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Local articulations of climate action in Swedish forest contexts

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ABSTRACT

Local actors are recognized as key drivers for climate action. Making climate change relevant and possible to act on in local contexts is thus a critical undertaking for both researchers and society at large. Connecting climate change to people's known surroundings and experiences, and framing climate action in relation to everyday practices in the local context, might then be crucial to making climate change relevant and actionable on the local level. In this paper, we explore the potential of forests to serve as such a connection. We have worked in close collaboration with a broad range of stakeholders in two case study locations in Sweden to explore potential courses of action for local climate action in relation to forests. We critically analyze these local articulations of climate action and examine the assumptions underlying them, with the aim to assess the effects and consequences of different problem representations. Our results illustrate the challenges of thinking and acting outside of the prevalent business-as-usual or more-of-everything discourses, of recognizing the importance of politics and choice, and of overcoming perceived barriers to action. We find tensions in the allocation of responsibility in both time and space – but also potential room for more local action in assumptions of un- or underused potential for political and civil action on the local level.

1. Introduction

Societal and governing responses to challenges associated with climate change are front and center to many of today's most pressing political and academic discussions. While there is broad consensus on the fact that humans are significantly influencing the climate system, there is considerable disagreement on questions of how, where, when, by whom, and for whom measures for climate change adaptation and mitigation should be initiated, decided, and implemented (Bäckstrand and Lövbrand, 2019; Hulme, 2015). Critically assessing the ways in which climate change policies, the problems they are meant to solve, and the subjects and objects they are intended to govern are constructed and understood is therefore central to the analysis and development of climate change policies (Leipold et al., 2019). In this paper, we delve into this task with the nexus of climate change, local action, and forests as our entry point.

Climate change is a global challenge, but its causes, consequences, and solutions span geographical and political scales from the local to the global. The local level has often received particular attention in climate policy studies, as local actors, local governments, and local communities are considered key drivers for climate change measures (cf. Aguiar et al., 2018; Amundsen et al., 2018; Lambert and Beilin, 2021). However, when dominating climate change discourses construct climate change as a spatially and temporally distant threat, they tend to curtail local capacity for action, as experts and global political arenas become the logical authorities to handle these abstract and complex issues (Heymann, 2019; Ruiz et al., 2020). Mismatches might also occur between general policy recommendations and local understandings and local capacity of climate change and climate action (Hulme, 2009; Nalau et al., 2015).

Making climate change relevant and possible to act on in local contexts is thus a critical undertaking for both researchers and society at large. Focusing on forests might offer a way to connect climate change as an abstract, global dilemma to concrete actions on the local level. Forests, with their ability to sequester and store large amounts of carbon, as a source of renewable fuel and material, and as producers of many ecosystem services, are pivotal to climate change adaptation and mitigation (Bowditch et al., 2020; Hansen and Malmaeus, 2016; Verkerk

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et al., 2020). Like the climate and climate change, the temporal scale of forest landscapes and forest governance is cross-generational. Moreover, just as different conceptions of climate change underpin differing policy responses, the way forests and their uses are conceptualized is crucial to governance and management schemes (Leipold, 2014). In contrast to the climate and climate change, however, forests – to many people – represent something concrete, something that is possible to have a relationship to. The forest might thereby be useful to forge a connection between climate change as an overarching, global dilemma, and tangible actions on the local level. This assumption seems particularly plausible for Sweden, whose forests are of great importance both for the country's economy and for the large proportion of its population that owns, uses, spends time in, or otherwise relates to and engages with forests (KSLA, 2015; SCB, 2021). The role of Swedish forests and forestry actors in climate change adaptation and mitigation is a prominent theme in ongoing public and academic debates in Sweden, and major actor groups differ significantly in their understandings of policy problems and strategies for implementation (Andersson et al., 2022; Sténs and Mårald, 2020). These debates connect to current global discussions on the role of forests and of actors on different levels for climate action, including work under the Paris Agreement and in relation to the EU Green Deal (Aggestam and Giurca, 2021; Amundsen et al., 2018).

For this paper, we have explored potential courses of action for local climate action in relation to forests in Sweden, working in close collaboration with a broad range of stakeholders in two case study locations. The aim of the paper is to critically analyze these local articulations of climate action by addressing the following research questions:

- What is the problem represented to be in local forest stakeholders' articulations of climate action?
- What assumptions underlie these problem representations?
- What are their potential effects and consequences for local and forestry-related climate action?

We thereby respond to the suggestions from previous research to attend to the contextual effects of discourses on climate change and climate action, including local and personal perceptions and experiences of climate change and its effects. This paper thus contributes to the larger efforts to make climate change relevant and possible to act on in local contexts. Drawing on collaborative processes for knowledge co-production, the study also speaks to the growing literature on how, and in collaboration with whom, gaps between science, policy, and climate action might be bridged (André et al., 2021; Tengö and Andersson, 2022).

Following this introduction, we give a brief background on the nexus between climate change, forests, and local climate action in Sweden. We then describe our theoretical and methodological points of departure and detail the setup of the stakeholder workshops that form the empirical basis for this study, before presenting our analysis of the empirical material and conclusions.

2. Climate change, local action, and forests

Climate action is here understood as efforts to minimize negative impacts of climate change (or take advantage of its positive impacts) on humans and ecosystems. It can include mitigation strategies, aiming to reduce greenhouse gas (GHG) emissions and increase GHG sinks, and adaptation strategies, focusing on responses to the effects of climate change (IPCC, 2014). While often treated separately in both research and policy, these two types of strategies are closely connected, and the relationship between them holds potential for both synergy and discord (Duguma et al., 2014; Kongsager, 2018; Locatelli et al., 2011). Common understandings of "climate action" as a policy area also encompass both mitigation and adaptation strategies (cf. Werners et al., 2021). For the purposes of this study, we use "climate action" to signify a broad spectrum of strategies to respond to climate change challenges and opportunities.

Dominant global environmental discourses tend to situate effective mitigation and adaptation measures on the global and national levels, thereby affecting social and relational factors that reduce the capacity of local stakeholders (Mårald et al., 2017; Priebe et al., 2021; Sousa-Silva et al., 2018; Uggla and Lidskog, 2016). Local climate action is thus contingent on overarching discourses that affect understandings of possible actions, possible actors, and their opportunities and limitations on all level of politics and administration. It is also embedded in local socio-ecological and cultural contexts, which affect its conditions. Previous research suggests that responses to climate change on the local level depend on perceptions of local effects and personal experiences of climate change (Blennow et al., 2012; Ruiz et al., 2020). Connecting climate change to people's known surroundings and experiences, and framing climate action in relation to everyday practices in the local context, might then be crucial to making climate change relevant and actionable on the local level (Stoknes, 2014). In Sweden, where forests cover 70% of the land area, forestry is one of the country's most important economic sectors, and a third of the population spends time in the forest at least once a week (SCB, 2021; Swedish University of Agricultural Sciences, 2023), the potential of forests to serve as such a connection warrants exploration.

