of setting up the PUAs in the early 2010s. Replaced as the Pasture Department Director, his role as the KFPUA's head has relied on the same skills and networks. In 2015, the Federation brought together 400 of the country's 454 PUAs, as well as associations from 26 of 40 districts. The Federation's charter (KFPUA, 2016b) defines the organisation's primary objective as assisting PUAs in resolving conflicts with pasture users, other PUAs, municipalities, forest management units and administrations of natural protected areas. Its other objectives include building capacities of the PUAs, pasture committees and district associations; devising sustainable grazing management practices; and disseminating best practice throughout the country and abroad. Finally, the KFPUA

aims to monitor the PUAs, communicate with donors and promote the interests of the Federation members at the national level. During 2016-2020, KFPUA focused on strengthening the capacities of the PUAs, promoting the rights and interests of the PUAs, and building the institutional capacities of district associations and the Federation (KFPUA, 2016c). In terms of non-agropastoral uses, KFPUA plans to engage in legal consultations, negotiation support, and drafting amendments to the grazing law. The Federation strongly supports the Coordination Committee bringing together government and non-government players, as well as international and civil society organisations engaged in the pasture sector.

In 2016, KFPUA members prioritized the harmonisation of secondary pasture use payments and unification of pasture monitoring methods and assessments of PCs. Their mobilization resulted in the amendments to the corresponding legislation, however, certain aspects of monitoring and performance evaluation, mostly oriented towards policy dialogue, could not be carried out under the Federation's leadership.

As an association of entities, KFPUA can respond to calls for projects from international organisations, i.e. its main source of funding; in addition, it also collects membership fees (1,000 som in 2015). Moreover, during 2016-2020, income-generating activities, e.g., legal consultations for district associations and PUAs, as well as preliminary studies for partner organisations, were planned. The Federation has been also supporting district associations in setting up activities to ensure their financial self-sufficiency, in particular via the production and sale of fodder plant seeds (KFPUA, 2016a).

3.4. Protection of local-level autonomy and development of a supporting network

The local players' strategy for influencing the national players is based on two intermediaries at the national level: KFPUA and its network of district associations, and NGOs. The Federation and its subsidiaries aim to raise the priorities of the PCs from the local to the national level. Owing to the leadership and networks of its director and the Federation's status, it can adopt a more political stance than NGOs.

In terms of interactions among local managers, the Federation is seeking to protect the autonomy of the PUAs and PCs against transforming them into merely technical services rather than community institutions. In case of the PCs becoming a technical department of a municipality administration, the mechanisms for representing the interests of different stakeholders and sub-systems would likely be greatly diminished.

The Federation and its network strengthen interactions among various tiers. The hierarchical relationships that had previously existed mainly between the national Pasture Department and its subsidiaries, on the one hand, and PCs, on the other hand, have been since supplemented by bottom-up dynamics through district

associations and KFPUA. The PUAs and PCs have emerged from the Pasture Department implementing its community-based grazing management policy, alongside other MoA departments. However, the strong support they had received during the initial setup phase was weakened by political changes. That led to the Department's re-organization rendering it new responsibilities related to the genetic improvement of livestock and fish farming, as well as the replacement of its director. Consequently, the resources allocated to pasture management have shrunk, both locally and nationally. Furthermore, government support reflects a development-focused vision and neglects other aspects of pasture management, such as coordinating and monitoring pastoral resources.

The support on behalf of local Department's branches to the PCs was important at the onset of the community pasture management policy but has been dwindling. Thanks to its more flexible operation, KFPUA and its network have been filling the gap by providing administrative, legal and financial resources (through projects), as well as defending the interests of users, member PUAs and PCs at the national level. By promoting the interests of the PUAs to the Parliament and international actors, the Federation goes beyond the Department's remit.

The Federation likewise collaborates and partners with other countries in CA, building on the experience exchanges that had taken place during the implementation of community pasture management domestically. The corresponding international initiatives manifest the organisation's primary line of business (KFPUA, 2016a). First, they aim to disseminate good practices in community-based pasture management, with Kyrgyzstan as a regional forerunner in the field. Second, international engagement acts as justification and protection against domestic stakeholders criticizing this management method.

The context is favourable to the Federation's existence. The climate of plurality enables it to coexist with the Pasture Department. The KFPUA status as an NGO allows better funding opportunities (e.g., from donors and international organisations) and independence from the government. However, the Federation's long-term sustainability still depends on its ability to win tenders from these organisations. The KFPUA is also seeking to devise an effective self-financing mechanism to reduce its dependence.

4. Conclusion

The creation of district level associations and KFPUA has broadened the room for communicative action, as platforms to exchange ideas, concerns, and priorities (Rist et al., 2007). The current system is less oriented towards specific management operations—such as integrating traditional knowledge into planning or monitoring.

Instead, it functions as a space in which rules and norms can be renegotiated. The collective action dimension could be further investigated to better understand the dynamics of social learning and the epistemic process between knowledge generation and governance in Kyrgyzstan.

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Knowledge mapping and strategy-building for agricultural change: Lessons learnt from participatory stakeholder events in Tajikistan's cotton-growing region

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ABSTRACT

The present article concisely reviews the outputs of a transdisciplinary research with the active engagement of local farmers aimed to enhance understanding of human wellbeing factors, provisioning of eco- and social system services, as well as risks and threats to social-ecological environment and strategies to tackle them. All of these factors were considered in relation to a south-western Tajikistan's cotton-growing region. Methodologically, this paper draws on the participatory research toolbox (PARSCO) designed by the authors on the basis of the previous methodology (MARISCO) to assess the complexity of social-environmental systems, and identify and evaluate more socially and ecologically sustainable development strategies (see PARSCO, 2025). The study findings reveal that a participatory stakeholder approach can be useful for not only forging and reflecting upon local expert knowledge, but also for amplifying contributions by otherwise underrepresented societal actors, particularly smallholder farmers, to interdisciplinary knowledge production.

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1. Introduction

Since the end of the Soviet Union, Central Asia's agricultural development has seen far-reaching policy, socio-economic and environmental transformations. The dissolution of large-scale state and collective farms in the majority of the region's countries has given way to often precarious smallholder farming (Hermans et al., 2024; Lowder et al., 2025). A trend towards re-collectivisation and re-industrialisation of agriculture has been observed - at least in parts of Kazakhstan - over the past 20 years (Petrick et al., 2013). Conversely, in Tajikistan, this trend has been of a negligible informal nature (Mukhamedova & Wegerich, 2018). At the same time, agricultural strategies are continuously molded by a top-down authoritarian policy culture often neglecting bottom-up and participatory perspectives (Spies & Welp, 2021; Kurmanov & Knox, 2022). This means that the people directly impacted by the target policies, especially rural communities and smallholder farmers, are not adequately involved in knowledge generation (and, eventually, decision-making), leading to policies not fully addressing their needs and concerns (Liao et al., 2014). The lack of local actor engagement in the processes above likewise spawns missing acknowledgement of everyday- and practice-based expert knowledge - an issue thematised in the literature since at least the 1990s (DeWalt, 1994; Lwoga et al., 2010; Van Assche et al., 2013). Moreover, the predominance of productivist approaches within agricultural top-down imposed strategies prioritises higher production at the expense of tackling social and ecological intricacies of local biomass production systems (Hackfort, 2024; Keilbart, 2021; Spies et al., 2022).

Since 2019, the TRANSECT project (Agrarian Transformations and Social-Ecological Complexities: Local Bioeconomy Scenarios in Central and South Asia, www.transect.de) has been investigating agricultural and bio-economic dynamics since the dissolution of the Soviet Union (specifically, in Kazakhstan and Tajikistan) and the Green Revolution era (in Pakistan). To do so, qualitative and ethnographic field research as well as participatory stakeholder workshops have been applied.

This article stems from a previous working paper that has already yielded another analytical piece (Spies et al., 2025), and introduces participatory knowledge mapping and scenario-building as potential apparatus to tackle these major issues, with a particular focus on Tajikistan's agricultural sector. It is an attempt to answer the question of how to methodologically grasp the heterogeneity (and hybridity) of local knowledge and perspectives, as well as make it aid the purpose of transdisciplinary - or applied participatory - study on biomass production and agricultural development in the case of Tajikistan. Based on the long-term qualitative field missions and participatory stakeholder research during 2019-2025 under the TRANSECT Project in Central and South Asia, the authoring team has designed and rigorously tested a

systemic and participatory method to address at least some crucial shortcomings. On the one hand, this workshop-based method allowed local stakeholders assess local farming systems holistically, including the many ways they are affected by threats and complex underlying factors. On the other hand, the stakeholder workshops helped farmers and other stakeholders in formulating and critically evaluating sustainable management strategies in terms of improving farming systems and combatting the challenges swaying them. Tajikistan's case study was chosen for this article due to the particularly large gap between state-imposed top-down decision-making and control - to the extent of steering the types of cultivated crops - and the relatively limited agency of smallholder farmers to negotiate state specifications (Hofman, 2018, 2021; Zakirova et al., 2023, 2025). The authors believe this case serves an especially stark example of how participatory stakeholder processes can be helpful in comprehending local farming systems from an everyday knowledge perspective, including smallholder farmers' positioning in such a socially and politically strained atmosphere. In addition, the case of Khatlon Oblast (Region) also illustrates that a flat hierarchical approach to knowledge production reveals the complexity of local knowledge otherwise largely hidden from the public albeit high-level policy radar in authoritarian systems.

The PARSCO methodological toolbox (Participatory Strategy Development for Sustainable Biomass Production) (PARSCO, 2025) stems from the MARISCO methodology (www.marisco.training and below) applied over many years in the context of stakeholder-informed conservation management around the globe. Like MARISCO, PARSCO endorses an approach that is both systemic and participatory. Agriculture or, more generally, biomass production comprises complex adaptive systems interacting in dynamic and nonlinear ways (PARSCO, 2025: 11). Inside these systems, multiple economic, social, ecological and political factors mutually impact each other, producing feedback loops in turn altering the initial systems' setup. The authoring team argues that: 1) PARSCO is methodologically sensitive to this complexity and, hence, is grounded in complex adaptive systems theory, as well as related concepts in assemblage theory (Spies & Alff, 2020); and 2) participatory approach is critical for getting a deeper sense of farming systems, as it helps the crucial task of heeding the perspectives and knowledge of - first and foremost - the producers. The call to better integrate local insights into knowledge generation, and as an extension into decision- and policy-making, has been articulated since the early 1990s and is still embedded in contemporary development studies (Blaikie et al., 2004; Rhoades & Nazarea, 2006; Zuberi et al., 2025). In the first place, this means formalising local citizens' knowledge and granting it significance and relevance alongside the so-called academic knowledge. By doing so, the method aims to bolster the contribution of local communities and stakeholders' knowledge to policy making and strategy development.

The following section of the article renders a detailed methodological overview with the focus on implementing the method in Tajikistan. The paper's remainder provides insights into the findings of the proposed participatory approach, as well as analyses its suitability for biomass production systems applied research in Central Asia and beyond.

2. Methodological background

With the aim of designing and testing a participatory stakeholder approach, the research team based its methodology on a proven toolbox - Adaptive Management of vulnerability and RiSk at COnservation sites (MARISCO) designed earlier at the Centre for Econics and Ecosystem Management (CEEM) of Eberswalde University for Sustainable Development (HNEE) as a participatory methodological toolbox (Ibisch & Hobson, 2014). Its main purpose is to enable stakeholder-based knowledge co-production and engage stakeholders through scenario-building. MARISCO has been already applied in conservation settings globally, mostly in local contexts. Under the TRANSECT Project, the authoring team revised the methodology for it to better suit the context of (managed) agro-ecosystems or biomass production systems, among others, by putting more emphasis on social systems and services in their linkages with ecosystems. The study team entitled their particular methodological approach as the Participatory Strategy Development for Sustainable Biomass Production (PARSCO). Based on its practical adoption, the authors elaborated a detailed user manual to make PARSCO conducive for a wide range of applications in various agricultural and biomass production settings (PARSCO, 2025).

Khatlon Oblast case study

In the course of the TRANSECT Project in Tajikistan, two consecutive workshops were held with 22 and 24 local stakeholders in May 2022 and March 2023, respectively. Due to the patriarchal structure of Tajikistan's society, women participation was limited. Hence, only two females attended both events, each accompanied by a male family member. Observing this gender imbalance, an additional female-only event was held in Khuroson District, with nine women attending, engaged in small-scale horticulture and vegetable production (sold at local markets). The stakeholders hailed from Jaloliddin Balkhi and Khuroson Districts of Khatlon Oblast (Region) in the country's southern part, where the authors had previously (2019-2023) carried out long-term research focusing on the dominant local cotton production system.

