Identifying interests and values in forest areas through collaborative processes and landscape resource analysis

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ABSTRACT

Today's societies face significant ecological and societal challenges, including climate change and economic crises. In this context, forests can be a useful resource for new innovations and products. However, increased out-take of forest resources can raise the pressure on common forest resources and increase already existing conflicts between e.g. forestry and production versus conservation. Herein, the objective of this paper was to explore a collaborative process, namely landscape resource analysis (LRA), as a tool to identify a variety of values and sometimes conflicting interests and to improve communication about these among different stakeholders by using maps and GIS. The method was applied to a small forest area, Norra Klarälvsdalen, in Värmland County, Sweden. The area hosts a variety of forest owners, firms and companies in different sectors and several voluntary organisations with interest in the local forest. The study showed that LRA in combination with GIS has the potential to add value to collaborative processes in local planning and forest decision making processes. Even though it is difficult to guarantee broad representation in collaborative processes, the LRA served to identify a wide range of values and conflicting interests among the local participants including as well immaterial, e.g. cultural ecosystem services, as material and monetary values in the forest area. It also served as a tool for social learning and put focus on local citizens perspectives and experiences in addition to 'experts' of forest landscapes.

1. Introduction

Today, our societies are facing significant ecological and societal challenges, including climate change and economic crises. To meet these challenges, the transformation to a fossil-free society is necessary, but has at the same time increased the pressure on forests, as forest products are seen as a valuable resource for new sustainable innovations and products supporting this transformation (e.g. EC, 2018, Stjernström et al., 2017). Thus, some caution needs to be taken that increased out-take of forest resources can raise the pressure on ecosystems and biodiversity, and also increasing already existing conflicts between e.g. forestry and production versus conservation, rights to land and re-sources, forest degradation and access to forests for recreation, leisure and tourism (e.g. Beland Lindahl, 2008; Eckerberg and Sandström, 2013; Gritten et al., 2013; Mola-Yudego and Gritten, 2010). The wide range of actors with competing forest interests also illustrates the importance of treating forests as dynamic entities and landscapes (McDermott et al., 2010). Another matter is that there is usually no single agency or authority responsible for harmonizing different forest interests (Johansson et al., 2018). Furthermore, in e.g. Northern Europe, forests are often located in rural, peripheral areas and cover large areas of land, making their scope difficult to grasp and to plan for (Tress and Tress, 2003).

In line with the World Resources Institute (2003, 2005) forest managers have long searched for methods to handle conflicts and al-ternatives to economic-focused values in forests such as cultural ecosystem services. In comparison to provisioning ecosystem services (e. g. food, water and timber), regulating ecosystem services affecting e.g. flooding, climate and water quality and supporting ecosystem services (e.g. soil formation and photosynthesis) cultural ecosystem services include both material and immaterial values. These include for example natural and cultural heritage, recreation, sense of place and identity, also important for our wellbeing, quality of life and mental and physical health (Pedersen et al., 2017, e.g. Young-Haines and Potschin, 2010). However, they are difficult to grasp as they often fall under non-market ecosystem services (Filyushkina, 2016).

There are several examples of successful collaborative processes in forests (e.g. Appelstrand, 2012; Mårald et al., 2015; Saarikoski et al., 2012). In particular, deliberative and participatory models of democracy have influenced planning systems and decision-making processes over recent decades (e.g. Healey, 2003) also within forest management and planning (e.g. Carr et al., 1998, Valkeapää and Karppinen, 2013). For example, participation is important in international agreements on sustainable forest management, including addressing sustainable use and governance of forest landscapes, goods, services and values (Angelstam et al., 2019) such as the European Landscape Convention (ELC) (Council of Europe, 2000) and Agenda 2030. Participation is also an important aspect in international agreements on sustainable forest management (SFM). There, social sustainability requires that individuals or interest groups affected by a plan or program have the right to be involved in the planning process (Jakobsson et al., 2021; Kangas et al., 2010). Consequently, these international agreements suggests that planning agencies should use participatory planning and collaborative processes as a model for planning, but there is still a demand for collaborative models with greater public engagement and which consider both social and ecological aspects of forests taking into concern the different ecosystem services (Johansson, 2018; Johansson et al., 2018). This has also become particularly urgent in the Nordic context with increasing forest conflicts in recent years (e.g. Bjärstig et al., 2019; Eckerberg and Sandström, 2013; Jakobsson et al., 2021). Thus, the increased call for collaborative processes has not necessarily led to more democratic planning systems, nor has it increased its impacts on the ground (Knudtzon, 2018). Often, processes with broad stakeholder involvement are set up to enhance the support of decision making to increase its efficiency, turning them into top-down processes rather than being participatory. In addition, plans and strategies that fail to consult local communities or local government institutions are far less likely to be adopted (Johansson, 2016).

With this background, the objective of this paper is to explore a method for collaborative processes in forest areas. More specifically, a method called landscape resource analysis (LRA) was tested as a possible tool to identify a variety of values and sometimes conflicting interests in forest areas and to improve communication about these values among different stakeholders. To date, LRA was primarily used to address how landscapes can be used for local development focusing on recreation and tourism (e.g. Clemetsen and Stokke, 2014; Haraldseid, 2016), and not on how to handle conflicting interests that can support forest planning and policy making processes in forest landscapes. In addition, visualisation using maps and GIS was used to support communication of different values and interests.

The paper addresses the following research questions: (i) Did the LRA process include interaction and exchange between stakeholders representing a wide range of and sometimes conflicting interests and values? (ii) Was it possible to identify, visualise and communicate different values and interests from the stakeholders throughout the LRA process?

Next, brief overviews of research on collaborative processes in forests, and LRA specifically, are presented, including features considered important in designing collaborative processes in forest areas. Section 3 describes the case study and the materials and methods used in this particular case. In Section 4, the results of the LRA are presented and discussed in relation to important features of collaborative processes, including legitimacy, empowerment and social learning, followed by a concluding discussion in Section 5.

2. Features of collaborative processes in forests and landscape resource analysis

Although more collaborative processes have been called for in forest development, several studies point to the lack of models and methods for using these in practice (Jones, 2018; Knudtzon, 2018). Sheppard and Meitner (2005) found that this has been due to low satisfaction levels and an unwillingness to participate in forest planning issues.

