Socio-Natural Capital for Sustainable Land Use in the Fennoscandia

Simo Sarkki, Kirsi Latola, Mikko Jokinen & Adam Stepien

This paper introduces concept of socio-natural capital, which is here seen as a property of social systems including institutions, human groups and individual people to use natural capital in a sustainable way. The objectives of this article are to map gaps regarding socio-natural capital via examining case of reindeer herding and its relations to other land uses in northern Fennoscandia, mainly in Finland, and to explore ways how socio-natural capital can be promoted in order to enhance sustainable land use in the northern sparsely populated Fennoscandia. These issues are examined based on previous research and especially on reindeer herders' perspectives, as well as on an online questionnaire (n=13) and a workshop (n=11) with stakeholders on land use in Fennoscandia. Gaps in socio-natural capital include lack of trust between different land users, discrepancy between governance ideals and real world practices, divergent perceptions on sustainable land use, and use of resources for external benefits. Following proposals can help to close these gaps: 1) to enhance public participation, 2) to stronger institutionalize indigenous land rights, 3) to enhance multi-directional knowledge exchange, and 4) to include social impact assessment more strongly into planning processes. Further studies and conceptualisations of socio-natural capital are needed to find ways how people could interact to build capital to solve land use contradictions for sustainability.

Introduction

The notion of capital has gained footing in recent decades in scientific discussions. Various types of capital have been identified with the purpose of emphasising that issues other than monetary ones are important for human development. Among the most prominent concepts in this 'capital family' are natural capital and social capital. The concept of natural capital was used to calculate the monetary value of the world's biodiversity, evoking a lot of discussions on the role of the environment in human well-being (Costanza et al. 1997; MA 2005). Social capital has been argued to facilitate collaboration and problem solving, grounding democracy and promoting

Simo Sarkki is Docent and Kirsi Latola is Research Coordinator at Thule Institute, University of Oulu, Finland. Mikko Jokinen is Researcher, Finnish Forest Research Institute, Kolari Unit, Finland. Adam Stepien is Researcher, Arctic Centre, University of Lapland, Finland.

successful economic growth (Putnam 1993; Fukuyama 2002). Thus, both natural and social capital are tightly linked to economic and human dimensions of development and have been developed to evoke attention and advance discussions on the role of alternative forms of capital to sustainable development. This paper introduces the concept of socio-natural capital to identify hindering and facilitating factors for sustainable land use in the Fennoscandia. Sustainable land use can be defined as practices that maintain and provide opportunities for land use for current and future economic and social benefits, while not deteriorating the ecological state of the used areas. There may be also contradictions between the ecological, economic and social dimensions of sustainability. Here the discussions on socio-natural capital are placed within the context of social-ecological systems (SES). SES literature highlights that the sustainability of resource use needs to take into account coupled social-ecological systems and their interrelations (e.g. Folke et al. 2005). SES examinations have been previously connected to natural capital (e.g. Biggs et al. 2012) and to social capital (e.g. Olsson et al. 2004).

Natural capital is seen as a stock of properties of ecosystem structures and processes, which provide so called 'ecosystem services' to people (e.g. Daily 1997). Following the Common International Classification of Ecosystem Services (CICES 2013), there are three types of services: 1) provisioning (products obtained from ecosystems e.g. food, wood, water), 2) regulating and maintenance (moderate or control of environmental conditions e.g. flood control; water purification by aquifers, carbon sequestration by forests, etc.), 3) cultural (non-material benefits obtained from ecosystems e.g. recreation, education, aesthetics). Today, supporting services (MA 2005) or natural capital (Costanza et al. 1997) are mostly assigned to ecosystem functions as parameters of the ecological functioning grounding the other types of ecosystem services. Ecosystem services can be understood as a flow from natural capital to ecosystem services, which further provide benefits and values for people (Haines-Young & Potschin 2010). However, the accounts on provisioning of ecosystem services need to take into consideration the inseparable social and ecological dimensions affecting ecosystem services, and further on human benefits and well-being (Heikkinen et al. 2012; Spangenberg et al. 2014). The ecosystem services, values and benefits provided by natural capital are socially negotiated, and also contested due to divergent social conceptualisations of what constitutes for example environmentally and socially sustainable land use. In this article we apply this idea, and do not focus on natural capital as such, but on contested social definitions on the sustainable use of that capital. Therefore, the notion of socio-natural capital seems to hold promise for integrating more clearly the social dimension inevitably linked to the concept of natural capital, and expanding it though the notions of trust, networks, communication, power, norms and governance practices.