Located in south-western Tajikistan along the Vakhsh River, Khatlon Region had emerged as the country's leading cotton-producing region instead of zone during the

Soviet era of large irrigated state and collective farms. From the 1950s onward, the expansion of canals and major irrigation networks on the Vakhsh had enabled intensive cotton monoculture tying the economy to irrigated cotton growing (Zakirova et al., 2023a). The dissolution of the Soviet Union and turmoil of the Tajik Civil War (1992-97) had delayed meaningful reforms to the country's agricultural sector (Spoor, 2008; Van Atta, 2009, 2017). Under the presidency of Emomali Rakhmon, however, cotton still remains Tajikistan's main cash crop and export commodity. Due to its strategic significance, cotton cultivation is rigidly controlled by the state, and smallholder farmers are obliged to grow it on at least 60% of their plots, even though larger-scale state farms no longer exist (Hofman, 2018; Zakirova et al., 2023a). Smallholder farmers often struggle to balance among the obligation to produce cotton for the informal state quota, the essential need to grow food crops for subsistence and the market, and the requirement to align with agricultural innovations, e.g., organic farming promising higher profits (Zakirova et al., 2025).

Thanks to previous field research mission in Khatlon Oblast, the authors managed to identify and recruit - with relative ease - key stakeholders for their participation in the workshop series. All events were organised and accompanied by a team of 4-5 facilitators from HNEE and local partner institutions. The audience's vast majority were male farmers with diverse backgrounds, representing different social strata in the study areas. The participant group included both resource-poor smallholder farmers, whose primary livelihoods depend on small plots (1-3 ha), and relatively better-off farmers with additional income sources, e.g., small businesses or non-agricultural activities. Other participants comprised agronomists from the study area, as well as representatives of local institutions and decision-making bodies such as water user associations. The methodology and results outlined below draw largely on the male-dominated workshops in May 2022 and March 2023 as - from an allocated time perspective - they allowed for more in-depth discussions and rating exercises.

As mentioned above, the additional female-only workshop was held in Khuroson District to evaluate local agricultural challenges and specifically women's perspectives on the ongoing and proposed sustainable farming strategies. In Tajikistan, local customs pose severe limitations for mixed-gender gatherings, i.e. females can only partake if accompanied by male relatives, and normally they hardly express their opinion with men present. The women-only setup, thus, allowed a more open environment for female participants expressing their opinions.

Workshop 1: Knowledge mapping and systemic situation analysis

The first three-day participatory workshop took place in Dushanbe, the national capital, in May 2022. Its goal was to create comprehensive knowledge map, or a systemic model, depicting the local resource use systems in their environment,

as well as the different threats and risk factors (Fig. 1); moreover, the participants systematically evaluated them against the corresponding criteria. Utilising coloured (red, yellow, light and dark green) stickers, the group rated the threats and risk factors based on their past, current and anticipated future criticality - from red symbolising 'highly critical' to dark green representing 'not critical at all'. In addition, each threat and risk factor was rated in terms of its manageability and level of perceived awareness among the participants (Fig. 2).



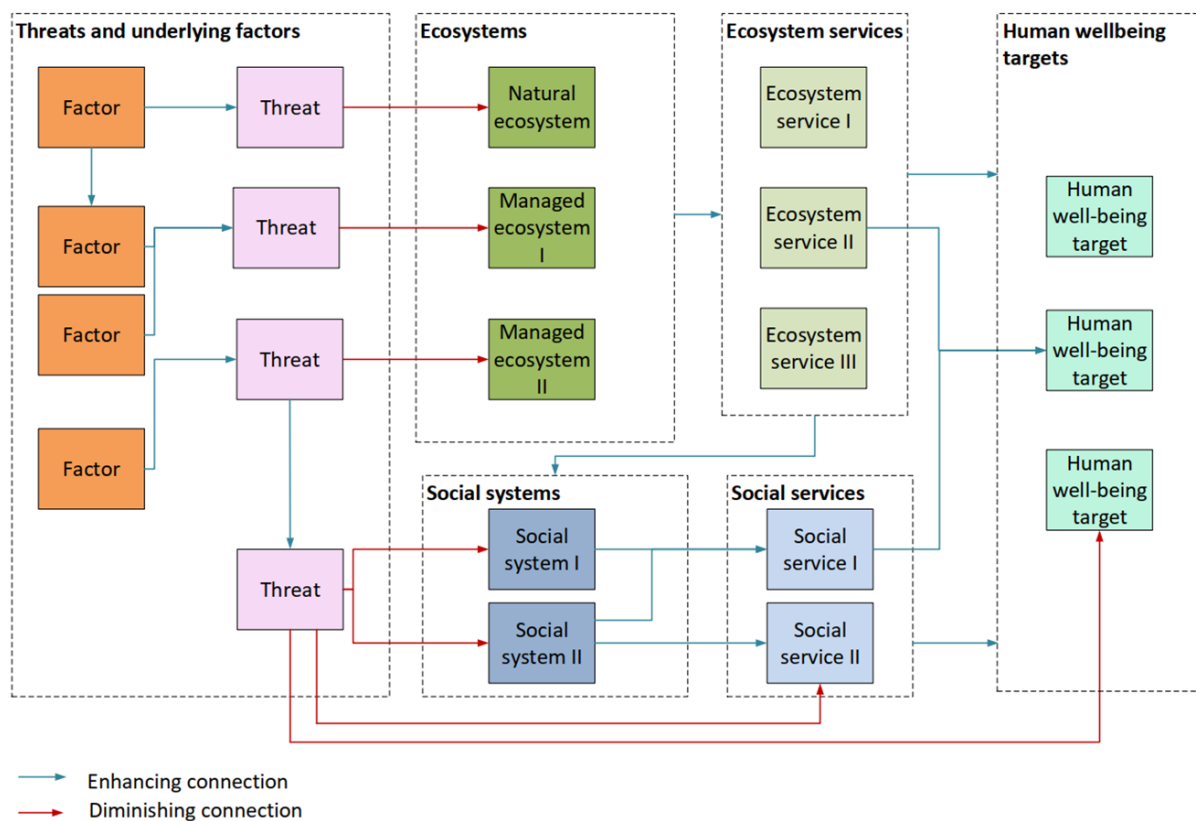
Figure 1. Participants working on the knowledge map during (Workshop 1, Dushanbe).

	Past criticality	Current criticality	Future criticality
	Manageability	Level of knowledge	Strategic relevance

Figure 2. Moderation card template for threats and risk factors with rating fields.

The exercise produced a comprehensive knowledge map prioritising human wellbeing and depicting the various ways in which resource use systems and, ultimately, human wellbeing are affected by an intricate interplay of social, ecological or political factors and threats (Fig. 3).

At the initial phase of knowledge map-building, the group defined the case study areas as per key administrative and ecological key variables, as well as plotted it accordingly over the prepared aerial image. Then, the audience identified human wellbeing targets/elements, i.e. their own needs for having a good life (right side of Fig. 3), with the following assessment of the ecosystem services (ES) and social services (SS) ensuring the welfare targets. The ES were conceptualised in the study and communicated to the participants as functions of the natural environment and its subsystems to the wellbeing of the population of the predefined case study area. Subsequently, the respective eco- and social systems underwent mapping. The final exercise was to identify the threats and contributing factors impacting the social and ecosystems providing the services above. In the course of such a step-by-step mapping process, the facilitators normally took a passive and guiding-only role, thereby allowing the participating stakeholders to freely engage in in-depth reflections and deliberations.



The workshop proved local farmers well aware of the broad spectrum of threats and factors directly or indirectly impacting their livelihoods and local environments. While that observation did not come as a surprise, the detailed participant assessments, including personal formulations of underlying social-environmental interactions, demonstrated complex and systemic thinking.

Workshop 2: Strategy formulation and assessment

The second event in Dushanbe in March 2023 gathered 24 participants, with the vast majority overlapping with the first workshop. The two key objectives of Workshop 2 were to conduct a systematic evaluation of existing and proposed strategies, and carry out a scenario-like analysis of local implications (Fig. 4). The organisers defined the overall strategy as comprising a series of decisions related to the deployment of available resources (management) and establishment of appropriate socio-institutional conditions (governance) fostering effective action(s) to accomplish desirable goals and objectives.



Figure 4. Participants rating strategies (Workshop 2, Dushanbe City).

First, the participants identified and plotted the ongoing strategies onto the knowledge map linking them to the corresponding factors, threats or other elements. After doing so, the group identified the gaps not addressed by the existing strategies and proposed alternative or complementary approaches to close them. Next up, both the existing and alternative strategies were systematically assessed against a variety of predefined criteria. The participants utilised the same colour coding - i.e., from dark green ('positive') to red ('negative') - to mark the feasibility and various expected impacts those policies could have on local resource use systems. A similar rating system was applied two weeks later during the women-only workshop. Female trainers facilitated the event to ensure a comfortable environment and encourage open dialogue, thereby overcoming linguistic and cultural barriers often curbing women's participation in mixed-gender settings.

3. Outcomes and outputs

The workshop series in Tajikistan revealed a wide range of knowledge, perspectives and ideas among local agricultural stakeholders combining in-depth local expertise and practice with the ideals of agricultural modernisation politics and top-down policy implementation. That was particularly reflected in the proposed strategies, not only mirroring hands-on solutions for social-ecological threats, but likewise calling for outside interventions by the state or international cooperation initiatives. The latter comprised, e.g., educational programmes for strengthening sustainable agri-development and financing infrastructure. Prior to dissecting the more general research findings, the subsections below briefly outline the two workshops' results to get a deeper insight into the local context, earmarked issues and ongoing strategies as mapped and assessed by the event participants.

Knowledge mapping and systemic modelling

The human wellbeing targets identified early in the first workshop ranged from food, water and health to religion, education and social cohesion within communities (incl. within households). The ecosystem and social services mentioned by the group inter alia encompassed water provision, crops, education, and income opportunities. The identified ecosystems included various types of farmland, pastures, forests, and aquatic ecosystems like lakes, canals and streams, while the social systems referred to a broad range of institutions such as local community organisations, state and religious bodies, as well as agricultural trading places, schools and other educational institutions.

During the exercise, the participants mapped and evaluated 47 threats and 49 factors, i.e. underlying root causes. The highest rated threats comprised expensive fuel, soil salinity, and unemployment. This reflects the local situation on the ground, as diesel fuel has to be purchased for market prices, and agricultural land often falls out of production due to the by now largely defunct former Soviet irrigation and drainage infrastructure. The rating also mirrored the high degree of labour migration from the study area to Russia and Kazakhstan due to limited livelihood opportunities. The pinpointed risk factors had to do with a wide range of aspects - from biophysical (e.g., lack of rainfall) to institutional (e.g., inaccessibility of state programs) and demographic (e.g., migration to cities and abroad). Monopolistic setups, lack of domestic fertiliser production, and high energy prices were among the highest rated factors. Again, this assessment reflects the challenges specific to Tajikistan, a highly authoritarian state, where business interests are often concentrated with top state officials, and where a lack of resources and a limited industrial base restrict domestic production.

In general, the first workshop showed a high degree of analytical skills and system-thinking among the participating stakeholders. The group were well aware of and quite knowledgeable about the complexity of threats and factors directly or indirectly affecting their livelihoods and local environments every day. Even highly sensitive issues were mentioned as factors, albeit worded in a cautious way. Corruption, e.g., was framed as the ‘human factor’ and not followed up further in the rating exercise. In the feedback session, the audience highly praised the workshop’s openness and the scope it allowed for out-of-the-box thinking, that they would not normally have the opportunity to engage in.

Assessing existing strategies

In the second workshop, the audience first re-evaluated the knowledge mapping and systemic analysis results, before agreeing on an overall goal/vision that the later assessed strategies should aim at. The goals were formulated by the participants as ‘good life, favourable conditions, effective long-term natural resource use, and higher production.’

During the next phase of the second workshop, the group identified 17 existing strategies and corresponding measures already applied locally in two target districts by various stakeholders, namely, state agencies and international actors. The active strategies with the highest overall ratings included horticulture promotion, government support for water pumps, and bio-humus production and use. The utilisation of imported hybrid seeds and chemical pest control was among the low-rated strategies.

While it does not appear scientifically sound to directly compare the ratings by females and males due to the different criteria applied and a limited number of strategies rated by the former, their perspectives shed valuable insights into gendered priorities and challenges. The deliberations revealed that women perceived themselves as particularly vulnerable within existing rural power schemes, especially in terms of accessing water and agricultural training. They conveyed strong concern over the lack of water in their villages, linking it to local power hierarchies and inefficiency of water user associations (WUAs). Therefore, WUAs - as a foreign donor-supported strategy to resolve water issues in Tajikistan - was rated highest by men but lowest by women, who deemed it a complete failure, with a key reason for this stark contrast in views being that a WUA member partook in the previous workshop attended by men. Despite the biased outcome regarding strategy-rating, the participants were nevertheless outspoken.

Formulating complementary strategies

In the next phase, the event participants suggested and formulated several complementary or alternative strategies to address the identified gaps in the active

strategies. The group indicated nine complementary strategies and, interestingly, the one rated the highest was related to knowledge creation, namely, providing training for farmers and expanding their knowledge and skills. Remarkably, in the female-only workshop, education-related strategies, among others, were rated significantly lower than in the male-dominated events - the women's argument being that they were usually excluded from such trainings, even though assumed most of the farming work.