Participants often feel that they are not heard during the process (Beierle and Cayford, 2002, Faehnle and Tyrväinen, 2013). In addition, processes can be conflict-ridden, end unsatisfactorily or be dominated by experts. Some forest managers experience that public processes are often too large, informal and inconclusive to lead to decision-making (Sheppard and Meitner, 2005). Stakeholders in participatory processes often have differing expectations about the process, which can create confusion, embarrassment and conflicts, with negative impacts on learning and knowledge exchange (Rist et al., 2006, Ångman, 2012). A general critique of collaborative processes is that they often are set up by decision-makers and planners to support already set-up plans and decisions, which turns them into a top-down process rather than increasing stakeholders' influence on planning and decision-making (Healey, 2003). Exclusions based on race, gender, ethnicity, age and class is also still common. In addition, actors with economic interests (e.g., firms, industries) are often more powerful than civil society actors, so that power-based discourse often further alienates already marginalised societal groups (Knudtzon, 2018). However, collaborative processes can also change existing power and relationship patterns, and decrease tensions among groups (Buchy and Hoverman, 2000). When they are transparent and account for conflicting interests, public participation can increase public trust in decision making and thus enhance the legitimacy and the effectiveness of, for example, forest policy implementation and forest management (Johansson, 2016, Mårald et al., 2015, Reed, 2008, Sheppard and Meitner, 2005). Plans and strategies about which local communities or governmental institutions were not consulted are also far less likely to be adopted (Johansson, 2016). Hence, legitimacy is an important feature of collaborative processes and refers to "the way in which outcomes are negotiated, administered and accepted by stakeholders (Corbera et al., 2007, p. 589)". This includes the recognition and acknowledgement of stakeholders and their concerns (Paavola, 2003).

Other features of collaborative processes in forest management include empowerment through increased access to local knowledge and social learning among stakeholders that can help actors to develop an understanding towards each other's preferences, values and opinions (Mårald et al., 2015). Thus, forms of knowledge co-creation can empower stakeholders and increase their access to common knowledge. However, there is a difference between learning that is social or collective versus individual (Menzel and Buchecker, 2013). For example, co-creation of knowledge and social learning includes learning with and from others, but can also help individuals explain and value others' opinions (Reed, 2008). Furthermore, increased involvement through public participation can improve local communities and government relations, as well as empower stakeholders to shift their role from mere participants to gamechangers (Buchy and Hoverman, 2000). By encouraging social learning among all stakeholders this can have long-term effects on empowering local communities and local development. Ångman (2012) emphasize the role of meeting spaces in which different interests and perspectives can be raised. This can lead to a wider base of common knowledge, enhancing the potential for more sustainable decision-making, but information must be easily accessible by, and understandable to, all stakeholders. This includes open access to both local/regional knowledge and scientific/expert knowledge and information securing participants' degrees of control, knowledge transfer and learning.

Building on these arguments, studies have determined the role of effective process design (Reed et al., 2018), including several factors that are important to increase legitimacy and reliability of collaborative processes (e.g. Beierle and Cayford, 2002; Buchy and Hoverman, 2000; Reed, 2008; Sheppard and Meitner, 2005). For example, collaborative processes need clear objectives from the start. When possible, participation should be institutionalised, meaning that an existing organisational culture facilitates the collaborative process, and that goals are allowed to remain ambiguous until negotiated during the process (this can also be a process goal). To emphasize empowerment, equity and

trust, a broad range of stakeholders should be involved as early in the process as possible, to ensure wide representation and opportunities to affect the entire process. Arler (2000) and Mellqvist (2017) also stressed the importance of local knowledge, based on understanding a landscape from the perspective of its everyday use by those living or working there. Hence, one part of understanding and developing fruitful collaborative processes requires that each process be related to its specific geographical and/or local context (Buchy and Hoverman, 2000, Nelson and Wright, 1995, Wallin et al., 2016).

Several studies addressing collaborative processes in forests have also called for place-based, collaborative learning processes among stakeholders (e.g. Elbakidze et al., 2016; Kangas et al., 2010; Tikkanen, 2018; Valkeapää and Karppinen, 2013) and a more holistic approach to forest management and forest decision making (Fischer, 2018). They specifically emphasize the importance of a landscape approach, meaning an approach concerned with, and understanding, place and space (i. e., landscapes as integrated social and ecological systems) towards addressing sustainability and sustainable development (Axelsson et al., 2011; Elbakidze et al., 2016). In addition, recent public participation GIS (PPGIS) and participatory GIS studies have engaged the public and other stakeholders in identifying and mapping a range of ecosystem services and landscape characteristics (Brown, 2012a, Brown, 2012b, Brown et al., 2014, Brown and Fagerholm, 2015, Brown and Kyttä, 2014). These studies have been fruitful for mapping landscape values and specific places, based on participants' personal experiences, to identify preferences for rural land use and zoning. However, due to its strong implications for local development trajectories, use of such approaches has been limited (Brown, 2012a, Brown, 2012b). In another context, Adelfio et al. (2019) used GIS to co-produce knowledge and deliver information through visualisation techniques, which they termed 'GISualization'. In their urban studies, they combined quantitative GIS data with qualitative data from interviews and workshops to illustrate and communicate the use and local values of specific urban sites in three large cities. This type of empirical mapping is especially suitable for highlighting immaterial values and cultural ecosystem services in landscapes, often related to tourism, recreation, scenic beauty, cultural and natural heritage (Brown and Fagerholm, 2015). Next, we present landscape resource analysis (LRA) as a possible tool for capturing a landscape approach.