The concept of human capital refers to the stock of competencies, knowledge and social attributes that increase an ability to produce economic value (Simkovic 2013). Bourdieu (1986) has introduced sub-dimensions for human capital, those being social, cultural and symbolic capital. Here we apply the concept of social capital to build up our notion of socio-natural capital. In recent discussions on development, the concept of social capital has been described as the glue that holds societies together (Serageldin & Grootaert 1999). The most important aspects of social capital are trust, norms, reciprocity, leadership and networks (Putnam 1993). Furthermore, communication has been included as a dimension to social capital necessary for exchanging information, identifying problems and solutions, and managing conflicts (Hazleton & Kennan 2000).

Socio-natural capital is here seen as a property and capacity of social systems to use and govern natural capital in a sustainable way. It requires knowledge about how natural capital transforms into human benefits. Socio-natural capital encompasses the ability of people or groups of people to use ecosystem services in ecologically, economically and socially sustainable ways, not deteriorating the future possibilities to utilise them. Furthermore, the notion of socio-natural capital allows one to emphasize that sustainable land use is negotiated between various users. Socio-natural capital helps to ease trade-offs and manage conflicts by building relationships based on trust and reciprocity and may use positive leadership to develop socially just solutions to the use of social-ecological systems (SES). Resilience theory has examined how the sustainability of the use of SES can be enhanced in an in-depth manner (e.g. Folke et al. 2005; Walker et al. 2004). However, the SES and resilience literature often neglects the dimension of power embedded in the negotiations over defining the sustainable use of SES (Cote & Nightindale 2012). Our concept of socio-natural capital aims to capture some of the issues related to power regarding debates on the sustainable use of SES. As the socio-natural capital is a property of social systems (including institutions, actor groups, individuals) the concept is actually much closer to social than natural capital. However, here the insights from the natural capital literature encouraged us to establish firm linkages between social capital and social perceptions related not only to social interactions, but also to ecosystem processes, natural capital, framing of environmental and social sustainability, and the constitution of human values and benefits regarding the use of SES. The notion of socio-natural capital complements the resilience literature on sustainable use of SES by being explicit about power relations: inclusion and exclusion, trust, political character of perceptions of the natural resources and their use, trade-offs between various interests, and distribution of benefits and burdens deriving from use and governance of SES.

Two important characteristics of northern people justify the application of the notion of socio-natural capital in the analysis of land use for example in Fennoscandia. Firstly, northern people have had for centuries close relationships with nature, and nature is a key factor in the understanding of well-being in the region. Secondly, northern resource use is characterised by a history of colonisation and use of resources for the benefit of external actors, and thus social issues and power relations are connected to the position of the northern regions as a resource base for both local and external actors. Furthermore, resource developments and land use in the north are intensifying and affected by an increasing number of actors. Previous community norms and practices are not anymore enough to ensure sustainable resource use: competencies and skills are needed to interact with external land users and to manage internal trade-offs to ensure sustainability of land use. Thus, the concept of socio-natural capital seems suitable for analysing Arctic land use and related conflicts and trade-offs.

The objective of this article is to utilise the concept of socio-natural capital to examine and explain sustainability of land use in the Fennoscandia. This is done by mapping gaps regarding socio-natural capital through the case study of reindeer herding in northern Fennoscandia, mainly in Finland; and by proposing ways how socio-natural capital can be promoted in order to enhance sustainable land use in the north. It should be noted that we aim not to provide representative and comprehensive explanations, but rather to explore the relevance of socio-natural capital via specific case studies.

