



Beyond participation: when citizen engagement leads to undesirable outcomes for nature-based solutions and climate change adaptation

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Abstract

Scholars and practitioners are increasingly promoting so-called nature-based approaches for urban climate change adaptation. There is widespread consensus that they both support and require transdisciplinary approaches, notably by involving citizens in the change process and finding innovative ways to unite different actors' efforts and capacities. However, there is little empirical evidence regarding the actual value of citizen involvement to sustainability in this field. Against this background, this paper examines whether (or not) current forms and conditions of citizen involvement help to create a platform to support nature-based solutions and ensure a transformative adaptation process. The results show that under current conditions, citizen engagement often hampers sustainable outcomes. In fact, current structures and mechanisms for mainstreaming nature and climate considerations into sectoral planning are limited and, furthermore, neglect citizen involvement. In addition, there is a blind spot with respect to personal spheres of transformation toward sustainability regarding citizens, civil servants, and decision-makers. Key constraints are power structures and the lack of cognitive/emotional and relational capacities required for improved democratic governance. If we are to tap into the potential of nature-based solutions to increase climate adaptation governance, we need targeted financial and human resources, and greater capacity to overcome current constraints and support all levels and phases of mainstreaming, notably planning, implementation, monitoring, and learning.

Keywords Nature-based solutions · Ecosystem services · Ecosystem-based adaptation · Ecosystem-based planning · Emotions · Climate change adaptation · Disaster risk reduction ·

Highlights

- Nature-based solutions have the potential to increase citizen involvement in climate adaptation governance.
- Current approaches do not tap into this potential.
- Under current conditions, citizen engagement often hampers sustainability outcomes.
- Citizen involvement requires explicit support and systematic mainstreaming to support sustainability.
- Key constraints are power structures, and cognitive/emotional and relational capacities.

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Citizen participation · Collaborative governance · Sustainability · Co-Production · Citizen science · Values · Citizen engagement · Public participation

1 Introduction

Climate change impacts include an increase in extreme precipitation, inland and coastal flooding, heat stress, drought, and water scarcity. They all pose a serious challenge to sustainable urban development and place cities at increasing risk (IPCC 2014, 2018). In the absence of adequate international responses and given the need for place-based solutions, local authorities have a pivotal role in fostering climate change adaptation (CCA) through its mainstreaming in existing mechanisms and structures (Measham et al. 2011; Roberts et al. 2012; IPCC 2014; Rauken et al. 2014; Wamsler 2014).

In this context, nature-based approaches are being increasingly promoted and their potential to foster sustainability outcomes is receiving greater interest from scholars and governmental bodies alike (Andersson 2006; Faivre et al. 2017; Kabisch et al. 2016; Huq et al. 2013; IPCC 2014; Wilkinson et al. 2013). The concept of nature-based solutions (NBS) is relatively new and can be defined as solutions that use nature and ecosystem services to provide economic, social, and environmental benefits (EC 2015; Maes and Jacobs 2015). Its broad scope spans other concepts, such as urban green infrastructure and ecosystem-based approaches for CCA (Pauleit et al. 2011; Nesshöver et al. 2017). Originally introduced by the World Bank and the International Union for the Conservation of Nature (IUCN), the aim is to raise the profile of biodiversity conservation in tackling climate change (IUCN 2008; MacKinnon et al. 2008). In Europe, it has been adopted into the Horizon 2020 framework program for research and innovation (EC 2015).

There is widespread consensus that nature-based adaptation planning both supports and requires transdisciplinary approaches, including involving citizens in change and finding innovative ways to unite different actors' efforts and capacities (Eggermont et al. 2015; Kabisch et al. 2016; Nesshöver et al. 2017; Wamsler 2017). The motivations are manifold. First, climatic conditions are changing rapidly, as are their impacts on urban areas, reducing the capacity of local authorities and associated governance systems to deal with them (Romero Lankao 2008; Davoudi et al. 2010; Wamsler and Brink 2014a, 2014b). Second, climate change interacts with other socioeconomic, physical, and ecological drivers of urban risk at different scales in the context of both private and municipal land use (IPCC 2014, 2018). This challenges the division of responsibility between local authorities and citizens when adapting to climate events (Adger et al. 2013; O'Brien et al. 2009; Sarzynski 2015; Mees et al. 2019; Wamsler 2016, 2018). This situation has given rise to questions about alternative approaches to city–citizen co-production and led to the emergence of commoning climate adaptation (Wamsler and Riggers 2018). Finally, the need for transdisciplinarity and citizen involvement is widely claimed to increase relevance; fairness; acceptance; and, ultimately, sustainability (Adger et al. 2005; Burton and Mustelin 2013; Lemos and Agrawal 2006; Renn and Schweizer 2009; Mees et al. 2015; Nesshöver et al. 2017).

Despite the widespread understanding that citizen involvement is per se necessary and positive, and that it leads to more sustainable outcomes, there is almost no empirical evidence to suggest that it supports NBS to ensure continuous and transformative

adaptation in cities (cf. Glaas et al. 2015; Hegger et al. 2017; Mees et al. 2016, 2017, 2019; Waylen et al. 2015).¹

Against this background, this paper examines whether current forms and related conditions of citizen involvement help (or not) to create a platform to support nature-based approaches for sustainability in municipal adaptation planning. More specifically, we identify patterns in relation to (i) current citizen involvement and its links to sustainability outcomes and (ii) associated conditions in the form of drivers and barriers. Finally, we discuss the relevance of these results in relation to the current literature and practices, and conclude with some policy recommendations and further research needs.