2.1. Landscape resource analysis

LRA was initially designed as a tool to address the ELC focus on collaborative and democratic aspects of landscape planning (Clemetsen and Krogh, 2010) and can be defined as, 'a framework for democratic and participatory processes in identifying assets and potentials for revitalising communities' (Clemetsen and Johansen, 2015). This is in line with ELC (Council of Europe, 2000) using the term landscape democracy which concerns more democracy-oriented approaches and public participation in planning.[1] This means that LRA both characterises landscapes and investigates people's attachments to a place based on their experiences and perceptions of it. LRA also addresses people's *place identity*, a term describing people's relationships with and attachments to a place or landscape (Tuan, 1977). According to Beland Lindahl (2008), different meanings of, and experiences with a place are also important aspects of nature resource management, especially when there are varying expectations or competing interests for the same resource. Thus, in LRA, landscape characterisation, including mapping

both natural and cultural resources (Clemetsen and Stokke, 2014), is a tool for creating a common platform for discussions of visions and potentials for place-based development. It also focusses on the importance of integrating people's perceptions, values and preferences about a particular place or landscape, as well as issues of cultural and natural heritage (Clemetsen and Johansen, 2015). As a method LRA was developed and put together from already existing methods on landscape analysis and sense of place and has mainly been used in place-based projects involving local communities in tourism development projects in Norway. It differs from other methods in terms of the extensive documentation during the actual LRA-process (Haraldseid, 2016) and that it focusses on the local's perspective and their experiences of a certain landscape. These experiences often differs from the voice of 'experts', but are equally important (Clemetsen and Krogh, 2010). On a more overall level landscape analysis is not a static process but part of a development processes. In that way it is also a learning process for all actors. Importantly it should create space for dialogue between local stakeholders and authorities aiming to develop a new plan or policy (Brunetta and Voghera, 2008).

LRA is designed to include four levels of landscape reality concerning certain questions related to the past, present and future but also the material shared reality and the inner individual perceived reality (Clemetsen and Barane, 2021). More specifically they include the empirical, pragmatic, normative and value level, as first developed by Basarab Nicolescu (Clemetsen and Johansen, 2015). The empirical level serves to map and gather data and basic facts about the study area. This is accomplished by landscape characterisation and gathering data from pre-existing databases, usually with quantitative data. In contrast, the pragmatic level aims to gather data that are more qualitative, such as residents' and other local actors' values and experiences in the landscape, to capture their sense of place and place identity. This can be accomplished by collecting data via interviews, surveys, focus groups, field observations, etc. The normative level is used to define the area's common resources, based on data from the first two levels (e.g., by identifying important natural and cultural heritage sites, leisure and recreation spots). Depending on the resources identified, this level can serve as a resource for both entrepreneurialism and local development. The aim of the value level is to develop coherent strategies and plans for the area, to prioritise actions for local development processes. All strategies should represent and reflect the values, sense of place and experiences of those living or working in the area, and local ambitions for the future (Clemetsen and Johansen, 2015).

3. Materials and methods

In this section the materials and methods used, including maps and GIS, is described. First a short description of the case will be presented.

3.1. Case study area – Norra Klarälvsdalen

Approximately 70% of Sweden's surface is covered by forest. Lately, land conflicts between forest industry and local stakeholders and civil society organisations have increased (Holmgren et al., 2022). One problem is that forest-related issues and forestry are unconnected to local planning systems (e.g., municipal planning, regional or county-level administration). This is because strong economic interests in the forest sector have made forests important nationally (Stjernström et al., 2018). However, when connected to local planning systems, forests are also important local resources (i.e., unevenly distributed place-specific resources for local and regional development in sectors other than the forest industry) (Stjernström et al., 2017). Moreover, forest resources also have an important public value when privately owned. This is especially true in Sweden, where forests are treated as a valuable public asset via the so-called right of public access (*allemansrätten*), a historic public right of way to forests. However, this right has recently been challenged by increasing multiuse of forest landscapes, such as large-

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[1] Here, we do not aim to deepen the discussion on defining landscapes. We use the definition on landscape democracy and the definition by ELC on landscapes as 'an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors (Council of Europe, 2000:3)', meaning that they consist of both social and ecological systems that cannot be separated.

scale leisure activities and tourism (Stjernström et al., 2017).

The LRA process in this study was set up in *Norra Klarälvsdalen,* a rural forest area that includes the parishes Norra Ny and Dalby in the municipality of Torsby in northern Värmland County, Sweden (see Figs. 1 and 2). The area is sparsely populated by about 3000 inhabitants. The site was chosen based on its extensive forests, variety of forest owners (i.e., from small private owners to large forest companies), presence of small and medium sized businesses and firms across a variety of sectors, ranging from leisure and tourism to adult forestry education and nature tourism and conservation, but also several voluntary organisations. Thus, there are a multitude of possible and varying interests and values among this forest area's local stakeholders.

3.2. LRA-process in Norra Klarälvsdalen

The LRA process in Norra Klarälvsdalen was initiated and organised by the project researchers, but the goal was to use bottom-up practices when participants identified and described the area's qualitative values. In total the researchers conducted eight internal workshops, two external participatory workshops and an external dissemination to a wider group of stakeholders (an overview of the LRA process is presented in Fig. 3).

3.2.1. Internal workshops among the researchers
The first five internal workshops aimed to gather different types of data about a potential study area and to discuss and learn from others' experiences with LRA processes, but also to prepare for and set up two
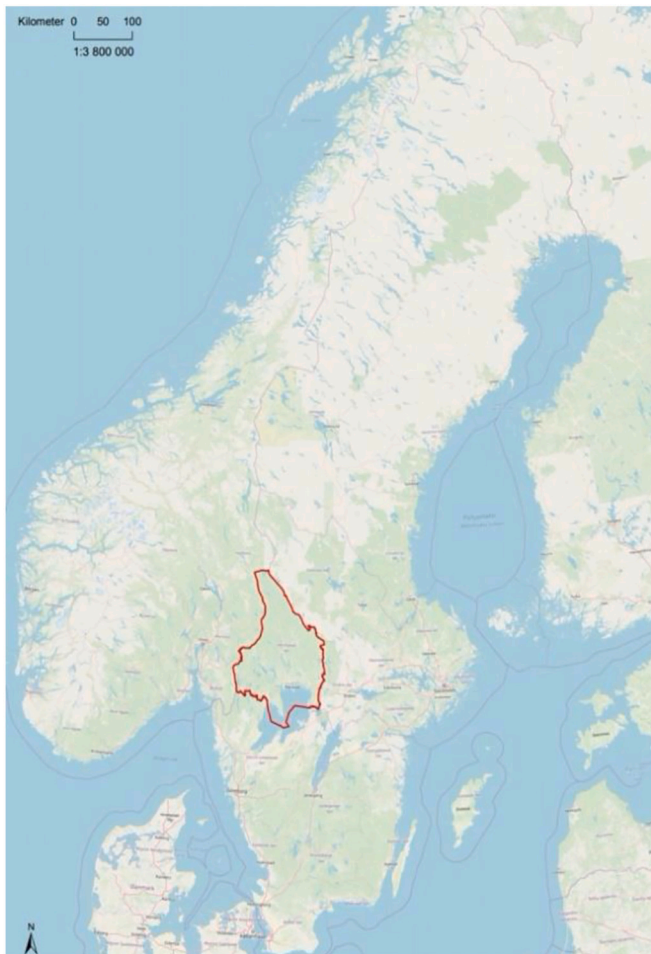