Swedish forestry actors may perceive some of the expected effects of climate change as beneficial – including a longer growing season and expanding markets for biobased products (Andersson and Keskitalo, 2018; Sandström et al., 2020). Nonetheless, Sweden will also need to adapt to negative effects of climate change, including potentially greater risks of damage caused by storms, droughts, fire, or insect and pathogen outbreaks (Keskitalo et al., 2016; Seidl et al., 2017). Both Swedish policymakers and the Swedish forest sector are optimistic regarding the capacity of existing forest resources and the potential of climate change mitigation in and through Swedish forestry (Gustavsson et al., 2017; Iordan et al., 2018; Lundmark et al., 2014). However, the tendency of Swedish forestry to prioritize production values over environmental conservation goals affects the climate change adaptation and mitigation strategies of the forest sector (Andersson et al., 2022; Beland Lindahl et al., 2017). Moreover, the complex structures of ownership, governance, and multiple and overlapping uses and systems of rights in the Swedish forests affect both forest owners' autonomy and the state's abilities to govern and control (Andersson and Keskitalo, 2018; Danley et al., 2021; Keskitalo et al., 2016; Mårald et al., 2017).

Forests are central to discussions on climate change adaptation and mitigation (Seidl et al., 2017; Verkerk et al., 2020). As argued by Mårald et al. (2017), forests and forestry are of national importance in Sweden – not only to forest owners or those directly dependent on forest resources, but to everyone. The Swedish right of public access[1] allows the public to travel, camp, and harvest wild berries, mushrooms, and flowers in any forest (Sténs and Sandström, 2014). Outdoor recreation, including walking or hiking in forests, hunting, and fishing, is popular (Fredman et al., 2012; SCB, 2021). In the north, the Indigenous Sámi people have land use rights in relation to reindeer herding (Allard, 2022). Economic, social, political, and cultural actors, including both state and non-state organizations, are active participants in this societal arena, and forests and forestry are the subject of ongoing public and academic debates – not least in relation to climate change and other environmental challenges (Andersson et al., 2022; Hallberg-Sramek et al., 2020; Holmgren et al., 2022; Jakobsson et al., 2021; Sténs and Mårald, 2020).

These debates reflect tensions between the global relevance of forests in climate change and their role in local lives and the national economy. They are also embedded in current global discussions (and controversies) concerning, for example, forest management and climate benefits, the role of forest habitat and biodiversity preservation for climate change mitigation and adaptation, and the potential of a forest-based

[1] "Allemansrätten" in Swedish; lit. "every man's right".

bioeconomy (cf. Bowditch et al., 2020; Holmgren et al., 2022; Luyssaert et al., 2018). In Sweden, forests anchor both potential conflicts and possible collaborations for climate action in many people's communities and local settings. The Swedish case thus offers interesting opportunities to explore the conditions for local climate action in forest contexts.

3. Methods and material

This study is based on outcomes from two parallel co-production processes to develop pathways for local climate action in forest landscapes, organized as part of a transdisciplinary project combining historical, political, and forest science perspectives on forests and climate change in local contexts (Hallberg-Sramek et al., 2022, 2023, Priebe et al., 2022, 2023; Hallberg-Sramek, 2023). The processes consisted of a series of four consecutive workshops and were carried out with two groups of forest stakeholders in two different locations – one in northern Sweden and one in southern Sweden (see Fig. 1). We focus here on the results of the second pair of workshops, which aimed to develop local political and societal climate action pathways.

3.1. Study areas and participants

Both sets of workshops included participants from two adjacent municipalities, one urban and one rural. In the north, the workshops included participants from Umeå and Vindeln municipalities in Västerbotten County. The workshops in the south were conducted with participants from Växjö and Lessebo in Kronoberg County. Both regions are dominated by forests, most of which are under some form of management (Statistics Sweden, 2022; Swedish University of Agricultural Sciences, 2019). Forestry and forest industries have historically shaped the social and economic development of both regions and are still important for the regional economies. Population density, forest ownership structures, and forest characteristics (e.g., tree species distribution) differ between the two regions (see Table 1). In both regions, there is a wide range of actors with interests and rights in relation to forests, including Indigenous Sámi reindeer herders in Västerbotten (Allard, 2022; cf. Section 2 above).

In total, 31 forest stakeholders participated in the process (17 in the north, 14 in the south). They had been invited based on their role in education (2), environmental organizations (5), the forest industry (7),

Table 1
Descriptive statistics for the regions in which our study areas are located.

	Västerbotten County (north)	Kronoberg County (south)
Population*	276 000	204 000
Area* *	5 488 000 ha	838 000 ha
Forest area* *	3 958 000 ha	692 000 ha
Productive forest area **	*3 190 000 ha*	*665 000 ha*
*Protected and voluntarily set aside forests (of productive forest area)**	*Formally protected: 6.1%* *Voluntary set-asides: 5.1%*	*Formally protected: 2.3%* *Voluntary set-asides: 5.7%*
Forest ownership (proportion of productive forest area)* *	Individual owners: 42% Private companies: 21% State/public owners: 37%	Individual owners: 76% Private companies: 4% State/public owners: 20%

Sources: *Statistics Sweden (2023), * *Swedish University of Agricultural Sciences (2023).