2 Methodology

This paper is based on a participatory analysis (Burns 2007; Glassman and Erdem 2014; Greenwood and Levin 2006) of Swedish municipalities to explore whether current forms of citizen involvement help or hinder sustainability outcomes by supporting nature-based approaches in municipal adaptation planning. To do so, in 2018, we established an interdisciplinary learning lab in the southern region of Scania in Sweden.

Sweden is an interesting subject for case studies in this field. It is a declared pioneer in climate change and environmental governance (DC 2014; Hertin and Berkhout 2001; Jordan and Lenschow 2000) and tops the Global Green Economy Index (DC 2014). CCA and the consideration of ecosystem services are stated government goals (SOU 2007; SOU 2013; Ministry of the Environment 2013). The Scania region has made particular progress (Länsstyrelsen i Skåne län 2014). Consistent with the participatory approach (Burns 2007; Greenwood and Levin 2007), municipalities were selected based on four criteria: (i) their risk exposure (Länsstyrelserna 2012; SMHI 2011), (ii) the role and proactive engagement of their staff in promoting NBS and CCA, and (iii) their interest in participating in the learning lab and related activities. A further criterion was the representation of municipalities of different sizes.

Accordingly, the lab brought together representatives from five municipalities (Malmö, Lomma, Eslöv, Höganäs, and Kristianstad) and scholars from different backgrounds. Six scholars from three academic institutions and eight municipal representatives participated. The lab was based on local needs and a desire for increased knowledge exchange, which were identified during a joint workshop in 2017.² Participants at the latter workshop developed the overall aims of the project, namely to systematically analyze, compare, and learn from the integration of nature-based approaches for climate adaptation into their daily planning practice and, in this context, analyze associated governance mechanisms and stakeholder involvement. Each municipality selected cases, which were subject to a step-by-step analysis, from the initial project idea, to comprehensive and/or detailed planning, procurement, implementation, maintenance, and follow-up (monitoring and evaluation). The cases were representative of how municipalities addressed NBS, CCA, and

¹ Exceptions come from related fields, such as landscape planning (e.g., Clausen 2017; Tippet et al. 2007; Beierle and Konisky 2000) environmental impact assessment (O’Faircheallaigh 2010; Glicken 2000), climate change mitigation (Bulkeley and Mol 2003), resource management (Irvin and Stansbury 2004; Waylen et al. 2015), or beehiving (Purcell and Brown 2005). Others relate to participatory governance of urban green spaces in general (e.g., van der Jagt et al. 2016). See also footnote 3).

² The city-to-city learning lab was an outcome of a joint workshop organized by Mistra Urban Futures Skåne and the Skåne Association of Local Authorities at Malmö Högskola University on April 27, 2017. Participants were selected based on their expertise and knowledge of ecosystem- and nature-based approaches to support sustainable municipal development.

related citizen involvement in development planning processes; four focused on the creation of new residential areas and three on targeted interventions within existing areas, notably green private–public nodes, a school complex and a green embankment (Annex 1).³ The municipal staff who participated in the lab were directly involved in these cases, being the project coordinators, planners, and environmental strategists with good overview of all planning steps and phases.

Data were collected in 2018–2019 during a series of workshops and field visits, group discussions, participatory observations, interviews, ongoing dialogue with key informants, and from a literature review. The latter included project-related articles, descriptions, policies, citizen surveys, and protocols from relevant citizen dialogues or planning walks to capture different stakeholders' perspectives. Seven case-specific workshops, five field visits to the case study areas, and 12 interviews were conducted and transcribed to assess municipal staff's perceptions. The workshops and interviews followed the same format, which was based on the jointly developed analytical framework (Annex 2) that built upon mainstreaming and citizen involvement typologies (Brink 2018; O'Brien and Sygna 2013; Runhaar et al. 2018; Wamsler and Pauleit 2016; Wamsler and Brink 2018).⁴ Accordingly, all cases were systematically analyzed by going through the different planning phases to discuss the consideration of NBS, CCA, and related citizen involvement (Annex 2). Additional workshops on related topics (urban greening and citizen participation) enabled further dialogue throughout the process. Data were analyzed with a combination of literal reading, grounded theory (Glaser and Strauss 1967) and systems theory (Bateson 1979),⁵ and systematized based on the jointly developed analysis framework. The identification and analysis of relevant data was organized into five phases: (1) coding scheme development in accordance with the analytical framework, (2) identification of potentially relevant texts, (3) application of the coding scheme, and (4) identification of patterns. The preliminary results and ensuing conclusions were then discussed and revised by municipal staff and lab members before they were revised and finalized.⁶

3 Results

The following subsections present our results as a set of patterns in relation to (i) current citizen involvement and its links to sustainability outcomes (Section 3.1) and (ii) associated conditions in the form of drivers and barriers (Section 3.2).

³ Unlike the existing literature on citizen involvement related to NBS and/or CCA, this study did not start with a focus on (selecting) relevant cases of (successful) citizen involvement (cf. van Ham and Klimmek 2017). Instead, it focused on projects relevant to NBS in urban CCA and how they have been influenced by citizen involvement. Thus, the paper presented here does not focus on citizen-driven initiatives and nor on initiatives by local authorities that aimed to promote citizen-led initiatives (cf. Buijs et al. 2017). This different starting point allowed for new perspectives and a more critical analysis of current mechanisms and structures.