Fig. 1. Location of Värmland County.
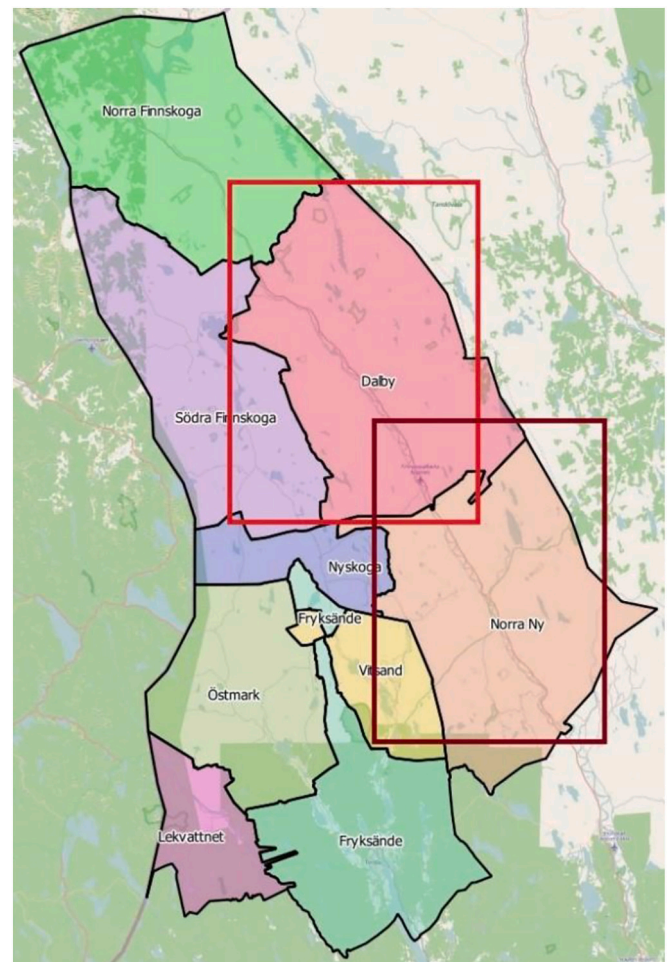**Source:** © OpenStreetMap (and) contributors, CC-BY-SA

Fig. 2. Map of selected geographical study area, roughly corresponding to Dalby and Norra Ny parishes in Norra Klarälvsdalen.
Source: Data CC by SA by OpenStreetMap

participatory workshops. To identify a geographical area for the LRA process, the researchers initially collected GIS data to characterise the landscape of the area that was presented in a first internal workshop. A large database of northern Värmland County was created, including maps with different GIS data layers with landscape information (e.g., natural resources, cultural heritage, land ownership and various protected area types). The next step was a field trip to a potential study area together with the Swedish Forest Agency, where the database information was combined with knowledge from previous research and experiences among those in the internal project group. The group also met with local actors from a local environmental organisation and local entrepreneurs. This resulted in the identification of the study area.

The third internal workshop focused on preparing for and designing the first workshop with local participants. Practical aspects of this workshop were discussed based on LRA experiences by an expert in the field, resulting in the decision to recruit an external process leader. In consultation with the researchers, the process leader and a research assistant were responsible for organising the logistics for the participatory workshop.

During the fourth internal workshop, the researchers and external process leader attempted to interactively add qualitative values to a GIS map. When this proved too difficult, it was decided to instead run the participatory workshop with analogue maps. The fifth internal workshop was dedicated to fine-tuning the practical aspects of the participatory workshop, in collaboration with the LRA expert.

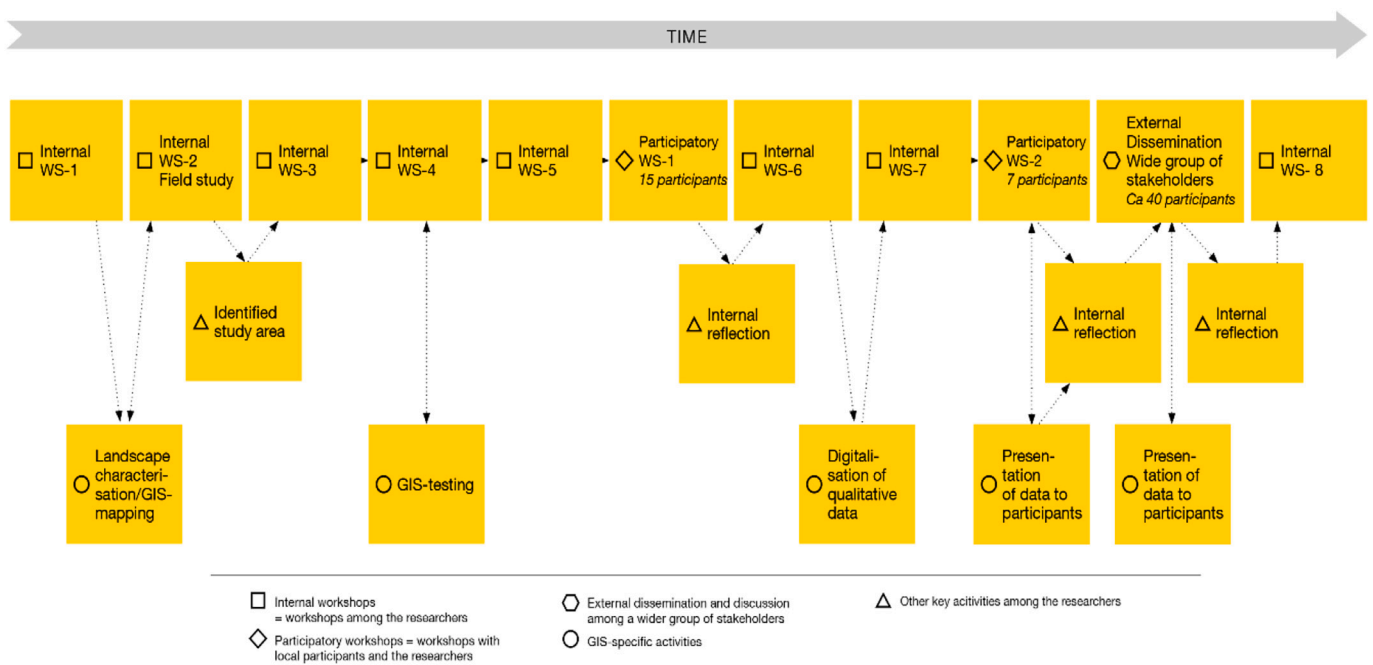In two final internal workshops, the researchers analysed and made a