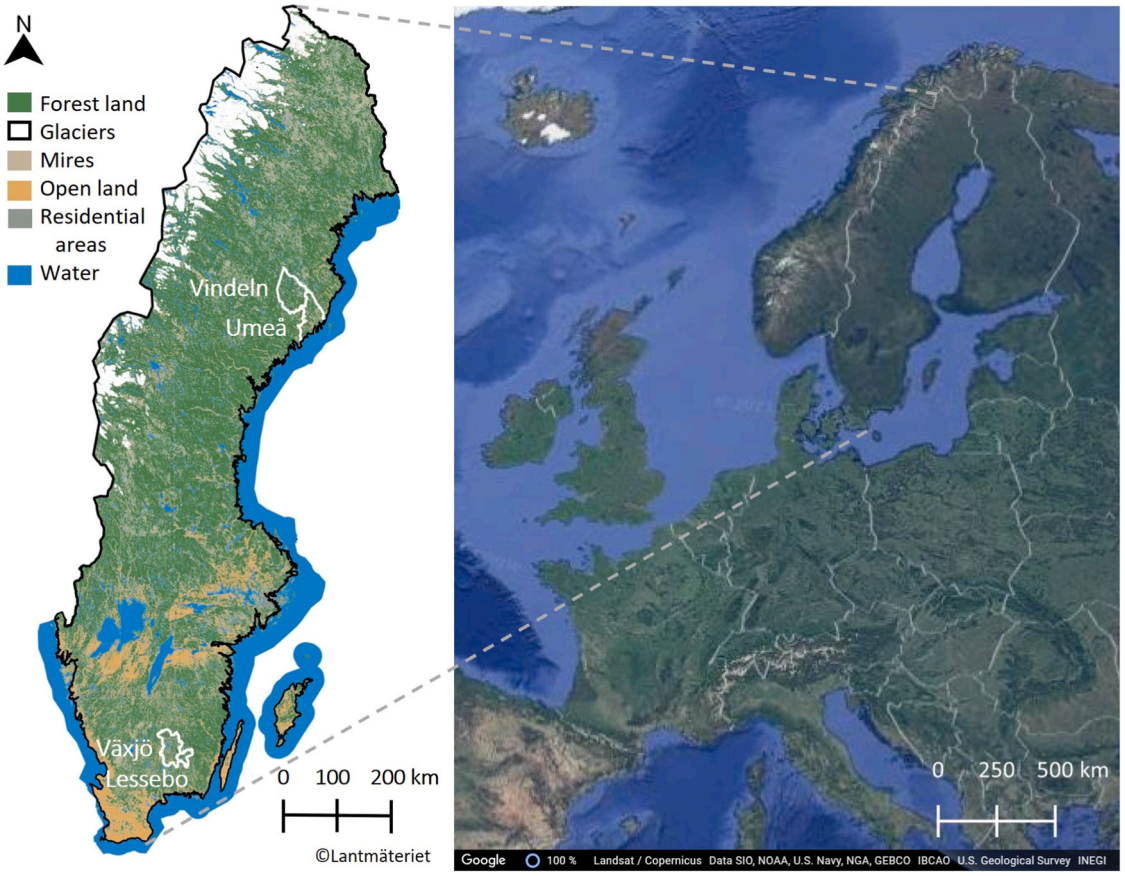

Fig. 1. Map of our study areas in Sweden. Left map was produced in QGIS (https://www.qgis.org) with data from Lantmäteriet (the Swedish Land Survey). Right map was produced by Google Earth using a mix of sources displayed in the figure.

hunting (2), local development (2), reindeer herding (in the north only; 1), tourism and recreation (3), or as individual forest owners (9). However, once in the workshop setting, they represented themselves as individuals and members of their local communities. The groups of participants were determined before the first workshops and stayed the same throughout the process, although attendance varied between the workshops (Hallberg-Sramek, 2023).

While the participants had differing social and economic relationships to the forest, they are (or will be) facing many of the same climate change challenges. Due to their economic, social, and geographical connections to the forest, these forest stakeholders are at the center of the forest-climate change nexus (Sandström et al., 2016; Sténs et al., 2016).

3.2. Study design

We organized two parallel series of four full-day workshops aiming to develop pathways for local climate action, including goals for both policy and forest management, and to communicate the results to local decision-makers and public officials (see Fig. 2). The format, themes, and questions were the same for both groups, while some of the content was adapted to the contexts of the respective areas.

In the first pair of workshops, the participants worked to identify opportunities of learning from past experiences of local collective action and to develop visions for local futures. In the second pair of workshops, the participants focused on political and societal pathways for achieving locally desirable and suitable futures. In the third pair of workshops, conducted in-field in local forests, the participants reflected on different forest management practices in relation to their future visions and pathways to reach them; and in the fourth and final pair of workshops, they synthesized their work and presented prioritized targets to local decision-makers and public officials.

Throughout the processes, we took several measures to manage and mitigate power relations between participants and researchers (Turnhout et al., 2020). Participants who could not attend as part of their employment received financial compensation for their time participating (Frantzeskaki and Rok, 2018). A professional facilitator was recruited to lead and assist in planning the workshops. Drawing on extensive experience from similar meetings and processes in the forest arena, their role in the workshops was to provide structure, facilitate discussions, and handle potential conflicts. They also worked out common ground rules with the participants at the beginning of the first workshops, which were reiterated and used at subsequent workshops (Reed, 2008). Hallberg-Sramek (2023) offers a more detailed description of the process as a whole.

This study focuses on Workshop 2 (see Fig. 2), which was held in May 2019 with 14 participants in the north and 9 participants in the south. The in-depth analysis of this part of the processes follows this study's focus on local climate action as a critical, but complex, piece of the puzzle of addressing climate change challenges. Focusing on the participants' development of local political and societal pathways towards their envisioned futures enables us to concentrate on the possibilities for climate action on the local level, with attention to local contexts, conditions, perceptions, and experiences.

Workshop 2 was set up as a process of participatory backcasting, an iterative process chosen to enable the identification of alternative futures and possible courses to reach those futures (Kanter et al., 2016; Kok et al., 2011; van der Voorn et al., 2020). In this case, the future scenarios were based on output from Workshop 1. In Workshop 1, the participants had constructed visions for their local communities 100 years into the future and reflected on the role of forests in those futures (Priebe et al., 2022). In preparation for Workshop 2, the researchers analyzed the documentation of the participants' future visions (in the form of collages, notes from plenary discussions, and participants' individual written reflections) using the "scenario families" described by van Vuuren et al. (2012) to sort and organize them (see Table 2). Based on this analysis, the researchers compiled four future scenarios for each location, representing four different scenario families, which were presented to the participants at the start of Workshop 2 (see Fig. 3 for an example).

During the workshops, the participants were divided into working groups focusing on one future scenario each. Group divisions were made based on the participants' ranking of which scenario(s) they would most like to work with during the workshop, while also considering ambitions to create groups of approximately equal size. This resulted in four groups in the north (one for each presented future scenario) and three groups in the south (one for each presented future scenario but the one connected to the *Reformed markets* scenario family), where participants were assigned their first or second choice of future scenario.

The workshop activities alternated between researcher presentations, group work, interaction between the groups, and individual reflections. Researcher presentations included an overview of types of policy instruments (regulatory, financial, and information-based; cf. Vedung, 1998); a presentation on forest management alternatives in relation to climate change; and a summary of constructive approaches for local action in the past, identified by the participants in the preceding workshops. In the group work, the participants identified short- and long-term targets and relevant policy tools to reach their assigned future scenario, thus articulating pathways for local climate action (cf. Butler et al., 2022; Cradock-Henry et al., 2020; Harrison et al., 2018). The prompts for the group work and individual reflections included general, overarching questions ("what targets need to be met in order to reach our future scenario?" and "what tools should be used to meet our identified targets?") with cues aimed to focus the discussions on the local level and the role of forests (e.g., consideration of levels for action, follow-up questions highlighting the participants' local contexts, and follow-up questions addressing the use and contributions of forests in reaching identified targets). The facilitator and the researchers did not participate actively in the discussions, but were available to answer questions, clarify prompts, and offer additional cues.