Material and Methods

This study consists of three type of research material: 1) previous research, 2) interviews and 3) stakeholder consultations on land use contradictions in Arctic areas in the European Union.

The previous research literature consists of published examinations on reindeer herding and related land use contradictions, mainly in Finland (e.g. Raitio 2008; Sarkki 2011; Heikkinen et al. 2014). Furthermore, we conducted three telephone interviews on a topical case concerning a conflict between Sámi reindeer herding and mining in Gállok (Kallak), Sweden. Interviewees included an academic studying the conflict, and two members of the Sámi reindeer herding community. These materials were examined in order to identify gaps in socio-natural capital regarding Fennoscandian land use especially from reindeer herding's perspective (section 3). In order to analyse the material systematically, we examined it from the point of view of social capital and perceptions on sustainable use of natural capital as well as on procedural and distributional justice. We then used qualitative directive content analysis (Hsieh & Shannon 2005) to classify the material belonging to four clusters regarding their relationships to social capital and perceptions on sustainable use of natural capital as well as processes and outcomes. The clusters were given informative titles and represent problems regarding sustainability of land use from reindeer herders' perspective, and can be conceptualised as gaps in socio-natural capital (Figure 1).
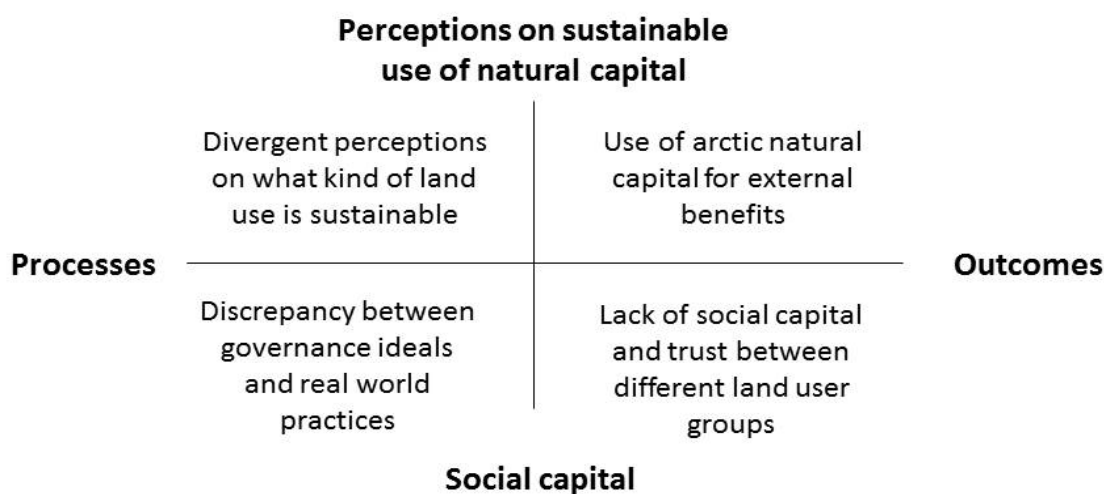
Figure 1. Four gaps in socio-natural capital regarding reindeer herding and other land uses in northern Finland.

The identified gaps provide increased understanding on the problems that could be eased by further developing socio-natural capital. In the context of the Strategic Environmental Assessment of Development of the Arctic project, we organized a workshop with 11 stakeholders representing governmental organisations (City of Rovaniemi, Metsähallitus – Finnish Forrest and Park Service, Centre for Economic Development, Transport and Environment ELY), entrepreneurs, the Finnish reindeer herders association and Sámi and research organisations (Finnish Forest Research Institute, University of Lapland). The goal of the