⁴ Typologies of citizen involvement in NBS and CCA relate to citizens' role as (i) being at risk, (ii) being an agent for NBS/CCA, and (iii) being affected by NBS/CCA policies (Brink 2018). Related spheres of activity include (i) the (positive or negative) influence on related municipal work; (ii) reliance on municipal work; and (iii) the reduction of individual or others' risk (Wamsler and Brink 2018). Mainstreaming relates to the systematic integration of NBS/CCA considerations and related citizen involvement at local, institutional, and inter-institutional levels. It includes changes in policy, regulations, planning tools, working structures, mandates, finances, and human resources (Runhaar et al. 2018; Wamsler 2014; Wamsler and Pauleit 2016) that span personal, practical, and political spheres of transformation (O'Brien and Sygna 2013). See Annex 2.

⁵ The combination of grounded theory and systems theory involves that during axial coding, the commonly used linear paradigm model was expanded by a broader (non-linear) systems analysis approach.

⁶ Due to this process of knowledge co-production, municipal stakeholders are included as coauthors of this study. However, text citations are anonymized in order to provide insights without compromising privacy and political issues.

3.1 Citizen involvement versus sustainability outcomes

The cases exemplified different types of city–citizen interactions related to formal participation processes; methods aimed at information gathering (e.g., surveys, informal interviews, digital dialogues), awareness raising (planning walks and games); co-production (e.g., joint workshops, the BID process, guidelines); and citizen contestation (e.g., formal appeals or informal protests and disputes) (Table 1).

Overall several cross-cutting patterns were identified regarding the links between current citizen engagement and sustainability outcomes, which are explained in the following text:

- Under current conditions, citizen engagement often hinders sustainability outcomes.
- It takes the form of (i) explicit contestation of municipalities' NBS/CCA considerations; (ii) inaction (no contestation) regarding approaches that ignore NBS/CCA considerations; (iii) lack of civic engagement (and sense of responsibility) for NBS/CCA considerations; and (iv) active ignorance of legal provisions that ensure NBS/CCA considerations.
- In the few cases where citizen engagement (contestation) led to positive outcomes for NBS/CCA considerations, they were mostly unintended.
- Consequently, municipalities' work on citizen involvement is driven by strategic reasons to increase validity (for democratic planning) and deal with current, or prevent future, conflicts that could hinder efficient implementation and sustainability outcomes. Accordingly, a significant amount of municipalities' human and financial resources go into "working against" negative citizen engagement.
- Under current conditions, increasing citizen involvement is rather counterproductive.

Table 1 Identified types of city–citizen interactions

Municipality	City–citizen interactions	
	Municipality-driven	Citizen-based
Eslöv	<ul style="list-style-type: none"> - Formal participation in the planning process - Citizen survey to obtain information on cultural ecosystem services. 	<ul style="list-style-type: none"> - Civil protests about planning proposals (a mosque) - Neighbor contestation (appeal against the detailed plan)
Lomma	<ul style="list-style-type: none"> - Formal participation in the planning process - Joint workshops with neighbors and teachers, respectively 	<ul style="list-style-type: none"> - Disputes between neighbors
Malmö/Sofielund	<ul style="list-style-type: none"> - Inclusive stakeholder involvement process (the so-called BID process)^a - Guidelines for citizens' self-governed NBS/CCA 	<ul style="list-style-type: none"> - Stakeholder fatigue (due to lack of actual outcomes of own engagement)
Kristianstad/Åhus	<ul style="list-style-type: none"> - Formal participation process - Dialogue with neighbors/neighborhood enterprises 	<ul style="list-style-type: none"> - Individual disputes between neighbors/neighborhood enterprises
Höganäs	<ul style="list-style-type: none"> - Formal participation in the planning process - Citizen planning walks - Citizen planning games - Digital dialogue (whole city) 	<ul style="list-style-type: none"> - Formal appeals and protest from neighbors - Individual disputes

^a BID process: In 2014, local property owners and companies, with support from the city, took action and formed a non-profit organization, involving substantial economic responsibility and joining resources.

The results show that under current conditions, citizen involvement often hinders sustainability outcomes. In fact, in all municipalities, it negatively affected the consideration of NBS and CCA, both explicitly and implicitly.

There were for instance ample examples of citizens' contesting NBS/CCA considerations, including small-scale (e.g., individual statements or disputes during hearings) and large-scale actions (e.g., organized appeals against municipal plans). Contestation was often based on individual personal interests and a lack of environmental awareness, and had a considerable impact on the planning process due to lengthy, resource-consuming delays in, and the reduction of, NBS/CCA considerations.

Personal interests typically related to mobility issues, in the form of a car-friendly environment that provides sufficient, free parking space and good access through hard infrastructure. Independent of the type of involvement, experiences in different areas are very similar. As one municipal representative describes:

(...) ordinary public hearing(s), with ordinary comments: People thought that the plan was not car friendly enough. People wanted to have roundabouts just next to the area. What comes from citizens is rather counterproductive for nature or adaptation considerations. People were afraid that the infrastructure would not be enough, that it would be difficult for them to drive their car. We were focusing on greening, walking paths and biking paths, ... no one was really interested in this. You never hear people say anything good in these meetings, because it's only those with negative perspectives who come. Now we have to [put more resources into] doing more calculations regarding the traffic...