Fig. 3. Overview of the Norra Klarälvsdalen LRA process (2017–2019) presented in a chronological order, based on five process elements: 1. internal workshops among the researchers; 2. participatory workshops with local participants and the researchers; 3. GIS-specific activities; 4. external dissemination of the LRA process for discussion among a wider group of stakeholders; and 5. other key activities among the researchers (for a more detailed description see Christenson and Dahlström, 2020; Christenson et al., 2020).

preliminary, inductive classification of the identified qualitative values. After the first participatory workshop data digitalisation was used to translate qualitative values from the participants on maps (Fig. 4, left) into geometrical shapes: i.e., points, lines or polygons. These three shapes are the basic geometrical types used for two-dimensional

representations on maps or in GIS software to represent a specific location or point (e.g., a house), a line (e.g., a path or trail) or an area using a polygon (e.g., a hunting area). These data were then entered into the GIS software (Fig. 4, right).

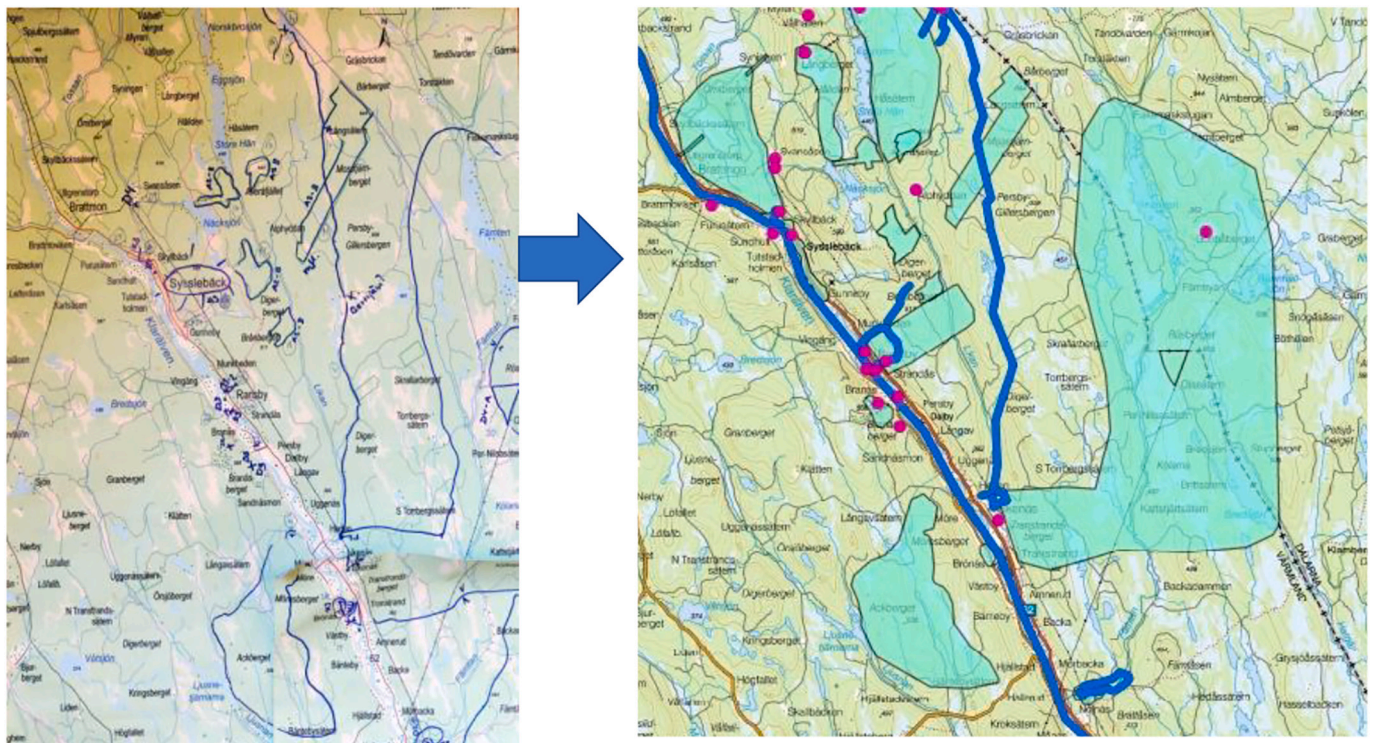This was followed up by a last internal workshop for the researchers

Fig. 4. Example of transferring qualitative values from the first participatory workshop to GIS. Left: photo by Henrik Grund. Right: export from ArcGIS. Map from GSD terrain map, Swedish mapping, cadastral and land registration authority.

to reflect on the overall LRA process.

3.2.2. Preparing for participatory workshops

The participatory workshops were arranged in guidance of former LRA processes but with the aim to identify and communicate local values and interests in forest areas. In addition, one occasion with an external dissemination was arranged to a wider group of stakeholders at the end of the process to communicate local values and interests to a broader community.

Recruitment for the participatory workshop was guided by an LRA-based need to include different interests in, and values of, the forest. The goal was to invite a heterogeneous group of participants with strong ties to the area, to secure broad knowledge about the landscape. However, the group could not be too large for the participatory workshop format and former LRA experiences (e.g. Clemetsen and Stokke, 2017) suggested that participants should be able to comfortably sit in one circle and listen to brief contributions by everyone present. Fifteen participants were recruited, all of whom lived and/or worked in the area and had both ties to, and knowledge about, the landscape. They were connected to the area in a variety of ways, including: a local development group; firms using the forest for timber or to produce goods; the tourism industry; nature or heritage conservation NGOs; adult nature and wildlife conservation education or nature tourism; second home ownership; the local authority; or forest ownership. The participants were not formally representing a specific firm, organisation or authority, but where there as local stakeholders.