workshop was to promote discussions and to propose recommendations that governance and policy leaders in northern land use should take into account, especially at EU and national levels. The identified recommendations are, in this paper, framed in terms of how they contribute to building socio-natural capital in northern land use. The workshop participants identified four key recommendations on how sustainability of northern land use could be enhanced: 1) enhancing public participation; 2) institutionalizing indigenous rights; 3) increasing two-way knowledge sharing; and 4) increasing the role of social impact assessments in land use planning. These recommendations correspond rather well to the identified gaps in socio-natural capital based on previous research. This increases the reliability of the identified challenges and related proposals, as examinations of both the previous research literature and stakeholder consultations led to similar results. Furthermore, the project mapped stakeholder views through an online questionnaire assessing the sustainability of northern land use. The respondents (n=13) were stakeholders from research institutes, NGOs, state agencies, EU officials and representatives of industry. The questionnaire results were clustered in relation to the four recommendations, and insights from the questionnaires were used to inform and enrich the discussions on the four recommendations. The recommendations and critical issues identified by stakeholders were also incorporated in the final report "Strategic Assessment of Development of the Arctic, Assessment Conducted for the European Union", which was launched in September 2014.

The collected empirical material for this article is not extensive enough to draw representative conclusions on the sustainability of land use in the north – an area composed of diverse sub-regions. We cope with this shortcoming in two ways: by also reviewing existing literature particularly focusing on reindeer herding, land use and sustainability in northern Finland; and by utilising the innovative framework of socio-natural capital to explain and explore the issues underpinning sustainable land use. Thus, despite the rather small amount of empirical material, we feel able to make relevant observations and conclusions contributing to the literature and outlining important issues that can be applied in practice to enhance sustainable land use in the north, especially from reindeer herders' perspectives.

Reindeer Herding, Other Land Uses and Gaps Regarding Socio-Natural Capital

The European northern landscape is often multifunctional, including land uses such as reindeer herding, tourism, energy development, mining, nature conservation, forestry and hunting. Here we focus on reindeer herding and its relations to other land uses. Reindeer herding is a rather extensive land user that requires vast areas. It is a traditional way to use the land, having economic, symbolic and cultural values, and is also used in tourism marketing. Reindeer herding is often believed to be able to co-exist with other land use activities. However, this has also meant that reindeer herders in several cases have had to move to other grazing sites and alter their herding practises. Loss of pasturelands for other land use activities such as mining, oil and gas extraction, and large-scale forestry is a problem for reindeer husbandry. In Fennoscandia reindeer herding is connected to Sámi culture and in Norway and Sweden practiced exclusively (with minor exceptions) by the Sámi.

Lack of Trust

There have been continuing conflicts in the 1990s and first decade of the millennium between reindeer herding and the state forestry enterprise Metsähallitus in northern Finland. Metsähallitus is a governmental organization responsible for earning profits from renewable natural resources like forests but also nature protection and nature heritage. Metsähallitus is also obliged by law to respect social and cultural aspects like maintaining job opportunities and Sámi people's rights when using and managing state land and waters. Part of the natural resource management is participatory planning processes, which are not legally obligatory, but voluntarily organized by Metsähallitus to enhance multiple uses of state commercial forests and waters. Reindeer herders have been trying to get their voices heard in these participatory planning processes, but have often been disappointed by the outcomes of these processes. As a result, reindeer herders have sometimes established coalitions with environmental NGOs and local tourism entrepreneurs to halt loggings in important reindeer pastures, and arranged on-site protests, initiated media campaigns against loggings, and informed forest companies from unjust logging practices. The case even reached the UN Human Rights Committee to defend herders' rights to practice their culture (i.e. reindeer herding). This has resulted in a mutual lack of trust as well as created a situation where each side pushes their agenda and middle ground options, and compromises are not seen as satisfactory. This undermines the potential of collaborative efforts to negotiate legitimate solutions to the use of forest resources (Raitio 2008; Sarkki & Heikkinen 2010; Sarkki 2011; Sarkki & Karjalainen 2012.)