Overall, the suggested strategies were quite disparate, with many of them rather straight-forward demands for external assistance, e.g., training, provision of credit/loans, or construction of infrastructure by the state or other investors. Notably, many of the proposed 'alternative' strategies emphasised technological approaches and top-down interventions well-aligned with Tajikistan's mainstream agricultural policies, putting into question the binary notion of 'local vs. external' knowledge and perspectives. Several of the proposed strategies appeared to support productivist paradigms of modern intensive agriculture promoted by mainstream national agricultural policies across Central Asia - a feature that has dominated the modernisation-inspired development discourse in the region since post-independence and even during the Soviet time (Alff & Spies, 2020). For instance, state-administered and technology-focused strategies were mentioned, such as 'expanding greenhouse farming and introducing multi-level greenhouses'. Interestingly, in the comprehensive assessment, such strategies often scored lower than more holistic and ecosystem-based models, e.g., 'establishing self-sufficiency of local seed systems'.

It's noteworthy that the second workshop participants came up with relatively few strategies for implementation by themselves, which may be interpreted as a result of the strong paternalistic and top-down political culture of the existing authoritarian regime in Tajikistan, that farmers have internalised to an extent. Yet, there were also certain notable exceptions. One of the medium-rated strategies ('green manure') referred to the practice that farmers could deploy on their own using their limited resources provided access to the necessary knowledge. Moreover, the group formulated an innovative idea of forming local seed-saving and sharing systems ('establishing self-sufficiency of local seed systems'), although it was rated lower than other strategies in terms of feasibility, as the farmers argued the need for external support, access to which is considerably limited.

4. Discussion

The workshop series in Tajikistan revealed a plurality of perspectives among the participants integrating locally grounded knowledge with different sets of 'external' expertise and ideals, regardless of possible conflicting underlying principles or paradigms. Hence, local agricultural stakeholders' knowledge and imaginations

could be described as ‘hybrid’ (Thomas & Twyman, 2004; Chaudhary et al., 2022), in the way that they often embedded or nested local knowledge with overarching principles of top-down imposed agricultural development requiring state or other external intervention. That became obvious, in particular, based on the diverging essence of the proposed strategies the event participants agreed upon - ranging from educational and productivist interventions, requiring outside support in line with existing policy paradigms, up to more ecosystem-based approaches. In part, that interconnection of knowledge sets and associated strategies was likely due to the ‘overprint’ of ‘traditional’ farming systems by the decades of Soviet and post-Soviet modernisation campaigns that had strongly influenced local ideas around agri-production (Scott, 1998). This reflects a widespread notion in rural Tajikistan (and wider Central Asia) suggesting a lack of agricultural knowledge prevalent in contemporary smallholder farming. More precisely, it is widely assumed that vital farming expertise is - or rather was - a key characteristic of the ‘scientific approach’ applied in the Soviet collective and state farms and, thus, became extinct as those entities were dismantled in the 1990s and state support, e.g., extension services, diminished (De Danieli & Shtaltovna, 2016).

However, while the political and historical contexts are pivotal for accessing knowledge and shaping visions and ideas, it would be over-simplistic, as well as patronising, to assume that the rather ‘conservative’ nature of many of the proposed strategies was merely a result of superimposed ideas. In our assessment, that would underestimate the analytical skills and thorough deliberations of local stakeholders well aware of the complexities of their livelihoods and environment. Thus, strategies may be reflective not of their local knowledge and constrained perspectives but rather of how farmers envision accessing resources.

Yet, how can this heterogeneity of local knowledge and perspectives be grasped methodologically and put into use for transdisciplinary research on biomass production and agricultural development in Central Asia? The proposed methodological approach offered several features that the authoring team find useful in this regard and in the regional context.

First, the applied method of participatory knowledge mapping and systemic assessment is based on an open conception of knowledge production aiming to reduce power hierarchies. All ideas and suggestions by the participating stakeholders were collected side by side on the same plane of expertise, represented by the knowledge map devised in Workshop 1 complemented with strategies in Workshop 2. That meant that each element was deemed equally valid, regardless of who put it forward. The only criterion for judging the ‘quality’ of knowledge was the joint rating of ‘level of knowledge’ for the identified threats and factors that represented a critical self-assessment of the participants in terms of how well-informed they felt

about a particular element and its causal processes. The identified and proposed strategies were jointly contemplated and critically reviewed during the comprehensive assessment, i.e. all approaches were cross-evaluated based on the principle of consensus and without a-priori categorisation. In this regard, the visual method of plotting strategies into the jointly developed situation model and attributing them to the factors, threats or other jointly identified elements, we argue, also helped hedging hierarchical and binary thinking. This outcome, especially under Tajikistan's authoritarian political climate, can potentially expand the contribution of local and other grassroots-level stakeholders otherwise underrepresented or simply ignored in knowledge generation. An elevated positioning of local actors in producing what is considered 'valid' knowledge likewise has the potential of boosting the agency of local stakeholders like smallholder (and other) farmers in decision-making processes. Last but not least, the participating stakeholders highly appreciated the events and the applied PARSCO tool case as an opportunity to reflect and express their visions, knowledge and needs, something they would not have a chance to do normally.

Second, applying a systemic approach grounding strategy elaboration and evaluation in a comprehensive situation analysis improved consensus-making while also helping avoid binary or dogmatic thinking. By jointly and thoroughly pondering the complex social-ecological systems in which farming practices are embedded, as well as the manifold and interrelated challenges and their root causes, the word division is strange were more likely to come to the same conclusions despite varying opinions, when compared to other methods such as participatory scenario-building that place less emphasis on a detailed situation analysis (e.g., [Palomo et al. 2011](#)). In contrast, the method proposed herein - of grounding strategy formulation in a thorough situational analysis - could also mean that proposed strategies may be more 'realist' and conventional compared to the outcomes of participatory co-design processes emphasising creative visioning ([Gray et al., 2024](#)). However, we argue that this limitation is not only a disadvantage - our workshop outcomes and outputs are based on deliberative consensus bringing together heterogeneous knowledge and viewpoints, which, we contend, can generate context-specific innovations more likely to be widely accepted.

Nonetheless, other challenges related to deliberative stakeholder and participatory processes still remain. Bringing together heterogeneous stakeholder groups requires power inequalities and difficult group dynamics handled with care. When preparing the PARSCO stakeholder workshops in Tajikistan and other case studies, the study team had deliberately refrained from dividing stakeholder cohorts into more/less powerful actors, as that could produce potentially biased pictures hard to link together. As the case of the WUA representative in the strategy-building exercise showed, participatory stakeholder involvement does indeed run the risk of being

affected by power misbalances. As discussed elsewhere, managing group dynamics in a power-sensitive manner requires a good deal of facilitator skill and experience (Spies et al., 2021). In our methodology, a combination of silent brainstorming sessions - with participants writing on cards and engaging in open discussions and carefully selected breakout group sessions - was applied to encourage less outspoken individuals and curb dominant ones. Moreover, great care by facilitators is required to not impose their own normative ideas on participants, which cannot be fully avoided, as this often happens subconsciously when managing group dynamics (Tavella & Franco, 2015). Hence, reflecting one's own positionality as a facilitator is crucial not only when moderating a process, but also afterwards when making sense of the (sometimes messy) interconnectedness of expertise and perspectives. Interpreting the outcomes of participatory strategy-building necessitates understanding the structural barriers and possible mental lock-ins affecting the process (Gaventa & Cornwall, 2006). However, at the same time results should be taken seriously by the facilitators, even if they conflict with their own normative notions of sustainability and what constitutes 'local' knowledge.

Finally, while certainly with limitations, the participatory method of knowledge co-production and co-design proposed by the study team provides stakeholders with an 'open space' for collective learning and deliberation of visions and concrete ideas. This very sense of openness was noted and highly appreciated by the workshop participants, as such settings for expressing, formulating and re-evaluating perspectives - as they claimed - were largely absent in their public lives. While the aspect of providing open venues for debating ideas may seem trivial from a theoretical point of view, its importance should not be underestimated in the societal context of rural Central Asia, where farmers and other agricultural stakeholders often lack opportunities for free thought and - even more so - expression.

5. Conclusion

Workshop-based stakeholder engagement proved instrumental in different ways. Firstly, it showed that participants, as local experts, had a thorough understanding of their unique complex social-ecological environs, and the many factors influencing them. The systemic approach of the method encouraged stakeholders to think holistically rather than in a sectoral way, and comprehensively analyse the social, institutional, political-economic and ecological processes affecting their local environment and everyday lives.

Secondly, this exhaustive and systemic understanding was also reflected in the assessment of existing and formulated complementary strategies to address ongoing issues, that covered a wide spectrum of sectors and leverage points - ranging from educational activities to policy measures and new farming practices. We, hence,

discovered that some strategies proposed by participants were later slightly devalued by themselves. This phenomenon underscored the importance of using systemic evaluation approaches to thoroughly evaluate and refine ideas that initially sound good. This is also a reminder that our understanding of what works can evolve over time, and it is crucial to adapt accordingly.

Thirdly, the application of the PARSCO methodological toolbox did help generating knowledge aimed at reducing power hierarchies. In particular, the word division nature of assembling and negotiating knowledge sets in the course of the workshop cycle made the opinions of all participants appear equally valid, regardless of power misbalances within the group. Joint knowledge deliberation, without the normative interference of facilitators, allowed for consensus-making and demeaned dogmatic thinking inside the group, particularly when it came to realistic yet implementation-prone development scenarios. Last but not least, the applied methodology provided participants with open space to freely formulate and discuss their thoughts - an opportunity that smallholder farmers are largely deprived of in their usual settings.

Lastly, thanks to separate women-only workshops, the study team observed a noteworthy gender disparity in evaluating existing and complementary development strategies. Women in Tajikistan, or at least in Khuroson District - where a separate female-only event was held - were more critical in their judgement of the social risks and benefits associated with the strategies. This divergence in perspectives sheds light on the need for gender-sensitive approaches in policy and strategy development, particularly in rural Central Asia, where female voices often remain mute - and, thus, ignored - in public debates and decision-making.

The authors summarised the method in the form of the practical user manual (PARSCO, 2025), allowing to effectively facilitate a systematic and bottom-up assessment of local biomass production systems, and that has proven to be a valuable instrument adaptable to different local contexts and participatory research tasks. Furthermore, it not only offers insights for bottom-up policy formulation, but likewise manifests as an evaluation and management tool for planning teams. This approach, we argue, magnifies the contribution by local communities and stakeholders, including smallholder farmers, in Central Asia to knowledge generation, ensures their voices are heard, as well as lays the groundwork for effective and context-specific decision making at the local level. Further methodological testing is required to forge ways in which the acquired knowledge and better scenario-building could properly 'bridge the gap' between local experts and administrative bodies to guide local-level decision-making.

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Saiga vs. Human? Observations from a participatory scenario-building process in Western Kazakhstan

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ABSTRACT

In this contribution, the author scrutinises his observations from co-facilitating and observing a participatory scenario-building exercise based on the Resilience Framework methodology in a steppe area of Western Kazakhstan. This workshop format was applied by a consortium of partners from the United Kingdom, Kazakhstan, Germany, and Mongolia to map various land use and conservation issues in this part of Central Asia (CA) and elaborate scenarios for a more socio-ecologically sustainable development of the social-environmental systems (SES) in question. The two workshops in Uralsk, Kazakhstan, in March and April 2025 largely drew attention to the conflict between pastoralist herders and farmers - the majority of the local rural population - and the conservation objectives around the migrating saiga antelope populations that had soared up to 2.8 mln as of 2024 (Koshkina et al., 2026). With the local stakeholders, including representatives of farmer associations, livestock holders and rural administrations, the approach sought to gain a systemic understanding of the local socio-economic and political context, as well as carve out development scenarios including strategies to pursue to achieve them. The article not only describes some of the key observations from the workshop cycle, but also inspects several epistemological issues regarding knowledge generation processes worthy of additional analysis.

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1. Introduction

The study of social-environmental systems (SES) requires a deep understanding of their complexity, interconnections among their key elements and, in particular, of human-environment interactions as major drivers of ecosystem change. Inclusion of different stakeholders - like farmers, pastoralist herders, local state administration decision-makers, to name just a few - in locally embedded and applied research and knowledge production, as well as engineering strategies for sustainable change can yield pivotal insights (Spies et al., 2025; Allington et al., 2018). First, the qualitative participatory approach provides added value in terms of locally available expertise on key aspects of ecosystem services, resources and land use, including potential conflicts not immediately evident from applying only qualitative and ethnographic research. Second, the participatory approach potentially fosters the ownership of change management efforts among local dwellers, as well as their commitment to and trust in future rural development processes inaugurated by international actors, civil society organisations (CSOs) and state agencies, i.e. stimulates the local-to-national and even -to-international evolution.