The importance of setting clear objectives for the participatory workshops was recognized early in the project, as was the need to inform potential external participants about the workshop's aims in an invitation letter. The invitation contained information about the research project, including that its purpose was to apply, and reflect on, a collaborative method. LRA was described as a way to identify different forest values, to meet various interests and ensure sustainable forest use. The invitation also included a link to a film in which one of the researchers spoke about an object that symbolised the forest's value for her (INGOSKOG, 2019). Attention was paid to finding a suitable location for the workshop. Utmarksmuséet[2] museum was therefore considered appropriate as it is centrally located in the study area with strong links to place identity and the history of northern Värmland. The workshops were held during weekends to allow as many different participants as possible to take part. However, this did not guarantee that all participants joined the second participatory workshop where only seven participants took part.

Another important aspect, and an important LRA feature, was informing the participants that they could use any knowledge or ideas that emerged from the project (e.g., in local development projects). This also paved the way for opening a common meeting space in which different values and interests could be discussed (Brunetta and Voghera, 2008, Clemetsen and Krogh, 2010).

4. Results

In this section we present the results of the LRA process in norra Klarälvdalen in relation to the research questions presented in the introduction: "Did the LRA process include interaction and exchange between stakeholders representing a wide range of and sometimes conflicting interests and values?", and "Was it possible to identify, visualise and communicate different values and interests from the stakeholders throughout the LRA process?" The results are also discussed in relation to the features of collaborative processes, including legitimacy, empowerment and social learning.

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2 '*Utmark*' refers to historic agro-forestry, or summer forest grazing near shielings where farmwomen lived and made milk products.

4.1. Interaction and knowledge exchange between stakeholders in the LRA process

The first participatory workshop was centred on identifying a variety of values and interests. The workshop was carried out in three groups, each moderated by a researcher. To create a sense of equity and trust among the participants, it was designed to achieve as high degree of participation as possible e.g., the first workshop activity, in which all participants took turns speaking about an artefact that symbolised their important value in the forest. Thereafter, the participants were asked to contemplate how they value the forest area in Norra Klarälvsdalen, and to record their thoughts on a piece of paper. Each participant then took in turn to share their values while the geographic location of each value was drawn on large, printed topographic maps corresponding to the two rectangles in Fig. 2. The session continued until all values and locations had been added. Focus was placed on creating a two-way discussion to identify as many different forest values as possible, and to create a platform for communication among participants and learning about these values and different interests. Deliberation was therefore a central part of the process. How the participants spoke about what they valued about the forest was rich and often quite personal. One participant expressed:

> It is all about our cultural heritage, to keep that. And there are also many visitors in these areas, so it is good for tourism as well as these [the shielings] … and it is all about cultural history to pass that on to others and the buildings, their history as well. They [the shielings] used to be a way to sustain yourself and the family, it was an important part of life here, and without this one could not survive the winter, so these are very important for cultural heritage.

Another participant expressed a different value:

> For me it is all about hunting, all kinds of hunting. The social aspect, both with the hunting crew and with one's dog. Different types of hunting give different types of values, both the meat but also hunting as recreation, a way to recharge the batteries, anti-stress really. It is the same with fishing too.

Thus, the setting of the workshop served as an important tool for creating a common meeting space (Ångman, 2012) where different forest values and experiences were shared among the participants, highlighting that the local forest is a common resource. In addition, the workshop was also important for the researchers to gather qualitative data that helped identify values beyond the mere economic and visible from the workshop participants. These added values represented both material and immaterial values but also important local knowledge among the local participants. Several of the of the participants embodied different individual interests and values. For example, they could simultaneously be part of a local association and an NGO, or represent a local firm and be a forest owner. Even though the identified resources were not business or development based, it became clear that the exercise of identifying their experiences, immaterial and material values and preferences allowed the participants to also learn about different economic opportunities in the area. The participants pointed out that their forest was an important local source of economic development, of which the participants felt they wanted to be a part. This also shows that encouraging social learning and the co-creation of knowledge can lead to long-term effects that can empower local communities and support local development (Buchy and Hoverman, 2000, Nelson and Wright, 1995, Wallin et al., 2016). However, the different forest values that was pointed out also showed the complexity of forest landscapes. Different values and interests often collided between different actors, but sometimes also led to internal and individual conflicts about the future of forests. On the other hand, such conflicts are necessary and can, if recognized and taken into concern, enhance the legitimacy of collaborative processes (Paavola, 2003).

As part of sharing and exchanging ideas and knowledge between the

stakeholders, the three groups combined during the final part of the workshop, so that each could share their reflections and discussions with the wider group. There were efforts to ensure that every participant had time and space to tell their story, regardless of how outspoken they were. There was consensus that breaking into smaller groups facilitated opportunities for participants to express themselves, although there were concerns about whether all participants had felt fully able to express themselves.

4.2. Identifying, visualising and communicating different values and interests in the LRA-process

After the participatory workshop, work on processing the various qualitative values began. The researchers transcribed the recordings, and all the over 100 identified values were linked with the markings on the maps and a PPGIS was created (see also; Christenson et al., 2020). During a sixth internal workshop, the researchers analysed and made a preliminary, inductive classification of the identified qualitative values. All identified values were listed on whiteboards and their commonalities were discussed. They were grouped and then compared with the existing ecosystem services framework. The data matched well with the ecosystem services definitions, which include: *provisioning services*, such as food and biomass; *supporting services*, such as nutrient cycles and soil formation; *regulating services*, such as flood regulation; and *cultural services*, such as recreational and cultural heritage conservation (World Resources Institute, 2005). It is important to stress that the researchers did not initially frame the LRA process in ecosystem services. Rather, it emerged in a bottom-up manner from the participatory workshop process through each participant's direct input in their own words about how the forest landscape is important to them. This included some interpretation of what constituted a value, and what type of a value it was. For example, the participant quote: 'I think that it is wonderful to walk in the forest', with the route this participant regularly walked was marked on the associated map. This value was interpreted to reflect the qualitative value *quality of life* (Table 1).