Lack of trust is also an issue regarding the relationship between mining companies and reindeer herders in Sweden and Finland. Since the summer of 2013 an ongoing a dispute has been taking place in Gállok, Sweden (also known as "Kallak" in Swedish) where local Sámi reindeer herders are in conflict with a mining company. According to the interviewees, the main concern of the herders is that migration routes and utilization of winter pastures will be endangered, affecting three Sámi reindeer co-operatives (Sameby) and hundreds of families and households. Swedish mineral law puts a limited tax burden on companies or does not require companies to pay royalties apart from a small mineral fee (compared to direct taxation specifically on mining activities in other jurisdictions). In 2014, Sweden mining companies throughout the world ranked Sweden number one and Finland number two to be the most attractive countries for mining and exploration investments due to their public policies on things such as taxation and regulation (Wilson et al. 2014). Interviewed Sámi have also reported that from their viewpoint the Swedish government has a lack of interest in reindeer herding issues and Sámi rights. Reindeer herders have also argued that true dialogue between Sámi herders, mining companies and municipalities has not taken place and their needs and culture have not been taken seriously enough.

There might also be an institutional problem for defining who should be heard or be a legal party. According to one informant, being both Sámi engaged in the controversy and a researcher examining the case of Kallak: *"Sámi who are not members of the Sameby are not consulted at all in particular, unless they are land owners. I filed a complaint – to the environmental court (Mark och Miljödomstolen, and Mark- och Miljööverdomstolen) – rejecting the ʹtest miningʹ"*. The informant is also a land owner down-stream of the little Lule River. Her complaint was rejected in both courts, and she pointed out that *"I was not granted the right to be heard"* neither as Sámi with traditional historical heritage in the Little Lule river valley, nor as a land owner. This happened despite the Sámi

having rights recognized by national law on reindeer herding, and down-stream land owners having rights granted by the EU directive on water.

The key challenge in the relations between reindeer herding and mining seems to be that both ore deposits and winter pastures are scarce and not transferable. Kallak might be a case where socially and culturally sustainable co-existence of mining and reindeer herding is not possible. The situation is characterised by lack of trust among the local Sámi towards the Swedish government and mining companies, making collaboration particularly challenging. Furthermore, looking also at mining cases in Kaunisvaara in Sweden and Hannukainen in Finland, there are numerous challenges regarding relationships between mining and reindeer herding. It has been found that reindeer herders would expect more two-way interactions during the planning of mines, and mining companies have not always been transparent regarding their plans and actions, leading to lack of trust. This lack of trust is a long-term problem and affects not only relationships with one company or regarding one project, but the industry as a whole and in the long term, undermines trust even outside of the communities that were originally affected by a company's mismanagement of public relations (Heikkinen et al. 2014).

Divergent Perceptions on Sustainable Use of Natural Capital

Divergent perceptions on sustainable land use can create contradictions and undermine collaborative efforts. In Finland, the forestry industry is promoted by arguments according to which forests grow faster than they are logged, and thus the annually logged amount of cubic meters could be increased in a sustainable way. For example, Metsähallitus has used Maximum Sustainable Yield (MSY) logic when defining sustainability of the use of forest ecosystem services. Furthermore, to highlight the sustainability of forestry activities, Metsähallitus calculates how many million euros the state forestry loses annually due to taking societal obligations into account, including Sámi culture and reindeer herding. Opponents of forest industry loggings in old-growth forests argue that loggings may in fact be sustainable from the point of view of wood production, but the issue needs to be taken into account more holistically and in relation to other land uses, such as reindeer herding and nature-based tourism. Furthermore, alternative calculations are emerging to examine how much other land uses lose due to loggings. These calculations are, however, not the standard practice of Metsähallitus. This shows that the value of natural capital in forests is being calculated for political purposes, and that these calculations have different implications for sustainability depending on who has conducted them and from what perspective.

In addition, actors advocating nature conservation and nature-based tourism may consider sustainability differently than reindeer herders. For example Finnish Oulanka National Park has acquired a PAN Parks certification ensuring sustainable tourism within the park. A lot of attention is paid to the sustainability of tourism, with local reindeer herding seen as a threat to the natural integrity of the park. PAN Parks utilises the idea of the importance of non-human wilderness for intrinsic reasons and also considers that it works as a tourist attraction providing further economic benefits to the region. At the same time, the park functions as an important reindeer pasture, and herders want to continue using it as they have previously (Puhakka et al. 2009; Sarkki et al. 2013a). This highlights the fact that perceptions of sustainability between proponents of nature conservation and sustainable ecotourism can diverge from reindeer herders' views and produce contradictions.