Another says,

Everybody wants to have their own roads and roundabouts (...). We also had special dialogues with them, which is not part of the formal participation process. As a result, the distance between the new area and businesses was increased [to guarantee better access for all].

In most cases, citizen engagement "was not a question of nature or climate, more a question of parking space." In one city, the issue of parking space even led to neighbors overruling the municipality's plans, "They wanted to make sure that they can park their cars here."

Other personal arguments that conflict with NBS/CCA considerations include apparent contamination (noise and bird droppings due to greening), the creation of shade (due to trees or buildings), too close-by multi-story housing (that would allow room for greening or protecting arable land), or constructions that might restrict a sea view (e.g., green embankments). In fact, in one area:

They gave the municipality a list of 180 protesters because they did not like the project. It was not about green or adaptation considerations. It was only about: 'We do not like multi-story houses.'

People do not care as long as they have their private villa close to the sea, they do not care about climate change because they cannot see it now.

Neighbors are [also] worried about shade....it is not a climate perspective. It is an economic perspective. If you have shade 24/7 in your backyard, you'll get less money when you want to sell the house.

In another area:

(...) when the municipality suggested that they should protect the trees, several citizens were against this. We were told that there are too many bird droppings in the area and there is so much noise from the birds, and that's why we can't have trees in the city...

In the case of the construction of a sea wall:

External stakeholder involvement was huge. It is a very interesting example. There is a whole row of exclusive villas along that wall, and half of them wanted the wall because they got flooded, and half didn't want to have the wall because their (sea) view would be destroyed. So they wouldn't have a sea view anymore. And it was basically uproar. People came to our meetings. We had many meetings with the people living there. They were so upset, basically throwing things at us. There were a lot of discussions and meetings.

Contestation can be powerful, as political issues such as votes and tax income are significant drivers of municipal decision-making. "They created an appeal that made the politicians afraid so that they withdrew the proposal first, because they were afraid to lose votes." Municipalities also want to "please" their inhabitants. Their aim is, for example, that "young people will not move to [the next bigger city] Helsingborg but stay." In the few cases, where contestation led to positive NBS/CCA outcomes, it was unintended. In one case, environmental reasons triggered contestation, but only because it hid a strategic push for other, personal interests:

Instead of saying we don't like taller houses, they used their brains to demand more consideration be given to environmental perspectives. But their real objective was to stop or slow down the project, in other words, to gain time to increase citizen resistance.

Earlier in the process,

In the initial planning process – 180 people sent letters to the municipality and they had to withdraw the project – because they don't like taller buildings. But at the same time the planner can't use farm land and then do not use it efficiently (for one story houses only), which meant that they needed other arguments against the project.

In the end,

The municipality had to create an additional environmental impact assessment, 47 pages long, describing every detail of the area (including the risk of flooding). It is interesting to see how we got here, it wasn't because of interest in the environment, it was because they tried to find arguments against the project – against multi-story buildings. Now the detailed planning has been done. Now it is with the 'land and environmental court' – this is the normal process if someone opposes certain plans. They were fighting us to the end and therefore it had to go there. The detailed plans show how environmental issues have been taken into account, they refer to the impact assessment. So, in this case, consideration of the environment was spurred by the people, but not because of their environmental concerns

A second example shows how contestation led to unintended, positive outcomes for NBS/CCA. It took place during the initial planning phase, when:

The architects wrote in a proposal that a mosque could be built in the planning area. This caused a minor riot. They said that because they wanted to be open to any suggestions, the square could be used for many reasons, and this was just one potential idea. They

had a lot of suggestions, but this is what the newspaper highlighted... (...). It caused an organizational change within the municipality: architects were moved closer to the politicians (so that they couldn't make similar statements again). They were moved higher up in the hierarchy. This was positive in relation to the consideration of NBS and CCA because they were closer to civil servants who decided what land to buy and sell and under what conditions (...) Now, thankfully, to the mosque. They put us together with the property management department. The engineers there don't know anything about NBS or CCA, so I can tell them to add these issues, for instance, to the tender requirements. So, now we can create a red line [for incorporating NBS/ CCA considerations] running from the comprehensive plan to the detailed plan to the call for tenders.

The second type of citizen engagement that often hinders sustainability outcomes takes the form of inaction regarding municipalities' approaches that neglect NBS/CCA consideration in the planning process. It is often driven by political issues or a lack of awareness regarding how to approach the municipality. One example involved the destruction of the so-called people's park.

During the implementation process citizens didn't complain. There was surprisingly little reaction. I think that it was also a political statement, because now the conservative party is in power, and the people's park is a left-leaning cultural park, with a lot of places named after former politicians (...) and there are symbolic monuments (...). The new redevelopment project meant removing the last resource or evidence that it was a left-wing city, a workers' town, a big mining city with a lot of workers. Now it's an exclusive area for rich people working in Helsingborg, commuting and travelling to other places.

Another obstacle to sustainability outcomes is the lack of civic engagement in public life and the promotion of high-quality communities, including NBS/CCA considerations. This lack of interest in (or time for) participation is linked to unclear responsibilities and a reliance on municipalities to solve NBS and CCA issues (e.g., regarding NBS for water and floor risk management).

The problem is that property owners blame the city. They say that the water systems we have aren't good enough, and the municipality blames property owners, saying that they didn't think hard enough before repairing or rebuilding their house and gardens. So, this is a problem.