After the manual interpretation of the different interests and values the immaterial (qualitative) values were added through the digitalisation to layers of pre-existing, often material (quantitative) data. This

Table 1
Qualitative values generated during the workshop and grouped according to the ecosystem services framework.

Ecosystem services category	Examples from the participatory workshop
Provisioning ecosystem services	Foraging for mushrooms and berries
	Game
	Fish
	Income from harvesting trees
	Income from hunting tourism
	Grazing by shieling
Supporting ecosystem services	Biodiversity
	Carbon dioxide trap
Regulating ecosystem services	Water regulation
Cultural ecosystem services	Cultural history
	Building conservation
	Cultural heritage
	Quality of life from living in the forest
	Recreation – well being
	Health
	Walking/trekking
	Peace and quiet – healing
	Outdoor life
	Skiing
	Bathing
	Sense of place (belonging)
	Identity
	Learning
	Motor sports
	Job opportunities
	Exercise

way of digitalizing the data also worked well for visualising the qualitative data. The database made it possible to zoom in on specific areas and identify different qualitative values while simultaneously sorting different data types from the underlying layers (e.g., protected areas). Herein we argue that the combination of quantitative and qualitative data developed in the LRA process was useful to identify and communicate both material and immaterial values. This data also served as a basis for dialogue and social learning and increased access to local knowledge among the local participants and the researchers.

In a similar manner, and as noted above, Adelfio et al. (2019) used the term 'GISualization' to describe the multiple layers of knowledge that become available by combining GIS and other qualitative data. In their study, GISualization was used as a platform to enable dialogue between researchers. In this LRA process, a similar way of presenting data was used to enable dialogue among the workshop participants. However, it was also important to address different forest values in the area under study, similar to PPGIS (Brown, 2012b) which aims to visualise values and personal experiences. To this end, we used the qualitative data identified in the participatory workshop. This created an opportunity to identify and communicate the complexity, and potential conflicts, of different values of the forest landscape and as Table 1 shows, towards the many interests that were identified throughout the LRA process, such as biodiversity, mushroom and berry picking, tourism, outdoor life, job opportunities and harvesting trees. All these interests show the complexity in forests and the potential conflicts between different economic sectors, local values, and sense of belonging. Hence, this way of working encourages broad participatory engagement in the collaborative process, with a focus on place-based valuation for land use decisions. The values identified herein represented both the social and ecological aspects of landscapes (Angelstam et al., 2018; Elbakidze et al., 2016), and immaterial and material aspects of ecosystem services. More social aspects became especially clear through the mention of immaterial values such as peace and quiet, quality of life, sense of place and belonging (Rose, 1995; Tuan, 1977). Many of these could be categorised as cultural ecosystem services which, compared to other ecosystem services, are more difficult to visualise due to their qualitative character, which often makes them invisible. This shows that pre-existing, quantitative GIS databases can be combined with digitised qualitative data to demonstrate people's feelings about, and attachments to, forests, both of which are important in forest decision-making and planning (Beland Lindahl, 2008). Qualitative data are also an important addition to cultural ecosystem services, among others, which are often difficult to operationalise based on monetary terms (Brown and Fagerholm, 2015).

In a second participatory workshop the researchers presented and discussed the work carried out by the researchers after the first participatory workshop. It also included quality control and evaluation elements to ensure that no identified values were missing, determine whether the participants agreed with the ecosystem services framework-based categorisation and discuss whether the data digitalisation was successful. Importantly, some values missing from the first participatory workshop were identified and added to the dataset. All participants gathered for structured verbal and written evaluations administered by the external process leader. During the verbal evaluation the group discussed answers to three questions (Has your understanding of forest values changed by participating in the workshops? How?; Have you been made aware of something new? What?; and Has participation in the workshops affected you in any way? How?). The ways the participants answered shows that collaborative processes such as the LRA, can serve as a tool for social learning and knowledge co-creation. According to one participant, regarding what they learned and becoming aware of:

> That it is so complex, to be able to put all this together, it is so many values and it is hard to grasp and to show, if we just look at one thing it is more … but as shown like this [the LRA] it is so complex with all

these values. But it is good that there is a tool so you can show the complexity.

Another participant stated that:

It has been a little like a wake-up call. I have always been in the forest; it is the most obvious thing for me really. But the things that we have talked about in the workshops, it is really, it is made visible very clearly, the values that are in conflict, different interests and conflicts that can happen about the forest. I have thought about that before, but it has grown on me from these workshops, the fact that so many have their claims on the forest from their own interests and … for me it has been a wakening.

A written evaluation was then administered after the researchers left the meeting room. In this format, the participants also pointed out that the method had been valuable because many varying interests had been present and they had been able to express themselves, so that many points of view were shared. Most of the discussion focused on evaluating the actual collaborative method, which in another setting could work to strengthen the legitimacy of a collaborative process by acknowledging the stakeholders concerns and different interests.

On a more overall level the local participants were positive with their participation in the workshops. They appreciated having had the opportunity to voice their views and mentioned that they often feel ignored by far-away decision-makers. Especially, there was a lack of information and available knowledge on decision making in the forest. For example, the participants wanted to know more about protected areas and the basis of such decisions. Thus, the LRA could therefore serve to empower local stakeholders in forest matters. The participants also stressed the capacity of the method to illustrate the complexity of forest values and that it was important that both material and immaterial values are treated more equally. Hence, one important aspect of this collaborative process, and the LRA process generally, was the co-creation of knowledge, social learning and knowledge development, including both local and scientific knowledge. One aim was to create a common space for social learning about the qualitative aspects of different forest values and interests. Thus, sharing and communicating throughout the process was central (e.g., via the second participatory workshop and open dissemination seminar). Here, As Reed (2008) described, co-creation and knowledge development that includes a wide range of actors increases the potential for social learning in collaborative processes. Workshop participants gave several examples of what they had learned and their new openness to others' opinions and values.

However, the concern that some participants were more forthcoming about their views was also raised. Importantly, there were also existing power dynamics between the participants. However, discussing their forest as a group facilitated an understanding of different opinions and values. In the evaluation after the second participatory workshop, one participant described listening to someone with quite different forest values:

I have gained greater insight about the economic values of the forest – thank you [name of other participant] … insight into how difficult it is for all these different values to coexist, and in the future, and one can clearly see that here.