The article draws on the participatory stakeholder process in Western Kazakhstan (and Eastern Mongolia) under the SNAPP (Science for Nature and People Partnership) Network. It started off with a series of workshops in Uralsk, the administrative centre of Western Kazakhstan Region (Oblast), between mid-March and late April 2025. An adjusted methodological approach designed by the University of Oxford's Foresight4Food team was applied (Foresight4Food, 2025). Along with experts in participatory stakeholder research from the UK, Germany and Kazakhstan, those workshops included local Kazakhstani as well as international and national specialists in rangeland ecology and participatory stakeholder research, in addition to a diverse pool of stakeholders comprising farmers, pastoralists and local administration representatives from four districts (Kaztalov, Zhanibek, Bokeyorda, and Zhangala) of the target oblast. The purpose of the events was, first, to map the context of social-environmental systems in the study area and, second, to define and review (more sustainable) future rural development scenarios in a region affected by post-Soviet socio-economic decline, institutional transformations and climate change.

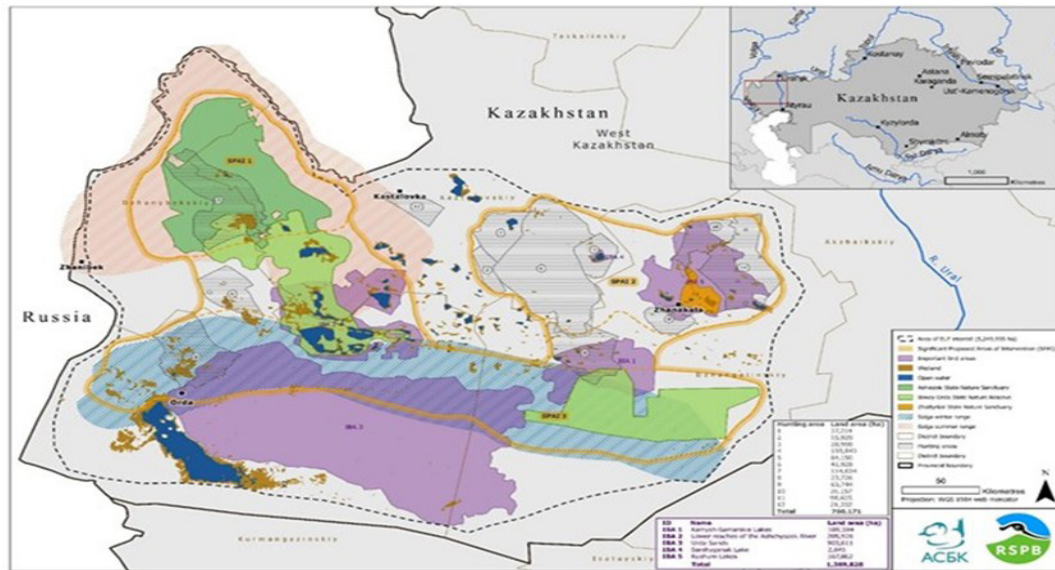


Figure 1. Study area in Western Kazakhstan.

The key challenge in the study area (Fig. 1) relate to the competition in resource availability and use (particularly, for pasture and haymaking lands, as well as scarce freshwater resources) between the livestock sector - as the backbone of local economy and responsible for the majority of people's livelihoods, on the one hand - and the sharply increasing saiga antelope population (*saiga tatarica*) population, on the other hand (Koshkina et al., 2026). A lesser point of contention revolves around the perceived risk of saiga spreading animal diseases among livestock (ibid.). The latter is due to the fact that saiga are mammals living in groups migrating over hundreds of kilometers across the Eurasian steppes.

The saiga populations in Kazakhstan and elsewhere traditionally demonstrate significant fluctuations (Grachev et al., 2009). Thus, poaching for saiga horn - on high demand in Chinese medicine in the 1960s and 1990s - had led to their near-extinction in many parts of the Eurasian steppe (Kühl et al., 2009). After the recovery of the Betpak Dala (Hunger Steppe) sub-population in the late 2000s and early 2010s, the respective saiga cohort dropped sharply by 200,000 in only a few days in May 2015, likely caused by hemorrhagic septicemia (Robinson et al., 2019). Ever since, the saiga population in Central and Western Kazakhstan have been notably growing, particularly thanks to the consequential efforts under the Altyn Dala Conservation Initiative. As per the 2024 aerial count, the local saiga population amounted to 2.8 mln (Koshkina et al., 2026), leading to human-wildlife interactions increasingly driven by land use conflicts with local agriculturalists and herders seeing their livelihoods threatened by overgrazing and potential animal disease propagation. Hence, the research question for the consortium was formulated as '[h]ow to optimise rangeland ecosystem management in Western Kazakhstan to harmonise the objectives of nature

conservation and agricultural development via analysing co-benefits and trade-offs offered by different development pathways?’

The following section briefly explains the logic of the conceptual and methodological approach followed by the consortium partners during the workshop cycle. The remainder of the paper outlines the key methodological observations of the participatory stakeholder process and reviews trajectories making use of the insights for future participatory research.

2. Conceptual and methodological setup

The approach followed in this participatory stakeholder exercise was broadly defined as to rivet on social-ecological sustainability and resilience in the study area, i.e. four rural districts of Western Kazakhstan Oblast. Beyond the immanent conflict of interests between livestock-holders and wider rural population, on one side, and conservation goals with regards to the threatened saiga population, on the other side ([Koshkina et al. 2016](#)), the workshop process thematically sought to balance rural economies and ecosystem integrity. Thus, the aim was not to pre-assume the narrow human-saiga conflict as the major driving force for key social-environmental dynamics in the area.

Resilience, hence, in the given context can be defined from a range of perspectives - ecological/ecosystem, social, economic. It puts resilience in relationship to functioning of systems, and particularly the interaction of social and ecosystems. Conceptually, resilience - according to Holling’s classical definition (1973) - refers to a measure of the persistence of systems and their ability to absorb change and disturbance, and still maintain the same relationships between populations and state variables, or - as in our case - to lead to the productive coexistence between social and ecosystems without crossing certain disruptive thresholds. Thus, the focus of the applied participatory methodology follows a shift of attention in resilience research towards social-ecological systems (SES). Elinor Ostrom framed SES as complex systems that require a well-developed toolcase of methodologies in order for key variables under different governance systems to be adequately analysed ([Ostrom, 2009](#)). Yet, the complex nature of SESs means that they self-organise, and novel configurations can emerge due to nonlinear feedbacks and actor agencies. These features of integrated SESs can make managing them a challenge, but also forge opportunities for recovering or re-organising after a disturbance.

Based on the assumed resilience dynamics and the underlying functions of social-ecological systems, the key goal of the workshop series was to devise land-use scenarios in close collaboration with local and national stakeholders. Such an approach would allow exploring different developmental pathways based on distinct

assumptions of social-ecological transformations in the given local context. The reasoning behind this core motivation for the workshop cycle was to engage local stakeholders in an informed, open and decidedly non-hierarchical discussion around perceptions of how the future might unfold. That included a participatory analysis of potential scenarios for their manifold implications in the study area that also drew attention to investigating the trade-offs and co-benefits inherent in different scenarios. From an environmentalist point of view, for instance, explorations of practice-oriented and policy-focused solutions to improving biodiversity conservation were prioritised, not least due to ecologists being among the organisers. That meant emphasising the importance of nature in balancing ecosystem service provision. Additionally, and closely related to that, the events intended to suggest to a broader public of stakeholders the first steps to nature conservation policies brought to fruition via cross-sectoral discussions. Furthermore, the exercise pursued to contribute to informed local management strategies, including spatial planning instruments. Last but not least, the workshops' outputs were to be fed into the global discourse through the 2026 International Year of Rangelands and Pastoralists.

The 1st workshop - held at M. Utemisov Western Kazakhstan State University, Uralsk, 13-14 March 2025 - brought together a diverse group of approx. 35 exclusively male participants: local decision-makers in the fields of agriculture, forestry, land and water use, wildlife inspection, agrarian (grain-producing) associations, corporate farmers and livestock holders, as well as the university's scientists. The workshop was facilitated by 6-7 experts from various Kazakhstani and international CSOs, scientific and research organizations. To an extent, facilitation was impeded by the physical absence of the key facilitators due to flight interruptions. While their online presence and guidance was ensured over the entire event duration, remote facilitation was disturbed by restricted communications, particularly, in the course of explaining central steps of knowledge mapping and scenario-building.

The 2nd workshop - initially scheduled for 28-29 April 2025 in the district centre of Kaztalovka - had to be relocated to Uralsk due to rumors of public meetings over the resource conflict between livestock-holders and growing saiga population to unfold in the initially planned location. A smaller group of approx. 15 participants, largely overlapping with the participants of the first event, arrived to the 2nd workshop in Uralsk, that allowed structuring and aligning the knowledge from Workshop 1, primarily focusing on scenario-building and profound discussion. The reflections in this article predominantly relate to the observations from Workshop 1.

3. Key observations of the workshop process

The initial event in mid-March 2025 was in essence dedicated to participatory knowledge mapping of the SES in the study area. The aim was to draw stakeholders in

the workshop process in a decidedly non-hierarchic way to inspire knowledge production sensitive to the power disbalances between the key decision-makers from local state administration bodies, on the one hand, and individual farmers, herders, etc., on the other hand (also in Alff et al., this issue). The physically present workshop facilitators were primarily conservationists on behalf of the Astana office of the Association for the Conservation of Biodiversity of Kazakhstan (ACBK) and the RSPB, the UK's largest wildlife conservation organization. Other UK-based head facilitators partook via Zoom making the core methodological communication reliant on online interpretation, hence at times challenging. While the offline facilitators were familiar to the local workshop audience due to years of collaborative research on rangeland ecology and saiga, an insider-outsider sentiment nonetheless remained throughout both events. The intended non-hierarchical workshop setup was likewise partly compromised by the seating configuration in the university's conference room - the inner table accommodated only 16-18 persons, with the second outer circle of chairs occupied by less powerful actors (assistants to state administration department heads, individual farmers, etc.). The relative absence of (smallholder) farmers, as only 2-4 were present during the initial round of introductions, made this stakeholder category appear underrepresented.

As mentioned earlier, one of the initial core exercise motivations was to not foreground the conflict around haymaking, pasture land and water resources between local farmers and livestock holders, on the one hand, and the multiplying saiga population, on the other hand. Rather, it was intended to concentrate thematically on the broader, more systemic and complex resilience, as well as the dynamics of the SES functioning in the case study area. Thus, a more result-open approach, i.e. translating the impacts on livelihoods produced by the post-Soviet socio-political and -economic transformations into scenario building was deemed more effective, making local voices heard. However, this intention did not entirely work out as expected for several reasons detailed below.

Firstly, due to locally well-known ecologists associated with saiga conservation perceived by the workshop participants as key facilitators, the human-saiga conflict dominated much of the event's agenda, and was by and far conceived as the main socio-ecological challenge in the area. For instance, much of the beginning of the first workshop day was dedicated to reviewing the saiga-related conservation efforts. This was not well-met by several of the more outspoken participants. Even a presentation by one of the workshop organizers that focused more broadly on land-use conflicts in the given area, not particularly drawing on the saiga-human conflict, was hijacked by workshop participants putting saiga overpopulation as the rural populations main problem. A common phrase, coined by one of the candid participants (a farmer association head) - suggesting strong ties between the interests

of saiga conservation and the state, and repeatedly brought forward throughout the workshop series, was: „Ecologists are the advocates of the saiga... no, wait, they are the state prosecutors even!“ Generally, over the course of the exercise, a lot of discontent with the status quo of the government’s passivity, particularly, pertaining to the issues caused by the expanding saiga population was articulated, overshadowing a more sophisticated assessment of social-environmental changes in the area. As the above participant framed it: „There has been a lot of talk about formulating ‘sustainable development’, yet for us it means nothing anymore... it became a red flag. We, humans, get neglected against the background of the saiga protection agenda.“

Generally, there was a lack of understanding among the audience regarding how policy-making and implementation work in Kazakhstan. That was why the conservationists among the facilitators were frequently accused of siding with the saiga and working against the local community. Confronted with such accusations, the facilitators repeatedly argued that they could only suggest solutions to the government, but have limited influence on government decision-making processes. That enemy scheme along the saigas-ecologists-state governance axis - while far from exclusive to this case study (König et al., 2020) - still reigns much of the thematic public discourse inside the country (Koshkina et al., 2026), and is rarely expanded or substituted with a debate on far-flung land and water use matters.

During the event, the facilitators had to regularly push the participants for a wider set of explanations beyond the saiga issue as critical for local development. For instance, after a presentation of the organising team - dedicated to land cover alterations in the study area between 1984-2010 - the participants were asked to identify the drivers for visible transformations. One participant claimed, that „[t]he dissolution of large-scale farms in the 1990s had led to tens of thousands of smallholders overusing pastures without pasture rotation.“ Another participant added that the livestock headcount in the desert areas of the target region had changed significantly: „While the sheep herds had plummeted due to vegetation cover reduction, in certain areas horse numbers on the contrary had grown by 300%.“ The same farmer claimed that „[i]n pre-Soviet times, the situation was similar to today, i.e. that it was more of the ‘standard’ (sustainable) condition, as Soviet large-scale farming had massively transformed the area, and today 10,000 smallholders work their own way.“

When the audience was split into break-out groups using an adapted World Cafe approach and asked about the complexes of issues that drove the social-environmental changes in the area, the competition of pastoral land and water resource use with saiga (conservation) came up first, with the challenges related to climate change (incl. lower precipitation, increasing droughts, etc.) identified in the second place, and infrastructural deficits (e.g., lack of processing facilities for livestock products, lack of fencing for protecting pastures from saiga overgrazing) voiced only the third.