People put all the blame on politicians. This is the biggest problem really. But it's not really fair, because a lot of people are involved.

In addition, people think that involvement will not lead to actual changes, which is linked to the way municipalities currently involve citizens (see below). Consequently, all municipal representatives stated that few people showed up to participatory meetings or public consultations, while those that opposed plans were overrepresented, creating frustration among municipal staff:

I can't understand why they don't take it seriously. How do we reach out to them? How do we get them to understand? I can't understand why. What is happening in this world, when nobody wants to listen?

A further challenge is citizens' ignorance of legal provisions regarding NBS/CCA considerations. For instance, the construction of the "green" sea wall was problematic because:

Several people had built on municipal land, they didn't own the land, they just took it and built on it, for example for garden sheds, fences, even quite expensive winter gardens with a view of the sea. All of that had to be taken down. First, they opposed the wall, and then we said 'you've appropriated our land and you have to move back'. In some cases, they'd built over 50 meters into municipal land. They'd also sold houses saying that the garden goes all the way to.... So some people didn't know... That was very dramatic for some people.

The few examples of citizen involvement with positive impacts on NBS/CCA relate to information gathering or provision that was *not* linked to a specific municipal intervention and, thus, did not create a conflict of interest with the people involved. Examples are the school complex, the development of recommendations for personal climate actions, and the general (i.e., not project-specific) digital dialogues and citizen surveys in Höganäs and Eslöv (cf. Table 1).

We sent a survey to citizens.... They had to answer questions and place dots on a map regarding their use of, and needs for, green space. The survey showed that there was a lack of greenery. We already knew that. It wasn't rocket science. But it also showed an actual demand for greenery. It showed that the square (in the detailed planning project) lacked greenery, and here we had an opportunity to add greenery, to add NBS. So, that was my idea. Densify and at the same time get greener.

Despite this apparent win-win situation, the proposed plan was later overruled by neighbors (see above).

Due to the described situation, municipalities' citizen involvement activities are mainly driven by legal and strategic concerns. The latter is aimed at (i) dealing with existing, or preventing future conflicts that hinder efficient implementation and sustainability outcomes⁷ and (ii) increasing validity for democratic planning purposes. Much time and resources thus go into arguing with citizens to ensure sustainability outcomes: "It consumes time... to deal with the neighbors... but it's part of the process."

After the public hearing you rework the plan, then you go to the next hearing. That's the democratic way the planning process is done. But perhaps neighbors don't always think about everybody's best interest, you have to consider the 'greater good'.

In the case of contestation, "the minimum time to solve appeals is six months and often it takes longer." Nevertheless, citizen involvement is often claimed to be per se positive and is assumed to lead to more democratic (and presumably sustainable) outcomes, which, in turn, influences current approaches.

Given current structural conditions, increasing citizen engagement can also be counterproductive. Contestation and power issues dominate and block efforts (cf. Section 3.2) leading, for instance, to increasing stakeholder fatigue.

In the BID process, there are a lot of stakeholders who are very interested in creating more green areas, keeping existing green areas, and they're also very interested in

⁷ Strategic reasons for citizen engagement can, thus, go beyond inadequate citizen engagement. They might also lead municipal staff to resort to even more strategic behavior, creating a vicious cycle, caused by current conditions (cf. Section 3.2).

finding solutions for CCA, like ponds, etc., but something is stopping the process... they're so tired of sitting in workshops. Nothing concrete is happening.

3.2 Drivers and barriers

The analysis of drivers and barriers shows that it is structural conditions (structures, mechanisms and capacities) that negatively influence current forms of citizen involvement.

The identified drivers and barriers regarding citizen support for sustainability outcomes are as follows:

- A lack of municipal capacity to encourage constructive involvement that can support both democratic approaches and sustainability outcomes.
- This relates to power structures and a lack of an adequate support structure for systematic mainstreaming of NBS/CCA and related citizen involvement at institutional level, aspects that are linked to political and practical spheres of transformation.
- Drivers and barriers at personal level relate to people's environmental awareness and beliefs, their "irrational" behavior, how they see their relationship to others and the environment, social power structures (linked to education, income, long-term residents/newcomers, political orientations, and groupings), and individual perceptions of influence and responsibilities.

Current conditions relate to a lack of adequate mechanisms and structures for more positive citizen involvement and associated mainstreaming of NBS and CCA into municipal work (Table 2). This includes a lack of political support, policies, regulations, working conditions and structures, planning tools, and financial and human resources. Existing regulations do not, for instance, require citizen involvement beyond formal consultation processes.⁸ In addition, local planning regulations are restricted regarding the use of private land for public purposes, which hampers the development of more innovative forms of cooperation.

There is a conflict ... it's very interesting to look at how to solve it... I've presented these cases to lawyers, but they always say that it's not possible because it involves private landlords, private land, and this is why we cannot work together.

In addition, there is a lack of mechanisms and structures for monitoring and learning. "Nobody takes care of what we know and how we can use existing knowledge in other areas." This would require targeted financial and human resources for citizen involvement and NBS/CCA mainstreaming, but is not given priority. "Economic perspectives drive municipalities' work and priorities." In addition, current approaches, working conditions, and structures are characterized by high staff turnover and long planning horizons, which can span up to 10–20 years. "The longer it takes, the more difficult it becomes to follow things through." Furthermore, positive citizen involvement can be hampered by the lack of political influence (and associated resources) of the departments or geographical areas involved.