At the end of the LRA process, an open dissemination seminar was organised in the study area to communicate the experiences and findings with a wider stakeholder group. In contrast to the second workshop, the dissemination seminar allowed actors from outside the study area to learn about the project and study area; this attracted a wide range of actors and stakeholders (about 40 participants) from a large geographical area, including representatives from the Swedish Forest Agency, Region Värmland, the cluster organisation Paper Province and the local adult education institution. This seminar provided a valuable opportunity for legitimising the process and to improve local communities and government relations, by visualising and communicating local forest values and interests to others than those that have been directly involved in the participatory workshops.

5. Concluding discussion

The aim of this paper was to explore LRA as a tool for collaborative processes in forest areas. As presented in the result section above, the case shows that the LRA process was able to identify and communicate a variety of interests and values, including alternatives to economic focused values. The complexity of collaborative processes in forest areas was revealed in various ways. Firstly, from the need for careful planning and organising of the content and practicalities of participatory workshops as outlined in the materials and methods section above. Secondly, the participatory workshops identified over 100 values and the participants stated how the LRA showed as well conflicting as common interests in their forest. Even though there were conflicting interests the method helped them to open up for the many different values in forests. One result of this was that they saw the value of both material and immaterial values and that they also wanted the immaterial to become more visible. In that way the LRA process increased the access to local knowledge which in many ways empowered the participants as they learned more about their forest, which they saw as a common resource. Thus, it also served to decrease tensions between different interests (Buchy and Hoverman, 2000) and could help increase legitimacy in forest matters in the area (Corbera et al., 2007). However, some participants still pointed out that some voices were stronger than others, pointing to the advantages and disadvantages with collaborative processes and the risk that some voices become more dominant than others.

In this case the LRA process did not increase public trust in forest decision making or forest management (Buchy and Hoverman, 2000, Johansson, 2016, Reed, 2008, Sheppard and Meitner, 2005). Rather it showed that there is a distance between citizens, their local forests, and decision-making processes and that there is a lack of information from authorities on these matters. As mentioned earlier forest policy and management in the Swedish context is decided on the national level and thus far from the localities that it affects. Thus, there is a risk that future plans and strategies in these localities are far less likely to be accepted on the ground (Johansson, 2016). On the other hand, the LRA process showed the participants that they had a common goal and a common vision for the forest. The process opened up for a wider understanding of the participants interest, where the participants clearly learned with and from the others, and helped the individuals to explain and value others' opinions (Reed, 2008). This also shows that increased involvement through public participation can empower local stakeholders to shift their role from mere participants to gamechangers (Buchy and Hoverman, 2000). The LRA process can therefore be an advantageous method to contribute towards landscape democracy in line with the ELC.

As discussed earlier by e.g. Reed et al. (2018), Mellqvist (2017), collaborative processes, including such processes as LRAs must be adapted to the specific local context and process goals. Even though the LRA-process is designed to focus on collaborative and democratic aspects of landscape planning, a disadvantage is that it is difficult to guarantee that all possible stakeholders are represented. Although the process is participatory and aims at broad, equal representation of interests, it cannot be a truly democratic process. It is impossible to engage everyone who lives or works in an area. This also points back to the importance of an effective process design (Reed et al., 2018), where the LRA can work as a satisfying tool for illustrating the different interests and values in forests. However, all kinds of collaborative processes are time consuming and this specific LRA shows that it is important to reflect over the chosen area. Regarding the geographical scale, the size of the study area may have been slightly too large. It would also have been difficult to scale up the LRA process to an even larger geographical area, since including relatively few participants would limit access to sufficient place-specific knowledge to identify enough place-specific immaterial values in large forest areas. Any such case might benefit from

applying the LRA process to sample areas, such as known hot spots in which values clash.

Just as in other studies using GIS-based forest modelling and landscape visualisation (Sheppard and Meitner, 2005) or PPGIS to engage the general public and stakeholders to identify and map a range of ecosystem services and landscape characteristics (e.g. Brown, 2012a; Brown, 2012b; Brown et al., 2014; Brown and Fagerholm, 2015; Brown and Kyttä, 2014) our LRA together with the GIS component to identify and communicate immaterial values in forests was fruitful. It served to map specific landscape values and specific places based on participants personal experiences to identify preferences for local land use and zoning. Thus, using GIS in this LRA was one way to fulfil the need for place-based methods to evaluate and assess nature services from different stakeholder's perspectives (Brown and Fagerholm, 2015). Moreover, using small group interactive community workshops to map cultural and provisioning ecosystem services is important (Brown and Fagerholm, 2015). The advantages of GIS were also noted by Adelfio et al. (2019), who suggested that using GIS as a tool to co-produce knowledge facilitates rich data in projects combining quantitative and qualitative data. The qualitative data from the GIS-workshop also served to visualise the immaterial values for further discussions and understanding of different values among the participants. In other studies GIS has also been used as a development tool to encourage empowerment and community identity. Here it was not the resulting maps that where of main importance, but they served as a tool for promoting participation among local stakeholders and to communicate a variety of values to different stakeholders (Brown et al., 2014). Because LRA is a framework for democratic and participatory processes towards identifying local assets, it can serve as a tool to identify both material and immaterial values, as well as nonmonetary and *qualitative* ecosystem services, in forests. It also helps to address local values, knowledge, place identity and sense of place in decision making and planning processes, all of which are vital when conflicting interests over natural resources may increase (Beland Lindahl, 2008). To summarise, the LRA as a landscape approach has showed potential to add value relative to other participatory approaches in relation to identifying cultural ecosystem services, focus on local perspectives and experience of a landscape in addition to 'experts', place-based collaborative learning processes among stakeholders and 'GISualization'. However, more studies are needed and as mentioned above a clear limitation of the study area is necessary.

CRediT authorship contribution statement

Ida Grundel: Conceptualization, Methodology, Writing – original draft, Writing – review & editing. **Nina Christensson:** Methodology, Investigation, Writing – original draft, Writing – review & editing. **Margareta Dahlström:** Methodology, Investigation, Writing – original draft, Writing – review & editing.

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.

Acknowledgements

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