3.3. Material

The group work was documented in the form of collages of post-it notes produced by each group. At the end of the workshop, the participants submitted individually written and anonymous reflections on what targets and tools they thought necessary for the local community to reach their preferred future vision, regardless of the scenario they had worked with during the workshop, and how these related to the role of forests for these actions. The material from the workshops was transcribed, translated from Swedish to English, and coded by the first author. As all authors had been involved in the entire workshop process, participated in the workshops at both locations, and contributed to the documentation, all authors could continuously validate translations and codes throughout the analytical and writing process. We used a software for qualitative text analysis (NVivo 12) to enable detail and complexity in the coding and analysis, inductively developing themes and subthemes following an analytical framework based on poststructural policy analysis (see Section 3.4 below).

While forests were the explicit entry point for the workshops' discussions on local climate action, the participants' discussions included both targets directly and specifically focusing on forests and forestry and targets addressing climate change, land use, or local action more generally. To reflect the participants' choices and priorities within the overarching frame of the workshop, the analyzed material includes all proposals put forward by the participants – not only those directly and expressly addressing forests.

The use of scenarios aimed to prompt the imagination of the participants, rather than providing a rigid frame for the policy targets. The participants were also encouraged to exchange ideas between the groups, which likely influenced the group work and the participants' individual reflections at the end of the workshop. The workshops thus

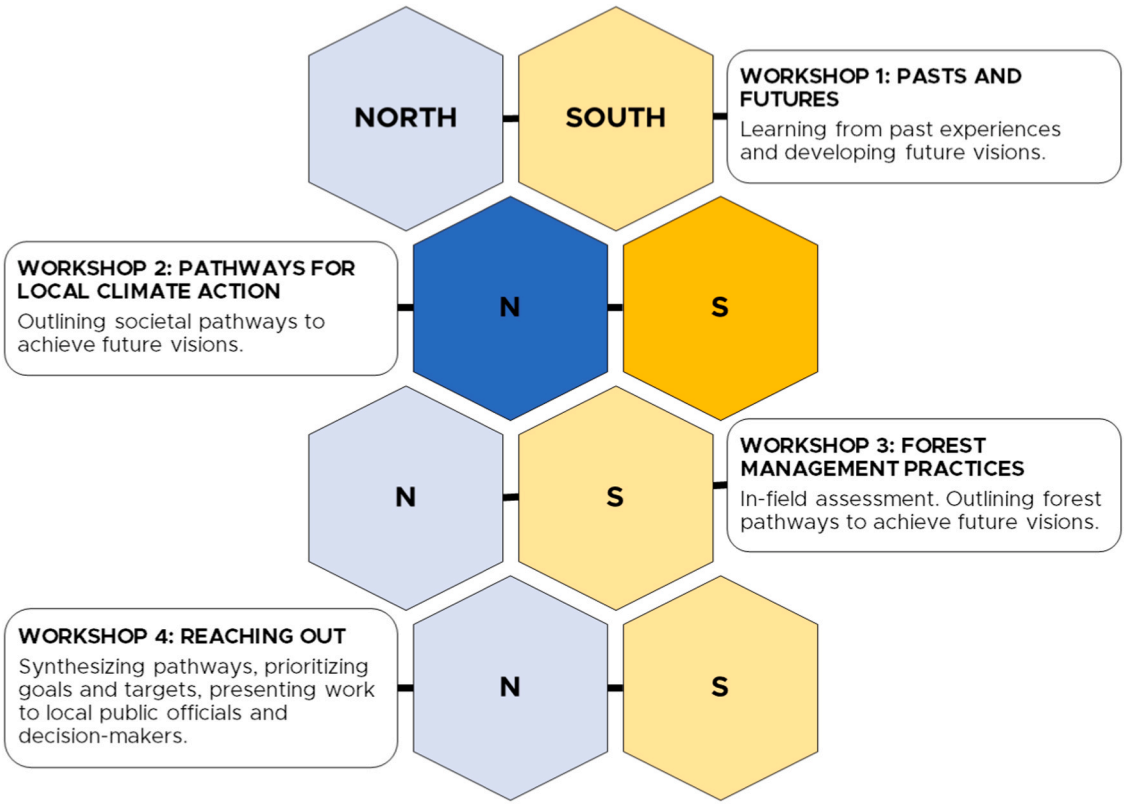

Fig. 2. Illustration of the workshop process that formed the basis of the larger research project. This study focuses on Workshop 2.

represented a dynamic and creative setting. They generated a complex material, where the future visions were one of several aspects to consider when assessing the local climate action articulated through collectively and individually proposed targets and tools. In the analytical process, we have, to a large extent, chosen to use the material in aggregated form.

We have also aggregated the material from the two workshop locations, in order to focus on common themes rather than compare them. While there are differences between northern and southern Sweden, not least related to the characteristics and use of forest resources, our observations during the workshops indicated that the two groups included very similar elements in their visions, targets, and tools (cf. Hallberg-Sramek et al., 2022). Rather than address the particularities of each individual site, or of different parts of Sweden, we choose to focus on the local level, and local contexts, in relation to other political and administrative levels. For the purposes of the workshops, we used municipalities (as geographic, demographic, political, and administrative entities) as the overarching delimitation of "the local" (Lidström and Madell, 2021).

3.4. Analytical framework

To critically assess these locally developed climate action pathways, we have drawn on the theoretical concepts of poststructural policy analysis. We depart from a broad definition of *policy* as the maintenance of order through politics, not only within political structures or through state activities but including any form of activity, on any level, that seeks to shape, guide, or affect the conduct of people. Policy materials may then include a wide range of prescriptive statements and texts that can be understood as a form of proposal and a guide to conduct (Bacchi and Goodwin, 2016; Dean, 2010).

We draw on elements of Bacchi's analytical strategy *What's the Problem Represented to be?* (the "WPR approach"; Bacchi and Goodwin, 2016) to structure the analysis. This approach departs from the premise that "what we say we want to do about something indicates what we think needs to change" (Bacchi, 2012). Bacchi suggests that "working backwards" from a policy proposal offers a way to analyze how it produces a problem (Bacchi and Goodwin, 2016). This identification of *problem representations* gives way to an analysis of what presuppositions or assumptions they rest on and how they are constructed, and of what is left unproblematic: what is not represented as a problem, or what is silenced through a particular problem representation. The WPR approach is also useful to assess the consequences or effects of particular problem representations – the limits they set on what can be thought and said, and the roles or positions they assume or prescribe for different individuals or groups. This approach offers a theoretically based structure to critically analyze local articulations of climate action.