The low level of mainstreaming leads municipalities to focus on internal issues, rather than looking into external stakeholder involvement.

⁸ Public consultation has deep roots in Sweden (OECD 2010; Björstig et al. 2018). Its form, however, is not regulated and is very much a municipal decision. Legislation requires however that planning proposals have to be made fully available to the public for at least two months before they are adopted (SFS 2010:900; Björstig 2018).

Table 2 Barriers and drivers

Barriers and drivers	
Municipalities – Political and practical spheres	<ul style="list-style-type: none"> - Lack of supporting policies, regulations, and planning tools - Lack of financial and human resources - Working conditions and structures - Traditional ways of planning (little stakeholder involvement, technical focus, etc.) - Cognitive/emotional and relational capacities needed to address personal spheres of transformation
Citizens – Personal spheres	<ul style="list-style-type: none"> - Personal/conflicting interests - Immunity to change/“people do not like change.” - Lack of environmental awareness and belief in climate change - Education, income, age, and political orientation - Pre-existing conflicts, experience and/or place attachment - Social power structures and networks - Perceptions of individual influence and responsibility

We decided to start at the institutional level first, with municipal land, before making private people working with NBS and CCA.

When I started to make detailed plans in 2014, the only thing I had to lean on regarding NBS and CCA was [outdated], from more than 10 years ago ... the mechanisms and structures that are in place do not ensure that input and tools are in place.

Consequently, citizen involvement is low on the list of priorities and there is no systematic way to collect their perspectives, needs, and capacities. Similarly, innovative forms of cooperation, including increased interaction of different citizen groups and at different stages in the planning process, are lacking (e.g., citizen representatives in the tender process). The few instances are ad hoc and based on engaged individual members of staff (champions) learning-by-doing, which is itself limited to pre-planning phases.

We have the advantage of having recent graduates, with fresh knowledge, who can add something to the project. Each of my new colleagues has invented a new method for citizen dialogue. That’s why we’re also starting to look into virtual reality and other technological stuff, which our older colleagues may not have done.

However, under the current structural conditions, municipalities lack the capacity to systematically encourage positive citizen involvement in support of democratic approaches and sustainability outcomes. Increasing such capacities requires an adequate support structure and mechanisms at institutional and inter-institutional levels to also address the drivers and barriers at an individual level and to tap into personal spheres of transformation (cf. Table 2).

Stakeholder involvement is always also a matter of psychology and making people understand why this [i.e. NBS/ CCA] is important even for them. It is not a legal thing; it’s something else. You need to make that work, and that’s really another subject. You need to reach people.

This statement is representative of the many individual-level drivers and barriers that were identified. These include strong emotions, place attachment, (non)environmental awareness and beliefs, “irrational” behavior, how they see their relationship to others and the environment, social power structures (linked to education, income, long-term residents/newcomers, political orientations, and groupings), and individual perceptions of influence and

responsibilities. The relevance of these aspects becomes especially obvious when dealing with different geographical areas and groups. For instance, in certain areas:

In the center people aren't very highly educated. They don't care much about changes in the city, such as the park redevelopment. In the other area, they have a local organization that's very strong, and if something new happens, they oppose it (...). They oppose everything: They're rich, often more educated people, and if you suggest putting rental housing nearby, they don't want it.

This statement, similar to other examples, shows the strong emotions involved in all cases of contestation, and how they are embedded in people's values, worldviews, and belief systems.

There's been a big fight – people writing about how they hate the project, that politicians are corrupt, etc. They were so upset, basically throwing things at us. These people don't care as long as they have their private villa close to the sea, they don't care about climate change because they can't see it yet.

It's because of local conservatives, they don't like change, so if you want to build something you need have the town's influential people on your side.

There's not much political interest in nature, but even more so, citizens aren't interested.

In some cases, different levels of place attachment and experiences were an important factor:

They have different houses. The worst-affected houses were newly built from the 80s, and then there's a long row of quite old houses (...). Younger people were in the more northern areas and older people in the more southern. The older ones in their old houses didn't understand why the young people had to have televisions and things like that in their basements. There was a big difference in how they used their house and what they expected to do in it. Because they had lived there for 50 years and said: 'If there's a flood, there'll be water in your house, what's the problem?' (...) The older ones have a cellar, but they don't use it for living space, which makes a big difference to the amount of damage.

They didn't support us much, they were fighting the other group, because they'd been flooded, they had 1.2 meters of water on their ground floor, flooded, and it was going to take them around three years to rebuild their homes in order to be able to live there again. So, this [young] group [of residents] was asking the opponents if they thought that that was ok and that this wasn't very human.

4 Discussion and conclusions

Five important issues emerge from our results. First, the widespread understanding that citizen involvement in NBS and CCA per se leads to more positive, sustainable outcomes does not hold true. Although several theoretical papers discuss related issues (e.g., Bulkeley and Mol 2003; Cooke and Kothari 2001; Purcell 2006), few studies have challenged these assumptions in the context of NBS for urban CCA.⁹ This paper fills this gap. While not specifically analyzing related outcomes, drivers, and barriers, several studies from other countries have highlighted the limitations or disadvantages of citizen involvement (e.g., Clausen 2017; Mees et al. 2019; Mattijssen et al. 2018; Irvin and Stansbury 2004; Waylen et al. 2015), suggesting that our results

⁹ See footnote 1.

are valid beyond the area examined in this study. Learning from positive examples of citizen involvement and self-governance is important (e.g., van der Jagt et al. 2016; van Ham and Klimmek 2017),¹⁰ but not sufficient. Critical analyses of other, unsuccessful cases regarding NBS for CCA are crucial if we are to avoid maladaptation and improve current approaches to democratic governance.