Secondly, over the course of the workshop, among the participants there persisted some level of uncertainty as to the actual event goals, and as to what extent the event correlated with their individual expectations. Furthermore, on various occasions the participants had difficulties addressing the tasks posed by the facilitator team. For example, during the moderated break-out group work - three groups of 4-6 participants - the audience were asked to identify the key drivers of change for the upcoming scenario-building exercise. In the discussions, a varying range of themes was discussed, but the participants struggled with pinning them down, especially while trying to scale down to the local context. Rather general issues were raised as matters of concern, e.g., degradation of soils and pastures due to uncontrolled resource overuse by herders, climate change, and remote location of the study area deep in Kazakhstan-Russia borderlands.

At the end of the exercise, three key concerns were prioritised: climate change causing land degradation, lack of alternative livelihoods other than livestock, water deficit/shortage. In reaction, the facilitators once again brought the attention of the audience to the ultimate workshop's goal, i.e. scenario-building, and that the focus should be on formulating 'manageable' local-context challenges to subsequently address them via the corresponding scenarios, specifically: a) How can land be managed better to withstand climate change, ensure water security and amend (former) poor land management? and b) How to forge additional/complementary livelihoods in Western Kazakhstan? After repeated questions of what the workshop was about, one of the facilitators stated: „We aim to identify, based on your knowledge, long-term scenarios that may guide government decision-making.“

Certain bafflements emerged while working on the second more advanced workshop's task - scenario brainstorming. The group found it challenging to grasp the uncertainties associated with imagining (hypothetically picturing) the study area 25 years into the future, according to the task. The audience were divided into break-out groups (A, B, C, and D) to define and discuss scenarios as per the criteria of four sectors of the scenario matrix (Fig. 2) indicating increasing/decreasing investment, sustainable/no management of saiga along the axis.

In the presentations thereafter, starkly differing scenarios came out - from extremely optimistic (close to wishful thinking) to extremely hopeless (almost fatalist ones of 'business as usual'). Whereas Group D claimed that without investment into agriculture there would be no agriculture at all, and that it would consequently lead to food insecurity and burgeoning poverty, Group B brought to the table the highly unrealistic scenario with positive outcomes in almost all aspects. In their turn, Group A 'saw' the region fragmenting in the future, in case of no control of the saiga population and shrinking investment. Group C envisioned the status quo remaining due to the main parameters not changing in the future.

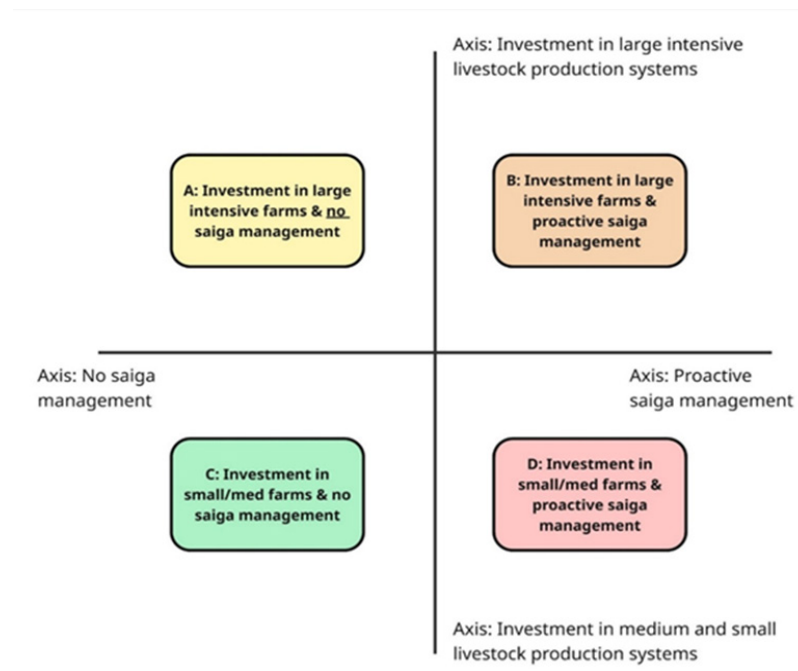


Figure 2. Identified and discussed scenarios (SNAPP 2025).

Thirdly, the participants had excessively high expectations of the workshop's results, on the one hand, and a sort of oversaturation with participatory approaches and scenario-building that allegedly would lead nowhere, on the other hand. Combined, this led to frustration over the expected outcomes of the event and scenario-building exercise, more generally. In the course of the workshop, one of the most outspoken participants stated: „What effect will the strategies/scenarios that we are working on today and tomorrow have on our future? How will they be practically introduced in our reality?“ And, specifically addressing the facilitators: „I came with high hopes this morning. But, frustratingly, as of now no (sustainable) solution benefitting the human population of Western Kazakhstan Oblast was presented to us.“ At another point in time during the event the participant demanded „a more operational approach [...] beyond the scenarios developed by the colleagues from the Western Kazakhstan University.“ Allegedly, similar scenario-building exercises (about saiga issues) took place in Astana over the last years. In response to that, one of the facilitators explained that the workshop was not entirely about the human-saiga conflict but took a broader and more systemic approach. The participant, apparently upset, replied that „the farmers in the area were put in the situation that made them solely responsible for sustainable pasture management (utilising personal financial resources), whereas the decision-makers up to the national government level cared less about the saiga issue and the destruction they caused.“

Notwithstanding the vicissitudes, in conclusion the workshop did generate valuable insights on the social-ecological dynamics in the study area - e.g., on live-stock shifts and environmental change - that, however, were often overshadowed by the eminent human-saiga conflict dominating the public discourse in the target part of rural Western Kazakhstan.

4. Discussion and future research

The previous section analysed the dynamics and limitations of the participatory workshops held in Western Kazakhstan in March 2025 designed to map, in a participatory way, SES's profile and engage diverse stakeholders in scenario-building. While the events were intended to foster a non-hierarchical and inclusive environment, the essay illustrates how socio-political histories, entrenched power imbalances, and long-standing human-saiga conflicts shaped the exercise in ways the organisers had not fully anticipated.

As evident from the above, a major hardship in terms of deploying participatory methods is associated with existing hierarchies. Despite the explicit intention to 'level the power field', the workshop setting itself - both physically and socially - failed to fully neutralise the pre-existing nexus of relations among conservationists, other alleged outsiders, and local inhabitants. The conference room arrangement - that, by default, placed the most 'influential' actors at the central table and relegated 'lower-status' persons to the outer seating circle - subtly reinforced the hierarchy from the outset. Such authority-reproducing setup was occasionally challenged by break-out sessions, yet became decisive again in plenum sessions. More significantly, the group predominantly comprised officials and representatives of administrative bodies, with smallholder farmers - possessing crucial knowledge and experiences - underrepresented. That imbalance inevitably influenced what voices were amplified and what concerns dominated, sidetracking the discussions towards institutional perspectives and grievances voiced by more 'powerful' actors.

The second and, perhaps, more decisive factor was the symbolic presence of saiga conservationists. Even though the workshop sought to broaden the thematic focus beyond the human-saiga conflict, the facilitators' identities as ecologists associated with conservation work positioned them, in participants' eyes, as representatives of the state-backed conservation agenda. That perception shaped the polemic's tone and content: participants repeatedly redirected conversations toward the saiga issue, frequently expressing frustration with what they viewed as government inaction and the ecologists' complicity or influence in decision-making. The recurrent phrase that "ecologists are the advocates of the saiga, even the prosecutors," captures a deep-seated antagonism in the region's public discourse. Such enemy fram-

ing - saiga-ecologists-state - overshadowed more nuanced deliberations on land-use change, climate impacts, and socio-economic restructuring, despite the facilitators' attempts to widen the analytical lens.

Interestingly, the event observation allowed pinpointing the moments when the audience articulated more complex structural explanations for local environmental change. Those included: the post-Soviet fragmentation of collective farms, alterations in livestock composition (such as a sharp decline in sheep and a dramatic rise in horses), and the cumulative legacy of Soviet-era land management. However, even such broader reflections tended to be framed against the backdrop of stressors caused by the saiga population growth or were overshadowed by the emotional and political potency of the saiga conflict.

The third pivotal theme was the cognitive difficulty that the participants experienced with scenario-building as a method - they often struggled to identify specific drivers of change, scale their concerns down to the local context, and articulate manageable problems appropriate for scenario development. That difficulty was compounded by unclear expectations regarding the event goals, as multiple participants were unsure of what their input would achieve, how scenarios would translate into policy, or why scenario-building was the chosen approach. Consequently, the scenario outputs widely varied - from optimistic and unrealistic visions to bleak or almost fatalistic projections - reflecting both the uncertainty the group felt about the future, as well as their ambivalence toward the exercise per se.

Finally, the observations and findings described herein highlight a certain tension between expectation and weariness. Some participants arrived with high hopes for the workshop's potential to generate actionable solutions. Simultaneously, there was an apparent 'fatigue' stemming from previous participatory exercises that, in their view, produced little tangible change. That ambivalence led to pointed expressions of frustration, questioning the practical value of scenario-building,, and calling for more "operational approaches" addressing immediate livelihood concerns, particularly those related to pasture management and impacts of growing saiga population. The facilitators' insistence on a systemic and long-term perspective often clashed with participants' desire for concrete near-term interventions.

In sum, the workshop experiences documented illuminate the difficulties of implementing participatory future-oriented approaches in contexts marked by entrenched conflicts, certain mistrust, institutional ambiguity, and social grievances. While the events in question aimed to democratise knowledge generation, structural and symbolic factors limited the extent to which diverse voices could shape the process. The dominance of the saiga conflict - both substantively and emotionally - revealed that the socio-environmental challenges could not be easily reframed utilising methodological design alone. Effective participatory work in such settings requires not only technical and sensible facilitation skills, but also keen insight of local polit-

ical ecologies, perceptions of authority, and the socio-historical transformations that have taken place over the past decades.

One of the avenues for future research worthwhile exploring in the context of participatory studies of this kind includes epistemological violence. This term from the decolonisation and knowledge sociology literature refers to indirect and systemic violence inflicted through control, marginalisation, or invalidation of knowledge and ways of knowing. The concept describes how dominant knowledge systems can silence, suppress, or even erase the experiences and perspectives of less powerful groups through institutional and discursive mechanisms. Within the framework of the current case study, the workshop setup - paving a certain way or system of knowledge generation, rather than a given set of knowledge - could be considered a symptom of epistemological violence and, hence, appears worth investigating in more detail, i.e. challenging the participatory nature of this kind of event settings and focusing on the positioning of workshop facilitation in framing and prioritising knowledge.

5. Conclusion

This article has highlighted both the potential and the limitations of participatory stakeholder research approaches for understanding and managing social-environmental systems in contexts shaped by uncertainty, conflict, and unequal power relations. Drawing on a series of stakeholder workshops conducted in Western Kazakhstan in early 2025, the research demonstrated that efforts to collaboratively map SES dynamics and develop future land-use scenarios are deeply influenced by the socio-political past, entrenched perceptions of authority, and ongoing human-wildlife tensions. Although the methodological design intentionally sought to foster inclusive and non-hierarchical dialogue, the workshop process revealed how structural and symbolic factors can constrain the realisation of these goals in practice.

The above findings demonstrate that the hierarchies within the workshop space - both literal, such as seating arrangements, and figurative, such as institutional affiliations - had unintendedly reproduced pre-existing divisions between local actors, administrators, and conservation experts. The dynamics influenced not only those who spoke and whose concerns became central, but also the overall vector of discussions. Smallholder farmers holding critical experiential knowledge of rangeland dynamics were underrepresented, while more powerful and vocal discourses came to subdue scenario-building and debate. Thus, the workshops risked reinforcing rather than challenging the existing asymmetries in knowledge production, despite their participatory intent.

A central lesson of this research is the overwhelming prominence of the human-saiga conflict in shaping local interpretations of SES change and stakeholder

interactions in Western Kazakhstan. Despite facilitators' efforts to expand the analytical scope towards more sophisticated and systemic drivers - including climate change, post-Soviet institutional restructuring, and land-use transformations - the symbolic presence of saiga conservationists deeply influenced audience perceptions. Certain participants viewed ecologists not as neutral subject-matter experts but as de facto ambassadors of state conservation interests. That framing repeatedly skewed the deliberations back to grievances related to saiga overpopulation, pasture degradation, and perceived governmental inaction, overshadowing opportunities to explore the multi-dimensional drivers of resilience as well as long-term socio-ecological pathways.

The exercise also illuminated significant methodological challenges associated with scenario-building as a participatory tool. The event audience struggled to scale problems down to the local context, visualise distant futures and uncertainties underlying the proposed scenarios, as well as understand how their contributions would alleet policy. Combined with skepticism stemming from the past experiences with similar exercises, high expectations for tangible outcomes generated certain frustration and moments of disengagement. The tailored scenarios ranged widely - from aspirational visions detached from current realities to pessimistic projections reflecting the lack of trust in institutional responsiveness.