In identifying the assumptions underlying problem representations, we examined the understandings or meanings that needed to be in place for a problem representation to make sense, explored key concepts and categorizations in the construction of each problem representation, and investigated the silences of these problem representations – that which was left unproblematic, or not spelled out (Bacchi and Goodwin, 2016). To analyze and discuss the effects produced by these representations of the "problem(s)", we employed a theoretical lens, connecting our results to a broader discussion on global environmental discourses and their consequences for local and forestry-related climate action (cf. Bäckstrand and Lövbrand, 2006, 2019; Fleming et al., 2014; Leipold, 2014). We focused here on *discursive* effects – that is, the limits that particular problem representations set on how a problem (and its solutions) can be thought and talked about – and *positioning* effects – how problem representations constitute and assign responsibility for addressing a problem (Bacchi and Goodwin, 2016).

Table 2
Basis for future scenarios used for backcasting in Workshop 2. Scenario families based on van Vuuren et al. (2012). See also Priebe et al. (2022).

Scenario family	Key elements from workshop 1 (north and south)
Economic optimism, with elements of *Reformed markets* and *Business-as-usual*	• Individual landowners as key actors • Protection and strengthening of ownership- and usage rights • Economic incentives to promote collectively beneficial action, including compensation for production losses due to conservation • Increased productivity and efficiency through technological innovation • Conservative approach to change - emphasis on thoughtfulness and careful consideration of alternatives and their potential consequences
Reformed markets	• Strong political leadership for sustainability and reduced GHG emissions • Strong societal preparedness to cooperate • Technological development for more efficient use of forest resources • Forest resources to substitute fossil resources in all economic sectors • Diversified land ownership
Global sustainable development	• Severe consequences of environmental degradation and climate change, due to delays and inaction, has resulted in commitment to preserve remaining environmental values • Global, rational, planned economy to ensure efficient use of remaining resources from a global perspective • Global citizenship, humanity committed to preserve remaining environmental values • Highly developed new technology for carbon capture • Highly developed knowledge about the environment and ecosystem functioning
Regional sustainable development	• Environmental crisis has led to stronger local communities • Local self-sufficiency - farming networks, local energy production, seasonal consumption, local barter economy • Communal use of forest resources • Circularity • Welfare, equality, equal distribution of resources and assets • Ecological restoration of forests

Fig. 3. Translated example of presentation of a future scenario for Workshop 2. The scenario is connected to the *Regional sustainable development* scenario family (see Table 2; van Vuuren et al., 2012) in the southern location.

4. Results and analysis: climate action pathways

Our analysis revealed three overarching themes among the pathways developed by the participants: *resource use*, *knowledge and information*, and *local development and decentralization*. In the following, we analyze what the problem is represented to be within each theme and its subthemes, the presuppositions or assumptions that underlie these problem representations, and their silences – that which is left unproblematic, or unaddressed. We also analyze and discuss the discursive and positioning effects produced by these problem representations. See Table 3 for a summarizing overview.

4.1. Using resources "in the right way"

The participants presented both concrete, detailed proposals for forest and natural resource management (e.g., "triad forestry – intensive cultivation 33%, 'normal' management 33%, protect 33%"[2]) and abstract, visionary targets for the environment, the climate, or natural resources in general (e.g., "use our resources in the right way"; "climate-smart targets for the use of forests"). This width in terms of levels of abstraction is the most pronounced for targets directed at the national level. Among the proposals addressing landscape use and forestry on the local (municipal) and regional (county) levels, several targets indicate a desired move towards a different perspective on landscape use (including the creation of "new functional areas", and a target stating that "[a] landscape perspective [is] needed in natural value assessments"). The participants did not, however, specify the achievement of these targets through associated tools to any great extent beyond mentions of the constructive approaches identified in the preceding workshops (e.g., "strategic ways of working") and types of policy tools (e.g., "legislate"; "municipal comprehensive planning").

Some proposals address forestry only indirectly. For example, the target "protect biological diversity" indicates connections made by the participants between forest management, climate action, and a broader set of environmental or sustainability challenges. Through the association with tools including biological value inventories, subsidies or grants to promote habitats for certain species, and tax-switching policies to fund compensation for landowners losing production profits due to higher levels of protection, it links to the expectations for voluntary forest conservation measures placed on individual forest owners by the Swedish state (cf. Danley et al., 2021).

Other proposals seem to target climate action in a more general sense. This may be interpreted to reflect the participants' diversity in places of residence, relationships to forests, and understandings of actions needed to meet climate change challenges. Several proposals addressed urban centers (e.g., "greener cities/towns" and "fossil-free [city] center"). Related to this, participants articulated a range of targets for fossil-free transports of both people and goods, including infrastructure investments (e.g., "better bicycle network between towns and villages"; "upgrade and expand rail system"; "expanded public transport"), greater logistical coordination (for both people and goods), and changes to the vehicle fleet and the fuel system (e.g., "autonomous vehicles"; "transition from fossil to biofuels"). The tools associated with these targets focus on municipal comprehensive planning, investments in physical and social infrastructure, and legislation to reduce the use of private cars in city centers.

A number of proposals targeted resource use by addressing construction, consumption and waste, and energy. The participants proposed changes to construction practices (e.g., "more wood construction" by means of municipal planning, legislation, and taxes on other

[2] This refers to triad zonation approaches in forestry, where management of different intensities is combined to enable multiple uses of forests – specifically, as a solution to meeting global timber demands while minimizing negative impacts on non-timber forest values (Himes et al., 2022).

Table 3
Summary of analysis.

	Themes		
	Resource use	Knowledge & information	Local action
Problem representations	We do not use our resources in the right way now (or there is a risk that we might not in the future) Current political tools and practices are not sufficient or suitable to address this	Children not receiving enough education Lack of, or lack of access to, knowledge or information associated with specific targets, particularly at the local level	The local level does not do all it could/should do to adapt to and mitigate the effects of climate change The local level lacks sufficient opportunities, resources, or discretion to do all it could/should do
Underlying assumptions	Underutilized opportunities in relation to the management/use/consumption of natural resources Possibility of planning, designing, and guiding climate action through policy by either tweaking or radically altering existing systems	Knowledge and information as a potential, or even necessary, remedy for inaction Given access more/more relevant/more correct knowledge and info, youth can/will do better than present adult generations	Un- or underused potential for local action Given greater opportunities, resources, and discretion, the local level could increase its capacity and do more
Silences	Detailed policy content of transformation, concrete alternatives for land- and resource use The finite nature of natural resources	The how, what, why, and who of knowledge	If the local level could do more, why is it not already?
Effects	Reiteration of global managerialism Obscuring radical alternatives Tensions in allocation of responsibility	Disregard of politics and choice Allocation of authority/responsibility to "experts" Allocation of responsibility to future generations	Reiteration of perceived barriers to action Allocation of responsibility "elsewhere" Embracing responsibility here, we, now

construction) and energy production (e.g., "develop biogas and solar energy"; "local small biogas plant"; and "solar panels on house fronts and roofs", associated with tools including state subsidies and tax-switching policies). The participants also proposed targets of overall reduction and changed patterns of consumption, to be reached by a mix of financial (e.g., "higher customs charges"; "CO_2-tax") and social or information-based tools (e.g., "involvement/commitment expanded beyond local community"; "[promotion of] locally produced food, local services").