Second, our finding that current citizen involvement in NBS and CCA often hampers sustainable outcomes does not question its relevance but the current structural conditions in place, i.e., the fact that current processes for mainstreaming nature and climate considerations into sectoral planning remain limited, and citizen involvement continues to be regarded as a secondary consideration in this context (cf. Waylen 2015). While municipalities are gradually shifting toward more networking, cooperating, facilitating, and enabling roles, and the idea of the city as a commons is gaining momentum (LabGov 2019), there is a clear lack of organizational flexibility and support to facilitate citizen involvement (cf. Mees et al. 2019) that goes beyond stakeholder interactions as a “technocratic compromise” (Checker 2011). Consequently, involvement tends to be punctual, isolated, and often counterproductive, even when authorities increase their efforts in some areas. This outcome supports studies that have demonstrated the lack of CCA mainstreaming and associated citizen involvement worldwide (Runhaar et al. 2018). It links to the vast literature that has demonstrated the need to combine multiple types of mainstreaming measures and strategies at the local, institutional, and inter-institutional level in order to achieve sustainable outcomes (Runhaar et al. 2018, Wamsler 2014, Wamsler and Pauleit 2016; cf. Annex 2). However, in practice, a comprehensive approach is currently lacking. At the same time, our results indicate weaknesses in the mainstreaming literature, which has so far focused on political and practical spheres of transformation (cf. O’Brien 2018; Wamsler and Riggers 2018), which leads us to the third implication of this study.

Third, our results reflect the current focus on political and practical spheres of transformation worldwide, and the clear blind spot with respect to personal spheres regarding citizens, civil servants, and decision-makers. Systemic transformation, which addresses all three spheres of transformation, is however necessary to address sustainability challenges such as climate change (O’Brien and Sygna 2014). Systems possess different “leverage points,” where interventions can be targeted to bring about sustainable transformation. Shallow leverage points consist of parameters, such as taxes or incentives, and feedback (i.e., interactions between system elements) (Abson et al. 2017; Meadows 1999), and they have tended to be the focus of sustainability policies to date. In contrast, deep leverage points are more difficult to influence, but lead to more substantial change. They include the design and “intent” of the system, i.e., the underlying values, beliefs, and worldviews of actors, aspects that also emerged from our results.

The lack of consideration given to such personal spheres of transformation in NBS and CCA illustrates a general concern in sustainability science and practice (Parodi and Tami 2018; Wamsler 2018a). It is often the case that NBS, CCA, and cooperation drivers cannot be considered “rational” as defined by rational choice theory (Shogren and Taylor 2008). This has an impact on risk perceptions, general environmental behavior, and

¹⁰ Related examples were also systematised in the context of the research project(s) that led to this study (see under <https://lucus.prodwebb.lu.se/research/urban-governance/urban-transformation> and <https://www.lucus.lu.se/klimatsamverkan>).

individual motivation to take, or support, municipal actions in these fields (Nightingale 2015; Wamsler and Riggers 2018). Our results thus support other studies that highlight the importance of considering, and providing space for, a comprehensive understanding of risk and its systemic root causes—and for alternative (“irrational”) behaviors that address them (Wamsler and Riggers 2018). The latter takes account of subjectivities (cf. Table 2), which are as important as power structures when managing nature and climate adaptation (Wamsler and Riggers 2018). Subjectivities are central to the operation of city administrations, as they are an integral part of how people understand their relationship to others. This means identifying capacities, practices, and interactions, and focusing on how they can both promote and frustrate attempts to collaborate. Individuals can for instance feel defensive when interacting with municipal stakeholders (cf. Few et al. 2007; Nightingale 2015; Wamsler and Riggers 2018). For example, they may be blamed for increasing climate risk, forced to provide personal information, or asked to interact with decision-makers, opening up opportunities for power asymmetries to be addressed or reproduced. This can either lead to resistance and a lack of cooperation, or citizens who are readier to work together (cf. Hardin 2013; Lewis and Weigert 1985). Meeting spaces can shape whether policy approaches are accepted, and whether they address the most vulnerable/marginalized members of society (Nightingale 2015, 2017; Wamsler and Riggers 2018).

Fourth, addressing personal spheres of transformation requires civil servants and decision-makers to develop new capacities. The increasing emphasis on participatory forms of governance (partnerships and the co-production of policies) that are designed to address complex, “wicked” problems leads to more complex and challenging working practices (cf. Folke et al. 2005; Hassenforder et al. 2015; Rowe and Frewer 2004; World Bank 2015). Consequently, there is a growing recognition of the need to address the cognitive/emotional and relational qualities of decision-makers and civil servants to help them deal with the increasing complexity and diversity of modern governance (Bristow 2019; Brink and Wamsler 2019; Wamsler and Riggers 2018), which has also been highlighted in a recent European Commission report (Mair et al. 2019). The idea of rational, objective, unbiased, and emotionally balanced civil servants has long held sway in academic writings on the state and within governmental organizations (e.g., Weber 1991; Jones 2008). And, yet, there is a growing understanding that they are neither rational nor objective (Mair et al. 2019). Cognitive, emotional, and relational qualities influence for instance how they analyze evidence, communicate risk, negotiate and relate with each other, develop productive and positive relationships with civil society, address conflict, take decisions, and develop policy (Blennow et al. 2014; Lilley et al. 2014; Bristow 2019; Sutherland 2018; Wamsler 2018b). At the same time, emotions such as insecurity and threat can lead to hierarchical and siloed working practices (Jones 2008), with implications for policy innovation and institutional design (especially affecting cross-cutting topics such as NBS and CCA). This has serious implications for democratic governance. Our results show that further research is needed to look into ways to better address these issues.