Use of Northern Natural Capital for External Benefits

The question of who benefits from northern land use is at the core of social justice and also a key question for socio-natural capital. There are increasing pressures to conserve northern resources and to consider northern natural capital as a global public good. On the other hand, external companies and actors are exploiting northern resources for the benefit of far-away stakeholders.

Firstly, predator management has evoked a lot of debate in Nordic countries. For reindeer herding, predator conservation is a difficult problem as an increasing number of reindeer are killed by wolves, wolverines, lynxes, golden eagles and brown bears. In Finland the number of reindeer, which were proven to be killed by predators by collecting the carcasses (which are often not found), has grown from 1500 in 1995 to 4090 in 2007 – meaning that in some reindeer herding co-operatives 60-70% of calves are killed by predators (Vuojala-Magga 2012). This is mainly due to the fact that the number of predators has grown due to conservation policies. For example the wolverine population was at its lowest in 1978, but had grown in 1990 to approximately 80 animals, and in 2013 to approximately 250. Similarly the numbers of wolves and brown bears have increased as well as the problems these predators cause for reindeer herders (Heikkinen et al. 2011). In Finland, state compensations do not cover the time, efforts and fuel costs due to searching the reindeer carcasses (Heikkinen et al. 2011). Even the European Commission started proceedings against Finland on that the state should enhance wolf conservation efforts, but later considered that Finland had not in fact violated EU directives with its wolf management (Hiedanpää & Bromley 2011). Predator conservation is done in the name of the public good, to protect endangered species, to safeguard predators' role in ecosystems, and for the intrinsic value of predators, but this is problematic for local social justice, especially from reindeer herders' perspectives.

Secondly, socio-natural capital may be hampered also from the point of view of protected area governance. In Finland, the strict Malla nature reserve restricts reindeer herding within its area. However, local reindeer herders are constantly arguing that they should have a right to herd reindeer within the reserve due to ancestral rights to the area (Heikkinen et al., 2010). Thus, again divergent opinions on using or conserving natural capital create contradictions and challenges for social justice.

Thirdly, not only is nature conservation problematic from the point of view of social justice, but also resource exploitation for the benefit of actors external to the region has evoked discussions. Recent debates include mining and its costs and benefits for local actors in Gállok, Sweden and in various sites in northern Finland. On the other hand, similar contradictions exist regarding forestry. For example, in Muonio in northern Finland, local reindeer herders as well as tourism entrepreneurs argued that loggings in old-growth forests should be stopped because the value of the natural capital of the forests for the local people had a higher standing than the revenues obtained from loggings (Sarkki 2011). A new settlement in the dispute was agreed upon in 2014. Originally the Muonio deal was set to expire in 2017, but in April 2014 Metsähallitus, Muonio municipality, and local stakeholders including the reindeer herding co-operative and tourism businesses in the area reached an agreement about the land use of 13,300 ha. This new agreement is in force until 2040. It expanded the protected area by 2000 hectares (of this 53% is forest). Forestry use will continue on 4600 hectares (35% of total area), but according to the

agreement, only moderate thinning, selective loggings or small-scale openings are allowed on forest land. The needs of tourism and reindeer herding as well as landscape and ecological values should be taken into consideration in logging operations (Ylimuonion valtionmaiden 2014). In the near future it will be demonstrated how solid the agreement based on new methods and moderate loggings will be (Jokinen 2014).

Discrepancy Between Governance Ideals and Practice

The notion of good governance would entail that decisions be legitimized by exploring various views and values in a fair and balanced manner (Stirling 2008). However, there seems to be discrepancy between ideal goals of participation and actual practices, especially if seen from multiple actors' points of view. The following points are also relevant for the growing body of literature on co-management in the Arctic (Armitage et al. 2011).