A through-line in terms of problem representation within this category lies in current and/or potential future use of resources, and with current legislation and management practice. The problem is represented to be that we do not use our resources in the right way now, or there is a risk that we might not in the future – including both the ways in which we plan, build, and use urban and rural spaces, and patterns of consumption and transportation – and that current political tools and practices are not sufficient or suitable to address this.

This problem representation seems to rest on the assumption that it is, in fact, possible to use resources in ways that work to adapt to and mitigate climate change, and that it is possible to govern and manage to this end. In other words, the participants articulate an underlying assumption of underutilized opportunities in relation to the management, use, and consumption of natural resources. This, in turn, rests on assumptions of the possibility of planning, designing, and guiding climate action through policy that either assumes the possibility to tweak existing systems, or the possibility to radically alter them. It corresponds, to some extent, to the differences in view of the different "scenario families" described by van Vuuren et al. (2012) that were part of the basis of the groups' future visions (see Table 2). However, we found elements of both types of assumptions (tweaking and radical change, respectively) in proposals from groups across the visionary spectrum, and the overlap between the groups was often significant.

Apart from some proposed targets indicating a more radical shift towards local autonomy and self-sufficiency, the participants' proposals tended to stay close to current policies and practices. For example, among the proposals concerning transportation, most seemed to assume continued high mobility of people and goods – just with different modes of transportation (public transport; railways) and/or different (fossil free) fuel sources. The detailed policy content of more radical transformation (e.g., significant decreases in mobility) remains rather quiet, if not completely silent, in the material. There is also a tendency of silence around concrete alternatives for land- and resource use. Albeit sometimes quite detailed (e.g., "abolish esthetic norms for fruit and vegetables to get rid of wastage"), the proposals were seldom specific in terms of land use practices and policy content. New or improved ways of using resources are assumed to exist, but their explicit content is left silent.

4.1.1. Business as usual, with more of everything?

The representations of climate action problems as underutilized opportunities in relation to the management, use, and consumption of natural resources thus seem to presuppose a continued use. Through proposals of, for example, more wood construction and increased use of bioenergy – and through the silences on concrete alternatives for land- and resource use – the participants' pathways assume a continued use of forest resources. They seem to remain largely within the confines of – and further reiterate – dominating market-oriented and administrative-managerial rationalities, while more radical or system-critical rationalities are less visible – or at least less concretely defined – in these pathways (cf. Arts et al., 2010; Bäckstrand and Lövbrand, 2006, 2019). They also resonate the production-oriented approaches that dominate the Swedish forestry governing regimes (Andersson et al., 2022; Beland Lindahl et al., 2017).

The discursive effects of this may include a continued silence on, and limited space for thinking and talking about, potential forms of more radical transformation. The problems of resource use could have, and can be, represented in different ways – for example, with higher emphasis on the finite nature of natural resources. Centering the discussion around continued – albeit changed, "sustainable" – use of natural resources in general, and forest resources in particular, indicates a tendency to take these resources for granted. More radical critiques of current and planned resource use in and of dominating economic and political systems – and of those systems as such – can thus become (further) marginalized, and more difficult to gain traction for.

The underlying assumptions of the possibility of planning, designing, and guiding climate action through policy, and the focus on structural changes (to, for example, infrastructure, industry, and energy production) indicates an assignment of responsibility to decision-makers and institutions on higher political and administrative levels than the most local. However, with reference to tools both at the municipalities' direct disposal (for example, municipal comprehensive planning) and requiring a redistribution of state funds (for example, infrastructure investments and tax switching polices), the participants' pathways also articulate a potential role for the municipality as a driving force for

transformation of both urban centers (through, for example, changes to construction and planning practices) and rural areas (through, for example, expanded public transport systems). There is, then, somewhat of a tension in the positioning effects of the problem representations we have analyzed.

4.2. Increasing knowledge

Knowledge and information – about both climate change and the role and use of forests for climate action – was a prominent theme in the participants' articulations. Targets in this category cover different levels and sectors, from general awareness-raising to the role of media, increased knowledge in local communities, and education, schools, and children. Suggested tools in this category include information campaigns (both general and specific, concerning e.g., wood construction), counselling, training for (local) politicians and public officers, and changes to school curricula.

Two problem representations stand out within this theme. The first focuses on children not receiving enough education on these topics, possibly because teachers are not sufficiently trained to give it to them – as expressed through targets such as the inclusion of environmental-, forest- and climate studies in school curricula and in teacher education programs. The second is related to the lack of, or lack of access to, knowledge or information associated with specific targets, particularly at the local level. Targets include, for example, "increased knowledge about nature and environment in one's own community"; "[improved] research and development locally and regionally"; "increase (…) local knowledge about nature"; and "[increased] knowledge about the place where we live". These targets are related to targets concerning information and knowledge on a broader scale (including, for example, "increased knowledge on all levels"; "well prepared and knowledgeable politicians"; and "increased knowledge about climate-smart choices"), but connect more closely to the lack of, or lack of access to, relevant information and knowledge in relation to the local level, specifically.

Among the tools proposed to reach the targets in this category, a majority include policy instruments related to information (including "information and counselling"; "social- and information tools"; establishment of "information centers"; training and education of elected officials; and research on particular subject areas). Many also connect targets of information and knowledge on a broader scale to tools directed at schools or children. For example, for a target expressed as "increase knowledge about sustainable development, ecological relationships, local knowledge about nature, etc.", the associated tool is expressed as "systematic and continuous education in pre-schools/schools on these subjects". This indicates a perception of interconnectedness between a general lack of knowledge and information, on the one hand, and a need to expand or improve teaching and education on issues related to forests and climate change, on the other.

The underlying assumptions to these problem representations appear to center on an understanding of knowledge and information as a potential, or even necessary, remedy for inaction – or, in other words, that the problems of deciding and implementing effective policies for climate change adaptation and mitigation could be solved if only individuals, communities, and politicians had better, and/or better access to, relevant knowledge and information. The focus on children, education, and schools, including the way in which measures directed at schools or children are put forward as tools to reach more general targets of increased knowledge and information, indicates an underlying assumption that youth can, and will, do better than present adult generations – if they are given (access to) more, more relevant, and/or more correct knowledge and information.

Representations of climate action problems as a lack of, and/or lack of access to, knowledge and information rest on assumptions of knowledge and information as a remedy for inaction – but are generally silent on *how* and *why* (for what ends) this knowledge is needed and is to be used. Moreover, these representations tend also to be silent on the *what* and the *who*; that is, what (or what type of) knowledge do we need more of, or better access to – and who has it, and is responsible for making it more accessible? Interpreting the pathways articulated by our participants, they tend to implicate knowledge about the biogeophysical aspects and processes relevant for climate change adaptation and mitigation (expressed as, for example, "knowledge about nature and environment"). Issues concerning knowledge about social or political processes are not articulated to the same extent, if at all.