Finally, our results indicate that under certain conditions citizens are more likely to engage in issues related to nature than climate adaptation. This observation supports arguments that NBS has the potential to encourage engagement in climate adaptation (Wamsler and Riggers 2018; Brink and Wamsler 2018). However, this potential has not, so far, been tapped. This brings us full circle, as it relates to the lack of consideration of personal spheres of transformation regarding citizens, civil servants, and decision-makers, and the lack of systematic support for developing more wide-reaching and innovative ways to collaborate. We conclude that if we are

to tap into the potential of NBS to increase inclusive climate adaptation governance, we need targeted financial and human resources to support stakeholder involvement and personal capacity development and at the same time establish adequate mechanisms and structures that can overcome current constraints and support all levels and phases of mainstreaming to create new narratives, from the early planning stages, to implementation, monitoring, and learning.

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Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

Annex 1

Malmö Municipality (ca. 340,000 inhabitants)

The case concerns the central urban district of Sofielund, one of the most flood-prone areas in the city, and its development/rehabilitation through the so-called BID process, including citizen guidance and the co-development of green areas.

Höganäs Municipality (ca. 27,000)

The first case is an urban regeneration project (detailed plan) for the Folkets (“peoples”) Park and a football field, which will generate around 200 new housing units (mainly apartments). The second case concerns Potatisåkern (the potato field) in Viken, which will generate about 100 new housing units (mainly apartments and terraced houses) on former farm land next to a residential area and close to the sea (detailed plan).

Kristianstad Municipality (ca. 85,000)

The case concerns an urban development project (detailed plan) on agricultural land in Åhus. The sandy soil is particularly valuable for biodiversity. The project will generate around 300 new housing units (detached houses and apartments).

Eslöv Municipality (ca. 34,000)

The case describes an urban regeneration project (detailed plan) for a central square. The project will generate around 90 new housing units.

Lomma Municipality (ca. 25,000)

The case includes the development of a school and a flood protection barrier (detailed plans) next to the coast.

Annex 2

	Project phases	Project idea	Planning	Implementation	Maintenance/ Follow-up
Project content	<input type="checkbox"/> Importance given to nature/ ES – How? Why? • Internal stakeholder involvement • External stakeholder involvement (citizens*)				
	<input type="checkbox"/> Importance given to climate/adaptation – How? Why? • Internal stakeholder involvement • External stakeholder involvement (citizens*)				
	<input type="checkbox"/> Staff background, interest, knowledge & network				
	<input type="checkbox"/> Working structures and mandates				
Drivers and barriers	<input type="checkbox"/> Local planning tools				
	<input type="checkbox"/> Local planning regulations (comprehensive/ detailed plans)				
	<input type="checkbox"/> Local politics (e.g. city council decisions)				
	<input type="checkbox"/> Regional laws and regulations				
	<input type="checkbox"/> National laws and regulations				
	<input type="checkbox"/> International laws and regulations				

*Typologies of citizens involvement in NBS and CCA relate to citizens' role as i) being at risk, ii) being an agent for NBS/CCA, and iii) being affected by NBS/ CCA policies. Related spheres of activity include: i) the (positive or negative) influence on related municipal work; ii) reliance on municipal work; and iii) the reduction of individual or others' risk (Wamsler and Brink 2018).

Framework for mainstreaming (nature-based approaches to) climate change adaptation

Levels/dimensions ^a	Mainstreaming strategies
Horizontal mainstreaming	(1) Add-on mainstreaming The establishment of specific on-the-ground projects or programs that are not an integral part of the department's core objectives but directly target <i>adaptation</i> ^a or related aspects.
	(2) Programmatic mainstreaming The modification of department's core work by integrating aspects related to <i>adaptation</i> ^a into on-the-ground projects or programs.
	(3) Inter- and intra-organizational mainstreaming Promotes collaboration between individual sections or departments and other stakeholders (departments, committees, organizations, or governmental bodies) in order to generate shared knowledge, develop competence, and take actions to advance <i>adaptation</i> ^a .
Vertical mainstreaming	(4) Managerial mainstreaming The modification of managerial and working structures, including internal formal and informal norms and job descriptions as well as the configuration of sections or departments to better address and institutionalize aspects related to <i>adaptation</i> ^a .
	(5) Regulatory mainstreaming The modification of planning procedures and related activities by formal and informal plans, policies, regulations, and legislations that lead to the integration of <i>adaptation</i> ^a .
	(6) Directed mainstreaming Supports or redirects the focus onto aspects related to integrating <i>adaptation</i> ^a by providing topic-specific funding, promoting new projects, supporting the education of staff, or directing responsibilities.

^a The mainstreaming framework can be applied to overall adaptation, or specific aspects of it (e.g., nature-based approaches), as well as to other cross-cutting topics such as climate change mitigation. Source: adapted from Wamsler and Pauleit (2016)

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