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Collective Action and Ecosystem Services: Balancing Livestock Grazing and Biodiversity in the Baiboosun Micro-Reserve

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ABSTRACT

This study explored the establishment and governance of Baiboosun, the first community-led micro-reserve in Kyrgyzstan integrating biodiversity conservation and sustainable pasture management in mountain ecosystems. Using a qualitative case study approach, the research was co-designed by a geographer and staff of local NGOs drawing on the data collected via interviews, participatory workshops, and 2019-2025 internal reports. The study utilized the conceptual framework on social interdependencies and ecosystem services (ESs) to examine stakeholder dynamics and multi-functional land use. The creation of the micro-reserve was driven by local actors, notably hunters and pasture committees (PCs), and supported by a national-level NGO, as well as state agencies. The reserve's management plan aims to balance biodiversity conservation with agropastoral use, avoiding exclusionary practices. It also emphasizes grassroots engagement, knowledge generation, and ecosystem integrity. The key enabling factors included stakeholder cognitive framing shifts, cross-scale institutional levels, and legal innovations supporting community governance of protected areas (PAs). Further research, however, is required to investigate the ecological outcomes and connectivity of such reserves at the landscape scale. This research provides empirical insight into multi-functional land management and community-based conservation, thus offering an innovative framework to integrate ES and governance in post-Soviet agro-pastoral landscapes.

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1. Introduction

With approximately 20% of the world's species at risk of extinction according to the International Union for Conservation of Nature (IUCN), biodiversity preservation is becoming an increasingly salient issue (Bradshaw et al., 2021). Conversion of natural environments into anthropogenic ones as well as climate change were deemed the main factors driving biodiversity decline (Bauduin et al., 2020), and in the Central Asian Region *inter alia* land use changes negatively impact the capacity of ecosystems to provide water and food, as well as sustain communities (Lioubimtseva, 2015).

Amidst the growing criticism of exclusion of local communities from protected areas (PAs), novel models of co-management and partnership aim to account for the values and interactions between people and nature. This paper investigates the capacity of local stakeholders to forge alliances both locally and *vis-à-vis* national agencies to foster mutualism between pasture management and nature conservation.

The meadows of Ton District are extensively exploited as agri-land and pastures. In this rural area on the southern shore of Issyk-kul Lake in the Kyrgyz Republic, the growing livestock population adversely affects the overall condition of the habitats of wild ungulates (e.g., ibex, roe deer), the main prey species of snow leopard. These fragile mountain ecosystems also suffer from poaching, predatory cutting of trees and shrubs, contamination, as well as illegal digging of medicinal herb roots.

Recognizing that in the vast majority of cases the challenges in preserving local biodiversity persist due to the anthropogenic destruction of natural ecosystems, the local association of hunters and fishermen initiated nature conservation actions that triggered the creation of the first community-led micro-reserve of the country.

The Kyrgyz Republic (KR) is small in terms of surface area (0.13% of the world's land). Yet, it is one of the 200 Earth's priority eco-regions because of the high concentration of flora and fauna (Olson & Dinerstein, 2002). The Kyrgyz Republic is home to over 12,300 animal and 7,723 plant species, including 3,780 higher plants, 3,676 lower plants, and 261 microorganisms (viruses, bacteria, elementary organisms). Approximately 3,500 plant species grow on its pastures, and according to A.G. Golovkova (1959), including more than 200 medicinal herbs, nectar source plants, as well as 630 palatable plant species forming the basis of high-nutrient pasture forage. The pastureland vegetation cover renders cheap forage for livestock and constitutes the primary source of income and subsistence for rural communities *i.e.*, 58% of the total country's population (NSC of the KR, 2025). Through trade, rural livestock provides meat and dairy products to urban centres.

In 2009, pasture management was delegated to local communities via the creation of Pasture Committees (PCs) with the primary function of ensuring sustainable use of pasture resources.

Biodiversity conservation arose as a complementary dimension of the targeted actions in the field of pasture management, although in the Kyrgyz Republic conservation is mostly managed by the State, as per the inherited Soviet model of exclusionary conservation (Weiner, 1999). This approach, also in other regions of the world, has been criticized for its injustice. Besides, the participation of local communities has demonstrated positive effects on the compliance of rural residents with conservation measures (Andrade & Rhodes, 2012). The new model, described in this article, aims at vesting local communities with PA management and governance obligations, and underwent testing in the Kyrgyz Republic when a local community self-mobilized to create the pilot micro-reserve.

Building on the conceptual framework devised by Barnaud et al. (2018), the study team examined the links between the establishment of a community-based PA and social interdependencies (SI) emerging around provisioning, regulating, and cultural ecosystem services (ESs) related to pastures. This framework is rooted in the field of socio-ecological system (SES) research steered towards analysing the institutions regulating interactions between social and ecological systems. It is based on a definition of institutions resulting from and influencing social interactions, and takes full account of the complexity of relations between ecosystems and society, as illustrated by the mismatches between the spatial and temporal scales of biophysical processes and institutions (McGinnis & Ostrom, 2014).

The SIs bridge collective action and power relations with the field of ESs. They draw a conceptual line between ESs providers and beneficiaries, while also recognizing that stakeholders can play different roles - contribute to ESs provision simultaneously benefitting from them, or one stakeholder can provide an ESs which benefits another. For instance, when local inhabitants graze livestock, they contribute to the production of recreational ESs, whose beneficiaries include outside tourists but also local residents. Intermediaries such as law- and policy-makers, administrations, and private actors likewise impact decisions regarding ESs and are included in the overall system. SIs exist between intermediaries, providers, and beneficiaries, but also among various categories of beneficiaries and providers. The analysis of SIs includes four dimensions:

Cognitive framing relates to the way stakeholders perceive their environment, and how they are linked with other stakeholders through biophysical processes or biodiversity;

Levels of organizations referring to different scales (and potential mismatches) between administrative and organizational tiers of natural resources use and ESs;

Institutions possessing sets of formal and informal rules shaping SIs and ESs management;

Power relations.

These interactions are examined over a specific question (action arena, in the SES vocabulary) and do not aim to be exhaustive. Most often, ecosystems provide a bundle of ESs, which implies choices regarding supporting synergies between ESs and agreeing on trade-offs (Raudsepp-Hearne et al., 2010). This approach has been applied to different case studies to investigate the dynamics underlying the multi-functionality of agro-ecosystems and interactions with natural resource management (Barnaud & Couix, 2020; Moreau et al., 2019; Salliou et al., 2019).

The case study of the Baiboosun micro-reserve allowed the research team to explore how communities roll out strategies to partake in the governance and management of a bundle of ecosystem services related to biodiversity and pastures, using the conceptual framework of social interdependencies (Barnaud et al., 2018).

International literature investigates engagement of communities in conservation from different angles. The field of ecosystem services has been quickly evolving since the seminal paper of Costanza et al. and Millennium Ecosystem Assessment (1997; 2005). Similar evaluations are getting increasingly popular and include local people perspectives (Ament et al., 2017; Maestre-Andrés et al., 2016).

Protection of an ES bundle in alpine ecosystems (grassland for livestock, patrimonial landscape, recreational activities, heritage, and identity) highlights the ability of different stakeholders to preserve natural infrastructure. The latter is key to maintaining fauna and flora biodiversity, as well as ensuring the provision of key regulatory ESs like water regulation and landslide protection. Cultural ecosystem services are defined as the nonmaterial benefits that people obtain from nature (Millennium Ecosystem Assessment, 2005). In the Kyrgyz Republic, pastureland and mountain ecosystems are vital in terms of cultural heritage and identity (Féaux de la Croix, 2011). Providing ESs such as livestock production, honey-making, and tourism create monetary but also relational values rarely incorporated in target assessments (Arias-Arévalo et al., 2018; IPBES, 2018).

2. Methods and materials

The interplay among the shifts in agri-systems, public policy alterations, and global change can be defined as ‘wicked problems’ (Rittel & Webber, 1973). There are no optimal solutions to respond to the associated challenges due to the interdependencies they entail and variety of social groups and interests involved. Especially when investigating sustainability matters, tackling the issues above requires academic and non-academic partners synergizing in a reflective and action-oriented approach (Popa et al., 2015) for knowledge co-production (Norström et al., 2020).

This research builds upon a qualitative case study, which also accommodates the dynamics occurring at the national level (Yin & Campbell, 2018). The idea of this paper emerged from the persons involved in independently establishing PAs, i.e. members and supporters of the CAMP Alatoo Public Foundation (PF) and Baiboosun Jaratylysh Korugu PF, eager to contribute to a reflective effort on the actions they have been carrying out. Together with a geographer, they engaged in co-designing this study to deepen comprehension of governance in a setting where stakeholders with different backgrounds come together to protect mountain ecosystems.

The data were harvested via collaboration with both of the aforementioned entities by means of interviews and workshops for local farmers (involved in livestock, fruit and crop production), hunters, local authorities (municipalities, district, and oblast), as well as administrative bodies (agricultural production, water management, pasture management, and PAs) during the period spanning 2019 through 2025. The data were assembled in the form of unpublished reports and completed by interviews. The qualitative analysis was conducted by the geographer, and the results were cross-checked with the rest of the team at different stages of the research.

3. Results and discussion

3.1. Community action as a conservation lever

Ton District (Fig. 1) is mostly composed of alpine meadows and sub-alpine ecosystems. Its territory has been historically renowned among hunters for its rich biodiversity, including large mammals. Snow leopards play the role of an umbrella species, as they rely on a variety of prey occupying various habitats at different altitudes in mountain ecosystems. In the 2000s, however, hunters became increasingly aware of the decline of game due to proliferating poaching and land use changes. In response, in 2016, endorsed by the Department of Biodiversity Conservation and Protected Areas (DoBCPA) under Ministry of Nature, Ecology and Technical Supervision (MoNETS) of the KR, the Ton District Hunter and Fisher Association (Ton District HFA) launched a series of efforts. The agreement signed with the Department for Rational Natural Resource Use (DRNRU) of the State Agency for Environmental Protection and Forestry under the Government of the KR aimed to ensure year-round protection of wild animals and their habitats on the hunting-reserve area of 156,000 ha (of the 723,000 ha of the total district's area). In 2019, scientists from the Academy of Sciences of the Kyrgyz Republic conducted the inventory of fauna and vascular plants, as well as identified those listed in the national Red Book; they also zoned the area according to the present ecosystems and elaborated preliminary conservation recommendations.

This initial stage in creating the PA in question was supported by a change in cognitive framing. The first shift took place among the Ton District HFA membership - they started diverting from game extraction to focus on ecosystem conservation. The engagement of the scientific community likewise contributed to permitting different stakeholders to find a common ground by assessing the status quo and showing potential conservation prospects (Fig. 2). An ES bundle was identified around alpine ecosystems: pastures utilized for animal grazing, landscape features attracting tourists and bearing patrimonial and historical value as well as providing habitat for biodiversity. These ESs were compatible and reinforced each other.

The PA's title - Baiboosun - as well as its location are deeply rooted in the history of imperial violence. The locals refer to the popular story of a man named 'Baiboosun' that lived in the area back in the time when the Russian Imperial Army forcibly conscribed Central Asian males to fight on the frontlines of the First World War and violently suppressed the uprising that followed. As many other residents of Issyk-Kul Region, Baiboosun decided to flee to China (Drieu et al., 2020) to avoid that. As he couldn't take all his horses with him, he left them in a hard-to-access high valley. After some years, as he decided to come back, he was anxious if his livestock would still be where he had left them. To his surprise, not only were the horses still there, but they thrived in his absence.

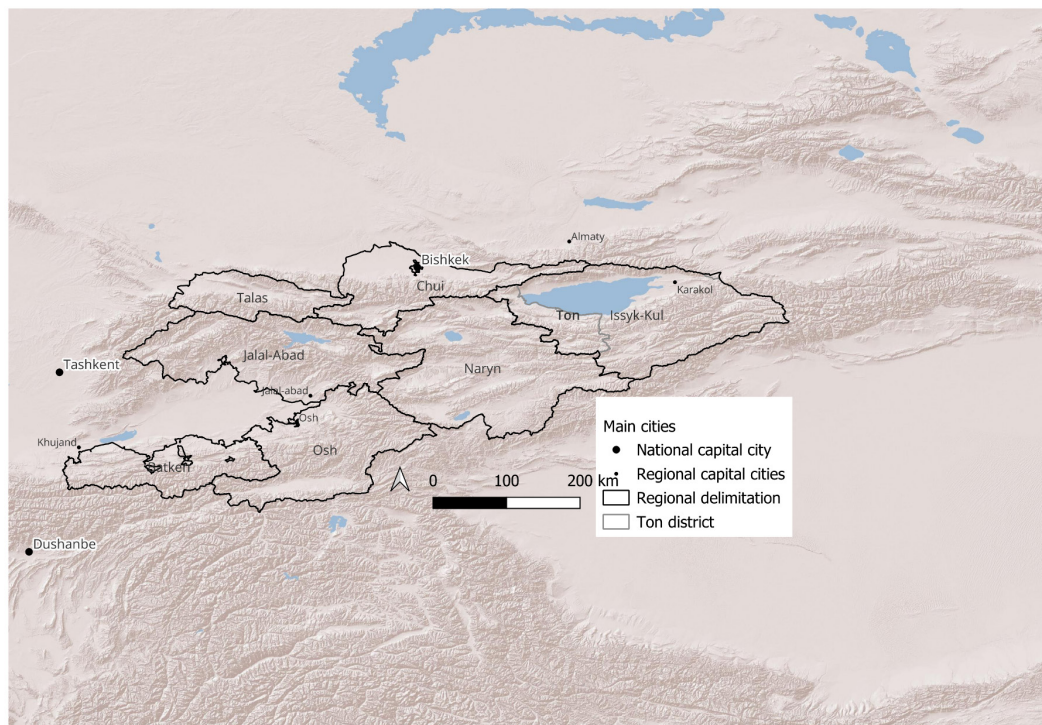


Figure 1. Map of Ton District and Oblast of the Kyrgyz Republic (source: I. Mestre based on data of OCHA and ESRI).