4.2.1. What knowledge, whose knowledge, and why?

The assumption that more, better, or more accessible knowledge and information could enable climate action – and the silence on the what, who, how, and why of that imagined process – resonates the tendency discussed by, for example, Hulme (2015, 2018) to disregard politics and choice in the treatment of knowledge and information and in decision-making based on existing knowledge. Even the highest quality scientific knowledge is often insufficient to solve societal problems or provide a basis for action – not least as concerns the climate and the governance and management of natural resources (Coen, 2021; Hulme, 2015; Kelly et al., 2020). Moreover, complexity, ambiguity, and uncertainty are common characteristics of most areas of policy making, and an overemphasis on uncertainty or on gaps in knowledge may impede climate action (Hulme, 2018; Meah, 2019). The problems of knowledge and information could be articulated differently – for example, as a difficulty to adapt knowledge and information to local contexts and conditions or, more generally, in terms of the complex nature of science-policy interfaces (cf. Klein and Juhola, 2014). The discursive effects of articulations of knowledge as a – or *the* – remedy for inaction and solution to climate action problems may include a diminishing scope for such perspectives, and for discussions about the political choices necessary for action (cf. Fleming et al., 2014).

The expectation of knowledge in the form of facts or truths presumes the possibility of politically neutral production and dissemination of such knowledge. It tends to position scientists (preferably from the natural sciences) as the authoritative holders and distributors of knowledge as facts, in contrast to both politicians (who mediate knowledge according to political and economic interests) and the general public (who have limited capacity of grasping the complexity of the global crisis). Similarly, these representations of knowledge problems may obscure the complex linkages between knowledge and action and the normative judgments that are necessary to inspire or determine climate action (Hetemäki, 2019; Hulme, 2015). Responsibility and authority are thus allocated away from the local, externalized to a body of scientific experts, and decoupled from normative, political, or contextual interpretation.

The representations of climate action problems as connected to children, youth, and education, and the underlying assumptions of youth as capable (or expected) to do better than present adult generations, tends to allocate responsibility to future generations – thereby, at least to some extent, absolving contemporary adults (including decision-makers) of responsibility. Consider, by contrast, the message of many youth climate activists emphasizing existing scientific knowledge, demanding immediate action from political and social leaders, and allocating responsibility and blame to adults past and present (Han and Ahn, 2020) – the problem can, quite apparently, be represented very differently. The focus on children and on future generations plays into discourses on uncertainty that support wait-and-see approaches, limiting the perceived responsibility and capacity for local, immediate action.

4.3. Local level could and should do more

Many of the participants' proposed targets concern local development, local identities, and community mobilization. In particular, the participants' proposals highlight rural development,[3] including a broad set of conditions for rural community survival and development (e.g., access to services, employment opportunities, infrastructure, etc.). Several of the participants' proposals for infrastructure development, as discussed above, could also be interpreted as pertaining to rural development (e.g., "improve public transport to/from rural areas"; see also Section 4.1). Other proposals focus on business development (e.g., "increase opportunities for and focus on local refinement of wood"; "[promote and support] locally produced agriculture"; "coordination of local business"). Proposals concerning local identities and community mobilization stress connection to place and perceptions of rural areas (e.g., "[increase] knowledge about the place where we live"; "strengthen local identities"; "elevate rural areas"; "strengthened [local community] self-esteem") along with increased community collaboration and the establishment of common, local targets (e.g., "gather and agree on one vision for village development"; "a common target should be developed locally for society"; "reach consensus on goals for local community"; "increase coordination within local community").

A group of related proposals center on decentralization, local participation, and political leadership. The participants suggested targets for community inclusion in decision-making (e.g., "include community members in development"; "[politicians] to be more responsive to rural communities/people"; "platforms/dialogue meetings") and public-private cooperation (e.g., "better cooperation between authorities and forest owners"). Other targets focus on increased trust in politicians, more knowledgeable politicians, and political leaders who "dare make decisions that are sometimes uncomfortable".

The tools proposed to reach the targets in this category include a mix of regulatory, financial, and information-based policy instruments. For the regulatory tools, most are expressed in general terms that also indicate a focus on political leadership and stability (e.g., "long-term rules"; "municipal comprehensive planning"). The emphasis otherwise lies with information-based and financial tools, including information and counselling, dialogues and meetings, voluntary organization, and education, along with infrastructure and business investments. We also find suggestions for the use of public procurements to "prioritize climate and local production", tax-switching policies to subsidize public transport, and "economic benefits for rural actors and locally produced agriculture".

A common theme in terms of problem representations in this category is that the local level (understood to include both the municipality as a political institution, the local community, and individuals) could and should do more in terms of climate action, but that it does not have sufficient opportunities, resources, or discretion to do it all. The proposed targets point out several existing conditions and actions that could be amplified – for example, in relation to rural community residency, local community mobilization, and political participation.

One underlying assumption thus appears to be that there is un- or underused potential for local action. Several proposed local-level targets and tools for achieving them focus on local political leadership and instruments that participants perceive to be at the municipality's disposal already. Examples include using municipal comprehensive planning to develop infrastructure for public transport, bicycles, and pedestrians, and to promote wood construction. Others focused on the consideration of environmental and climate impacts and prioritization of locally produced goods and services in public procurements.

Decentralization, local or regional self-determination, and local participation are recurring themes throughout this line of problem representations, indicating a second underlying assumption: that given greater opportunities, resources, and discretion, the local level could increase its level of activity. Many of the proposed targets and tools highlight the need for inclusive local political processes, the importance of citizens feeling included and being allowed to participate and contribute in meaningful ways, the municipalities' role in providing resources and arenas for communities and individuals to participate, and politicians' responsiveness to rural communities. This ties into targets focusing on community- and individual mobilization and commitment, including support for voluntary associations and community initiatives for collaboration and knowledge sharing.

Where the pathways articulate the problem as insufficient capacity on the local level, the assumption of a potential increase of local action (dependent on an increase of opportunities or resources) appears rather straight-forward. When the problem is represented in terms of un- or underused potential for action, it is less explicit on both causes and solutions. It might be interpreted as an assumption of unwillingness to act (of both the municipality as a political institution and the population, as a group and as individuals). It ties into the articulations about knowledge and information, as discussed above. It is, however, notably silent on one central aspect: if the local level could do more, why is it not already?