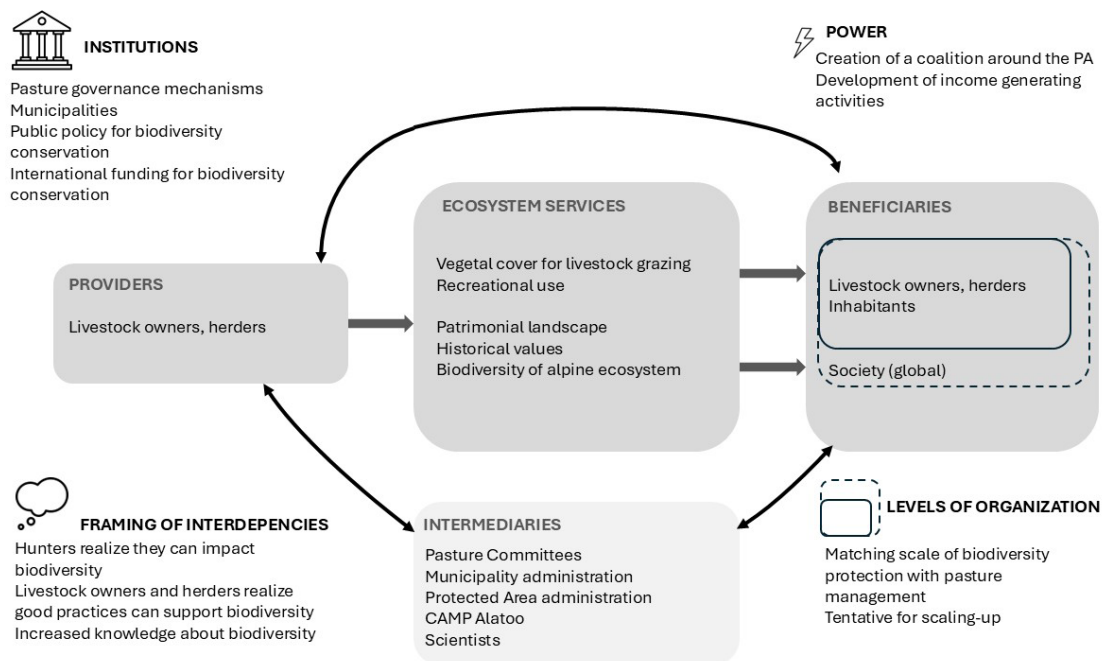


Figure 2. Main social interdependencies in the action arena in a newly created protected area, balancing agro-pastoralism and biodiversity (adapted from Barnaud et al., 2018).

3.2. Creation of a local alliance with pasture managers

It is acknowledged that the majority of biodiversity challenges in the region are attributable to the anthropogenic impacts on natural ecosystems, more specifically, of pasturelands. In early 2019, the Ton District HFA initiated the establishment of a PA, and following the endorsement of this proposal by the CAMP Alatoo PF, the inaugural pilot micro-reserve was created the same summer. Its status - much more protective than the 2016 agreements - aimed to regulate poaching but did not entail a conservationist approach.

With the support of CAMP Alatoo, a pilot area of 10,000 ha was identified jointly with pasture committees, municipalities, and HFAs to establish a micro-reserve. Located in the southern part of Ton District and under the jurisdiction of various Ton District municipalities, the area encompasses meadows falling under the status of state reserve lands and pasture lands administered by the municipalities of Tort-Kul, Bolot Mambetov, and Kol-Tor. At the outset of the process, four municipalities were included: Kun-Chygysh, Ton, Tort-Kul, and Bolot Mambetov. However, due to low involvement, Kun-Chygysh and Ton ceased their participation. Later on, the municipality of Toguz-Bulak showed interest in stepping in and subsequently engaged in the process.

The establishment of this PA was facilitated by the Memorandum of Cooperation signed by the heads of the DoBCPA of the MoNETS of the KR, Administration of Ton

District, three municipalities (Toguz-Bulak, Tort-Kul, and B. Mambetov) and their PCs, as well as CAMP Alatoo and Ton District HFA. At first, the idea was that biodiversity would be supported through a set of measures to enhance pasture management: less livestock grazing on pastures, better balancing of the carrying capacity, and later use of summer alpine pastures.

The area designated for conservation has been historically utilized as seasonal pastures by the local population, predominantly reliant on agropastoralism for sustenance and revenue generation. Pasture management has undergone substantial transformation since the country's independence in 1991. In 2009, the pasture management authority was entrusted to local communities through the establishment of pasture committees, that became responsible for collecting pasture user fees, drafting and implementing grazing plans, and facilitating sustainable pasture resource use. The fees collected by PCs were intended for the enhancement of pasture conditions and rehabilitation of degraded pasture ecosystems. The collection of fees was of critical importance to PCs, as they served as the primary source of financial support for infrastructure efforts at pastures as well as remunerating PC employees. Concurrently, the sustained growth in livestock populations since 1991 has likely contributed to pasture degradation, although this issue remains contentious (Isakov & Thorsson, 2015; Robinson, 2016). Nevertheless, the actions aimed at restoring pasture ecosystems and their biodiversity, i.e. the central tenets of the Pasture Reform, continue to be neglected due to various factors. Firstly, the government has utilized budget size as the primary metric for evaluating PC performance. Secondly, there was a lack of national-level monitoring to assess the condition of pastureland and biodiversity, overall impact of pasture management, and grazing plans. Consequently, the issue of biodiversity conservation emerged as a complementary dimension of pasture management efforts. Pasture management has been inherently associated with resource utilization, in contrast to nature conservation (Mestre, 2017).

At the local level, the Baiboosun PA and PC entered into a partnership to collaboratively define pasture management actions strengthening biodiversity. This approach was preferred over the exclusion of livestock from the PA territory, perceived by managers as detrimental for two main reasons. First, it could lead to human-wildlife conflicts with local herders limited in their alternative livelihood options (Anarbaev, 2022). Second, the efficacy of such micro-reserves was contingent on the absence of coercion against the backdrop of inadequate control mechanisms. The financial constraints associated with fencing and patrolling the territory to avoid herding appeared prohibitive. In this context, conservation is understood as regulated and collectively managed use rather than strict exclusion, aligning biodiversity objectives with continued agropastoral activity.

The coalition supporting the PA's creation comprised a range of stakeholders and managers with jurisdiction over the territory and influence over local natural

resource use. By adjusting and integrating the most active and involved municipalities, the initiators ensured strong commitment to biodiversity conservation with the risk of creating a divide with the wider area.

3.3. Development of a management plan to foster participation and scaling up prospects

In 2020, as per the recommendation of the DoBCPA of MoNETS, the area of the Baiboosun micro-reserve was expanded to approximately 14,000 ha. In 2023, after an additional functional zoning study to better understand the ongoing biophysical processes and assess biodiversity, more land was added, and the PA reached 38,000 ha (CAMP Alatoo, 2023) based on the principle of ecosystem integrity.

The management plan for the Baiboosun micro-reserve aims to:

- Protect local biodiversity from poaching,
- Ensure a balanced use of vegetation cover for grazing,
- Generate and disseminate knowledge.

These actions are carried out with a strong focus on community engagement in the PA management. For instance, local rangers underwent training on reserve patrolling, monitoring biodiversity, and enforcing anti-poaching measures. Most of them were former professional hunters who could mobilize their competencies and knowledge for conservation after the hunting ban.

The actions included in the management plan can be divided into awareness-raising and management activities (Table I.). The plan's execution is mainly hindered by the lack of administrative resources at the local level, making it difficult to report in the formats required by NGOs, international actors and local administrations.

Elaborating an economic model to ensure financial sustainability - with no or extremely limited state subsidies as the source of PAs income in the Kyrgyz Republic - manifests a crucial issue for promoting similar community-led initiatives in the future. Tourism and high-value local product value chains look promising, but their creation requires time and investment. In addition, potential local suppliers/vendors need thematic knowledge and skills, including on starting local commercial partnerships and, above all, on building their communication strategies. Tourism revenues are often used to support conservation efforts, albeit the trade-offs between the two objectives (Spenceley et al., 2019). This potential tension highlights the need for carefully designed economic instruments capable of reinforcing conservation objectives without generating new ecological pressures.

Table I. The Baiboosun Micro-Reserve Management Plan: Main objectives and activities.

Objectives	Awareness raising	Management
Protection of local biodiversity from poaching	Informing local residents about the ecological consequences of activities like root digging.	Equipped with tools like camera traps and GPS devices, community rangers conduct regular patrols to deter illegal activity.
Balanced use of vegetation cover for grazing	Workshops on sustainable pasture use for pasture users.	Drafting grazing management plans based on the Grazing Response Index (GRI) methodology. GRI is a tool devised to assess grazing impacts on pastures (Reed et al., 1999) adapted for the Kyrgyz Republic. Coordination efforts to harmonize the management plans amongst different pasture managers. Infrastructure efforts to enhance access to remote pasture and lower pressure near settlements.
Knowledge generation and dissemination	Environmental education courses in local schools on fauna and flora with exercises and games. Participatory Monitoring via designing a mobile app to enable community members and tourists to record wildlife sightings. These data contribute to the centralized biodiversity database.	Creating a core zone (75% of the PA territory) where only research activity is allowed.

With the government announcing a 10% expansion of the PA area by 2040, the Baiboosun initiative could serve as a pilot for future scaling up (Government of the KR, 2018). Since the launch of the PA, CAMP Alatau took part in the working group drafting resolutions to foster the legal framework updating, which is essential to streamline community-based PAs in legislation. The Chairperson of the Cabinet of Ministers of the KR signed the Procedures for Establishing and Operating PAs of Local Significance and Micro-Reserves on October 7, 2022. The document forges the legal basis for active and full-fledged involvement of local communities in biodiversity conservation. However, certain limitations still remain in the sphere of nature conservation. The categorization of PAs is a complex process further exacerbated by the absence of clear criteria. In terms of management, there is no unified methodology on assessing anthropogenic pressures and monitoring PA performance.

The Baiboosun PA Administration has been actively sharing its experience with other groups striving to establish protected areas on the southern shore of Lake Issyk-Kul (Chong-Jargylchak District) and north-west of the lake (Chong Kemin District). The PA Administration, CAMP Alatoo, and the municipalities perceive economic activities as a way to ensure adherence to the PA requirements and limit injustice. The livestock owners and herders who need to adapt their grazing practices to allow biodiversity regeneration would be more likely to do so with the economic incentive of gaining new revenues through tourism.

3.4. Multifunctionality and community-based management: a synergy?

The PA supporters integrate a bundle of ESs in their management: vegetation cover for livestock grazing, cultural and historical values, recreational use, as well as biodiversity. However, it is still necessary to identify conflicting and mutually supporting ESs (Conrad et al., 2023).

Quite interestingly, they were capable of achieving coordination with the diversity of stakeholders and managers involved in a single territory. The involvement of HFA for the conservation of local biodiversity and community efforts to balance different ESs through SI echoes the debate regarding local community engagement in nature conservation. Such engagement can take different forms, e.g., ownership, governance, or management (Borrini-Feyerabend et al., 2013; Eagles, 2009). The main principles for good PA management were identified by Nguinguiri (2004) as the capacity of local stakeholders to partake in decision-making processes, transparency, and access to information. They also include subsidiarity and decentralisation, also described by Ostrom as the key principles for common-pool resource management (1990).

4. Conclusion

The creation of the first community-led micro-reserve in the Kyrgyz Republic became the result of collaborative efforts by diverse stakeholders at different levels. At the local level, it was initiated by the Ton District HFA with the support of the community-based pasture management body and facilitated by the municipalities concerned that mediated SIs around ES provision and use. Those efforts were strengthened by the coordination and technical assistance of CAMP Alatoo, a national-level NGO that - jointly with state agencies - contributed to the national-level legal transformation, as well as managed to mobilize funding.

The identification of ES bundles and trade-offs is key to the management of the Baiboosun Micro-Reserve and could also inform the process of scaling up this model across the country. To support the territory's multi-functionality, it is essential

to clearly understand which ESs are more favourable to bundled management, how stakeholders interact in ES management and governance, and how ES provision, in turn, influences SIs (Barnaud et al., 2018).

The authors propose the two main perspectives for future research. Firstly, further investigation is necessary to gain additional insights on how the target PA is integrated in the larger territory of Lake Issyk-Kul's southern shore, as well as on how conservation can support maintaining natural infrastructure, e.g., the PA's capacity to forge a network and support biodiversity connectivity, provide clean water, etc. International literature shows how PAs can provide intermediate regulation services (related to water and biodiversity) supporting farming in a larger area (Castro et al., 2015). Secondly, an assessment of the ESs provided by the Baiboosun Micro-Reserve could highlight the plural values created and shift the focus away from solely monetary valuation (Arias-Arévalo et al., 2018).

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MZh, IM, CAMP Alatoo PF and Baiboosun Jaratylysh Korugu PF conceived and supervised the study. MZh, CAMP Alatoo PF and Baiboosun Jaratylysh Korugu PF collected and organized the data. IM developed the conceptual framework, analysed data, wrote the paper and made manuscript revisions.



Citizen involvement in budgeting and self-governance in Northern Kazakhstan: Achievements and lessons learnt

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ABSTRACT

In Central Asia, participatory stakeholder approaches and citizen engagement in self-governance have been so far applied rather sporadically. This brief essay thematizes the lessons learnt from executing multiple projects in this field of participation in the Republic of Kazakhstan (RK) over more than two decades. Based on the experience of the Decenta Foundation, the author reflects upon participatory decision making involving ordinary citizens - ranging from participatory public budgeting to local-level urban planning under numerous initiatives. As the Decenta Foundation director, the author outlines his thoughts on how participatory methodology at the local and oblast levels can improve decision making in otherwise authoritarian settings. The article may excite other Kazakhstan constituencies, rural districts and municipalities to embark on similar efforts.

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1. Introduction

Based in Pavlodar City, capital of Pavlodar Region (Oblast) in northeastern Kazakhstan, the Decenta Foundation has been advancing local self-government and citizen involvement in territorial management on the local level since 2002. The corresponding actions comprise in particular, but not exclusively, engagement of citizenry in designing public infrastructure in several industrial centres in Northern and Central Kazakhstan, and participation of local communities in public budgeting. This short communication summarizes Decenta's efforts along these two avenues, as well as sketches out chances for and risks of broader citizen engagement in governance, based on the relevant experiences and lessons learnt.

2. Methodological background

In the course of more than 20 years of its operation, Decenta Foundation has partaken in and implemented several projects in the field of citizen participation. The Foundation's extensive real-life experience inter alia includes the application of participation tools in the course of devising the regulatory framework for local self-government in Kazakhstan since 2003 (draft laws on local self-government, recommendations for the Concept of Local Self-Government Development in the RK).

Participatory public budgeting

A large part of the Foundation's efforts since 2010 has focused on citizen involvement in local-level budgeting. Adapting international knowledge and practices to Kazakhstan's context, Decenta has elaborated a methodology to investigate the openness and transparency of budgeting procedures, and has been consequently holding regular targeted research as well as thematic trainings for civil society organizations (CSOs), students and faculty, and the media.

Fifteen years ago, several CSOs and Decenta Foundation, jointly established the National Budget Network of Kazakhstan (NBNK). The Network's specialists and experts reviewed the experience of the Open Budget Partnership - an international organization that had previously elaborated a methodology for comparing the openness of state budgets (also in [Khagram et al., 2013](#); [Jung 2022](#)). Based on this model, NBNK drafted its own methodology to collate the degree of regional budgets' openness. After piloting the tool in 2011, the Network launched a research initiative to weigh the levels of openness of constituency-level budgets every two years. This intriguing experience showed that despite the unitary government form and single legal framework for the entire country, a number of Kazakhstan's oblasts demon-

strated higher OLBI (Open Local Budget Index) indicators. For instance, for several years in a row Eastern Kazakhstan Region led the rating due to the availability of open-access reports on all stages of budgeting process, as well as the proactive stance of oblast maslikhat [local representative body (parliament) in Kazakhstan] that likewise published reports on its activities. Overall, the research pointed to a limited interest in local budgeting processes on behalf of general public (Gustafson & Hertting, 2016), echoing the international experiences, e.g., the extensive investigation on the participatory municipal budget of Porto Alegre in Brasil (1989-2004), one of the global forerunners in the field (Sintomer et al., 2008; Marquetti et al., 2011; Calisto Friand, 2019). To popularize knowledge about budget and budgeting, Decenta developed special business games (Everything I Want to Know About the Budget) for students that demonstrated higher knowledge-retention efficiency than regular information (awareness) campaigns.

The Public Participation Budget (PPB) Program has become a useful initiative of the RK government. The Decenta Foundation has been actively supporting and promoting the Program, that allowed thousands of citizens of Pavlodar, Northern Kazakhstan and Eastern Kazakhstan Oblasts contribute to urban public space improvement efforts, as well as design and execute dozens of projects instrumental to various territory enhancements since 2019.

Like most other government programs, PPB had a serious gap in terms of informing citizens about its existence and requirements (Ebdon & Franklin, 2006). Mobilizing resources from external sources, Decenta Foundation conducted an awareness-raising campaigns for apartment residents jointly with its trusted partners, i.e. chairpersons of apartment owner cooperatives, heads of service companies, etc. Thanks to personal meetings and consultations, the PPB Program captured the attention of multiple apartment residents, who eventually decided to design their own projects to enhance urban spaces, primarily courtyards. Decenta accompanied such citizen groups by rendering legal advice, making inquiries to land authorities, public utilities (e.g., regarding ownership of land plots, presence of underground utility networks, etc.). In addition, the Foundation engaged professional architects to assist in drafting necessary designs and blueprints; trained stakeholder residents on how to discuss their ideas with neighbors, as well as hold small-scale surveys, courtyard/neighborhood meetings; and moderated the corresponding events and processes. As the result, all projects supported by Decenta were recognized as winners, receiving the largest number of votes from city residents at the electronic voting stage.

The Tugan Qala Project - under implementation in several single-industry cities of Aktobe, Kostanai and Pavlodar Regions since 2021 - is of particular interest and relevancy for this article. Thus, in the city of Aksu (Pavlodar Oblast) at least 4,000 citizens annually participate in altering or improving urban spaces like courtyards,

roads, parks, beaches, etc. The Project is unique as it is sponsored by a private corporation - ERG. Also, Decenta Foundation possesses the experience of involving citizens in designing the Usolka Eco-Park (Pavlodar), Shakhtyor Park (Ekibastuz), as well as in renovating public libraries in several cities.

Participatory local governance

Since October 2023, Decenta has been implementing the Participatory Governance - Shared Responsibility Project supported by USAID Central Asia. This activity is based on over 20 years of the Foundation's experience of local- and national-level collaborations - with rural communities, local governments, city authorities, and CSOs. The Project's strategy is to be demand-driven, sensible to local needs and concerns, and pull together the efforts of various stakeholders to achieve common goals. The goal of the Project is to build the capacity of local governments, self-government and civil society organizations for effective interaction and joint resolution of local issues ([Moldogaziev & Witko, 2022](#)). Some of the anticipated results include ramping up the potential of rural communities; promoting civil society engagement in drafting local self-governance concepts; enhancing legislation and law enforcement practices pertaining to the aforementioned PPB Program.

A significant share of Project efforts in 2023-2024 were geared towards improving regulations (via liaising with central government agencies, i.e. Ministry of National Economy and Ministry of Finance of the RK), and upgrading the quality of operations of local administrations at the very grass-roots level - in rural districts. Thus, at the central (national) level, Decenta drafted recommendations regarding the new Concept of Local Self-Government Development in Kazakhstan planned for adoption in late 2025. In the absence of a full-fledged law on local self-government, it is this Concept that remains the core document regulating the sphere. Moreover, the Foundation's subject matter experts offered their recommendations to fine-tune the legislation regulating the Public Participation Budget Program.

In terms of engaging with rural districts in four project constituencies (Pavlodar, Western Kazakhstan, Zhetysay, and Ulytau Regions), the goal was to build local community capacities, promote better governance, and boost local budget revenues by 20%. In Kazakhstan, for a long time local communities of rural districts did not enjoy budget schemes at all. The 2019 national reform in the sphere of local self-government introduced the new - forth - budgeting tier specifically for rural districts ([Emrich-Bakenova, 2022](#)). In practice, local communities and akims [heads of local executive government bodies] had little budgeting experience; and own local funds were insufficient to cover even most basic costs. Therefore, within the framework of the Project, Decenta held participatory consultations with local communities in

20 rural districts to jointly assess specific local needs and requirements, as well as mastermind territorial development plans for the coming years. Local partners and financial consultants, contracted by Decenta, assisted in drafting the plans that were subsequently distributed among local citizens and akimats [local executive government bodies]. Memoranda of understanding were signed with several akimats thanks to this engagement as well.

The Decenta Foundation is currently planning to assist local communities in implementing the corresponding recommendations, as well as train local community representatives and akims. Several urgent knowledge and competency needs are related to strategic planning, tax administration, community communications, and local entrepreneurship. The Foundation's experience also proves the demand for additional information on state support measures for rural residents and entrepreneurs, farmers, etc. Our observations likewise indicate the lack of development plans in the majority of rural districts, or their elaboration with insufficiently thorough assessment of external and internal factors - making such plans not viable from the start.

The Decenta's working hypothesis for launching efforts in rural areas states that local communities jointly with akimats are capable of boosting local budget revenues by 15-20% with minimal effort and expenditure. It can be achieved via a transport tax on local residents going directly to local budget, as well as via competent land resource and real estate management. It is also important to clearly understand the needs of local businesses operating in rural areas to aid them with relevant informational, legal, and technical support. In turn, prospering local entrepreneurship will inevitably generate higher tax revenues hydrating local budgets. However, as it turned out in the course of executing the Project, local communities and akims lacked knowledge, experience, and often outside perspective allowing them to comprehensively and objectively evaluate specific local situations and make appropriate strategic decisions. On multiple occasions, the articulated requests circled around devising an effective model to boost local tourism (Tiberghien, 2018); as well as training on financial models for individual business areas. Responding to such requests, in a rural district in Western Kazakhstan Oblast the Project piloted an internship offered to local residents acquainting them with the experience of a bottled water production business.

3. Results and discussion: chances and challenges of participatory approaches in Kazakhstan

The Decenta Foundation believes that participatory approaches to territorial management (both rural and urban) possess several advantages, including:

- Sharing responsibility for decisions made - in most cases, government bodies are

eager to make decisions swiftly, so they do it on their own without proper citizen engagement and, consequently, cannot expect any sympathy or understanding on behalf of local populations;

- Value of changes made - when offered a ready-made solution people often do not comprehend its value, time and effort spent on its development, as well as technical, financial and other resources required for its implementation. Involving citizens in the planning process therefore gives them the opportunity to learn the true ‘cost’ of the decisions made;
- Moving away from paternalism and dependency - one of the common perceptions is that people are generally inert, indifferent, and lack initiative per se. Yet, the truth is that very often it happens because people do not believe that the government is truly interested in their opinion. Therefore, involving citizens in governance allows them a chance to demonstrate their pro-activeness, desire to contribute/make a difference, as well as implement corresponding actions positively and productively;
- Growing trust in government (one of core elements) - to regain people's trust, it is important for state agencies to demonstrate that they not only listen to common people, but seriously consider their complaints, suggestions, recommendations, and then act to implement them. It should be an honest and consistent process with a clear and tangible result, in which people see not just the administration's concern regarding their problems, but also a solution;
- Collecting additional opinions and possible solutions - involving citizens makes it possible to look at challenges/issues from different angles and, accordingly, evaluate a broader range of potential resolutions;
- Boosting civic engagement.

Real-life deployment of the approach illuminates certain not so obvious challenges and limitations, e.g.:

- Lack of widespread practice (culture) of utilizing participatory methods;
- Lack of knowledge, skills, and abilities in involvement;
- Deviation from the algorithms of involvement (“we need to do everything quickly”);
- Lack of guarantees regarding the implementation of decisions made;
- Lack of a legal framework.

4. Conclusion

Despite the bottlenecks above, we believe it is the involvement of citizens in governance that should become a ‘norm’ for government agencies and local self-governments in Kazakhstan. Over the past two years, Decenta has gained experience

of operating in geographically diverse areas of the country. Each oblast (region) has its own economic, natural, social, and cultural peculiarities vital for consideration while planning and executing citizen involvement efforts. Our experience shows that the greatest effect can be achieved when a local administration accepts the offer of assistance and tries to create conditions for fruitful cooperation - constructive liaising and interactions with local administrations, and them vis-à-vis actual communities, manifests a key pre-condition for effectively addressing local issues. In recent years, the central government has proposed robust reforms to nurture local self-government, including by way of ensuring financial and economic sustainability of rural districts, vesting local communities with greater powers, electing local akims, etc. Yet, localities often lack explanatory and consultative support, which can be potentially offered by CSOs. Such concerted actions by all interested parties and stakeholders can forge a solid foundation for as well as guarantee effectiveness and efficacy of the declared reforms.

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