4.3.1. Who, when, and where?

The representation of local climate action problems in terms of perceived barriers to action echo challenges pointed out in previous research including, for example, arenas for public engagement; administrative and political capacity; funding and the need for financial support; the necessity of regional cooperation; and the requirement of well-developed legal and institutional frameworks (cf. Carlsson-Kanyama et al., 2013; Kristianssen and Granberg, 2021; Romsdahl, 2020). The reiteration of these barriers can have different discursive and positioning effects. On the one hand, articulating the problem as related to a need for more support – administrative, political, legal, institutional, and financial – can create a basis for local action in the form of demands and advocacy, as it allocates responsibility for the strengthening of local capacity and agency to (primarily) national authorities. On the other hand, the focus on barriers for action and the allocation of responsibility "elsewhere" can, in and of itself, curb action on the local level. To speak with Stoknes (2014), climate, and climate action, may continue to seem "distant in time, space, and influence".

In parallel to the allocation of responsibility "elsewhere", the participants' pathways also articulate an embrace of responsibility on the local level. They express a confidence in the potential of local collaboration and dialogue – referencing "the local" both as the individuals, landowners, businesses, and organizations living or operating in the area, the municipality as a political and administrative body, and the interaction between these actors. They assume that with appropriate arenas for cooperation, the local population could rally around a shared vision or shared goals; and if included and listened to, the local population could influence local politicians and officials in ways that would be beneficial for climate action. These representations of local climate action problems as a lack of sufficient influence, arenas for cooperation, and community cohesion position the local community (as people) as a potentially significant force for positive change. There is, however, a tendency here, too, to externalize the responsibility to realize this potential. The problem could be represented differently, with greater emphasis on the duty of the local community itself – understood, then, as the people who constitute it – to create the arenas, collaborations, and shared visions called for.

5. Concluding remarks

Our results illustrate the discursive effects of the global discourses that tend to limit the discursive (and material) space for local climate

[3] Often expressed as "levande landsbygd", lit. "living countryside", a Swedish expression with connotations of economic and social viability in rural areas and recognition of rural ways of life.

action. However, our material also includes proposals and articulations that position the local level, particularly the municipality (as a political and administrative body), as a central actor for change. The future visions used in this study, and the pathways developed by the participants, included a broad set of aspects to consider and connected climate action and forest landscapes to local social, economic, and ecological consequences of both climate change impacts and climate action policy. The way in which the participants also clearly linked climate action to regional, local, or rural development resonates arguments for integrating climate change adaptation and mitigation into broader policy processes of regional sustainable development.

Our results suggest that to further enable and encourage local climate action, a more detailed discussion of the conditions and premises of both "local" and "action" might be necessary. The problem representations articulated in and through the participants' pathways include multiple understandings of "the local level" – as a place (a geographical area), a political institution (the municipality), a group of people, and a number of individuals (residents within the place). The proposals target the local level as all these things, but do not always distinguish clearly between them. Similarly, assumptions and proposals about the need for more, better, or more widely disseminated knowledge and information target different groups – individuals, communities, politicians, and public officials – on different levels, but are not always specific about what knowledge, whose knowledge, or why knowledge is needed. Neither the concrete policy content of transformation, nor concrete alternatives for land- and resource use, were always explicitly described or detailed. Further unpacking the meaning of these concepts could hold a key to realizing the expectations for local action to contribute to meeting climate change challenges (cf. Aguiar et al., 2018; Amundsen et al., 2018; Lambert and Beilin, 2021).

This study also exemplifies the challenges inherent to the task of making climate change relevant and possible to act on, on the local level. Setting out, we assumed that the forest would be a useful focus to highlight the connection between climate change as a global dilemma and local climate action. Given the project's and the workshops' focus on forests and the selection of stakeholders, we expected land- and resource use – especially as relates to forests and forestry – to be a prominent theme in the discussion. During the workshops, the researchers and the facilitator intervened in discussions to prompt participants to consider the role of forests in their discussions. Nonetheless, the forest is often silent in the material. While the pathways do include proposals centered on or aimed at forestry and forest policy, they also cover a range of other topics – and are often more focused on transition, climate action, or rural development in a broader sense.

It seems, then, that while the forest served very well for bringing this diverse group of stakeholders together and as an entry point into the work, additional efforts might be needed to overcome distancing, dissonance, and inaction on the local level (cf. Stoknes, 2014). The role of forests as both public and private resources might be an important aspect to this. "The forest" works well to conceptually unite different interests, but as it speaks to and about very different needs and interests for different (groups of) people, it is more difficult to use as the basis for concrete policy suggestions on the local level (cf. Hoogstra-Klein et al., 2017). Moreover, our results echo the tendency of dominant discourses to view forests, forestry, and their role in climate action through a lens tinted by a focus on production, technological development, and market opportunities (cf. Andersson et al., 2022). Closely connected to this are the expectations for scientists to produce and disseminate "facts" or "truths" as basis for climate action, and the depoliticization of forests in relation to climate action that this entails. The discursive and positioning effects of assumptions of politically neutral (or apolitical) knowledge as necessary for action highlight the need for continued critical scrutiny of the underlying premises and choices of climate action on all levels (cf. Hulme, 2015).

Finally, some reflections on the limitations of this study are warranted. The way we designed and analyzed the workshops and our choice to let participants work in separate groups, with different future scenarios, also meant that certain common ideological lines of conflict were perhaps less visible in the work. Moreover, the proposals for different uses of forests were not explicitly weighed against each other or related to, for example, possible production volumes in this study. Probing such priorities or delving into ideological tensions to a greater extent could potentially have allowed for further discussions on, for example, goal conflicts on the local level. However, we found our approach to be beneficial for the purposes of both the participants' experience of the process and for our research outcomes. It enabled open and visionary discussions, and it allowed the participants to explore pathways to their preferred futures in a setting that was less restrained by existing lines of conflict.

While the literature identifies local actors as key drivers of climate action, the local actors in our study experienced a lack of power to promote climate action and local transformations, related to the top-down steering of climate policies. Meanwhile, they identified an un- and underutilized potential to act on the local level. Thus, there seems to be a gap between the local actors' perceptions of their own *potential to act* and their perceived *power to act*, which deserves further attention in science and policy. Tackling this gap could unlock this un- and underutilized potential for local climate action, while opening up for bottom-up solutions to climate change.

CRediT authorship contribution statement

Elsa Reimerson: Conceptualization, Methodology, Formal analysis, Investigation, Data curation, Writing – original draft, Writing – review and editing, Visualization, Project administration. **Janina Priebe:** Methodology, Formal analysis, Investigation, Writing – review and editing. **Isabella Hallberg-Sramek:** Methodology, Investigation, Writing – review and editing. **Auvikki de Boon:** Methodology, Writing – review and editing. **Camilla Sandström:** Conceptualization, Methodology, Investigation, Writing – review and editing, Supervision, Funding acquisition.

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Declaration of Competing Interest

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

Data Availability

Data will be made available on request.

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