Firstly, regarding forestry planning in Finland, Metsähallitus has many times initiated controversial loggings after planning processes have been finalised. From Metsähallitus' position, the decision-making process has been balanced and fair, while reindeer herders and ENGOs argue that they have not had genuine opportunities to participate, and that decision-making processes aim not to produce legitimate decisions, but justify loggings (Raitio 2008; Sarkki 2011). Thus, there is a gap in how different actors understand the legitimacy of forestry governance in state forests of northern Finland.

Secondly, the goal of participation is also to accept alternative views as legitimate. However, during a transdisciplinary RENMAN project (Forbes et al. 2006) social scientific research included reindeer herders in the process of knowledge production as equal experts and as a result developed recommendations for management to enhance the sustainability of reindeer herding. Yet when these recommendations were presented to management officials they wondered why reindeer herders were let into a field where they do not belong, and could not make neutral recommendations due to pushing their interests. This highlights the fact that inclusion of reindeer herders in management discussions as equal experts may be an ideal, while in reality many actors consider such an effort as strange and unwanted (Sarkki et al. 2013b).

Proposals For Enhancing Socio-Natural Capital

Enhancing Public Participation

The multiple stressors present in the European north and the complexity of the situation requires open, inclusive and democratic problem-solving mechanisms and partnerships. According to a questionnaire respondent *"land use planning that has an open process is the way to avoid conflicts"*. In the workshop it was emphasised that there is a need for an equal dialogue where all parties are respected with a confidence that their views are taken into account. This could close the gaps in socio-natural capital regarding lack of trust and discrepancies between participatory ideals and actual practice. According to a questionnaire respondent *"Respect for the existing international legal regime, as well as the establishment of mechanisms that enhance the full and effective participation of indigenous peoples in decision making is needed"*. However, as noted in the workshop, increasing participation encounters some problems. Firstly, lack of trust results in negotiations that are not often based on mutual respect, reciprocal compromise-making and trust, but rather strategic behaviour to promote own interests. Secondly, the capacity of local actors in terms of

time and capacity to take part in often rather technical discussions is limited. Thirdly, the actual effect of participatory processes on decisions is often blurred, and this further creates mistrust and feeling that local opinions are heard but not acknowledged. Fourthly, participation overload is possibly emerging when there are too many complex processes for an organization to follow and effectively contribute to – as is sometimes the case with the Sámi parliaments in Fennoscandia (Stepien et al. 2014). Finally, a questionnaire respondent, diverging from the other responses, stated that participatory structures are already in place and there is no need to develop new ones.

Taking into account the above challenges for fair and balanced participation, the following proposals can be made to enhance socio-natural capital: 1) Use trust-building techniques to try to break existing interest positions and search synergies; 2) Explain a realistic scope of participation and how it effects, or not, actual decision making; 3) Improve capacity building to explain technical details and types of inputs the decision process requires. However, participation overload should be avoided, and thus it would seem feasible to invite people only when it is important for actual decisions and their legitimacy; 4) Try to build reciprocal relationships between conflicting parties. In land use this can mean that negotiation over several sites is partly resolved in the favour of one party in one area, and partly for another elsewhere.

Stronger Institutionalization of Indigenous Rights

It was emphasised in the workshop that decision-making processes need to take into account the connection of local cultures to traditional lands, especially in the case of indigenous peoples. According to one questionnaire respondent *"Human rights and indigenous peoples' rights to both land and culture must come first. Having these core issues respected will without doubt be the best way to avoid and resolve conflicts".* That line of argument continues to assert that due to the close relation between culture and environment, in the long term land use may adversely affect culture and identity. In the short term it has been argued that land use may threaten Sámi rights to practice their culture, especially reindeer herding, being emblematic for the Sámi people. This argument has been made for example regarding the recent mining-reindeer herding dispute in Gállok, Sweden and regarding forestry-reindeer herding dispute in Inari, Finland (Sarkki & Rönkä 2012).

The main international documents codifying indigenous rights are the 2007 UN Declaration on the Rights of Indigenous Peoples and the 1989 ILO Convention no. 169. Contrary to Norway, Finland and Sweden have not ratified the ILO Convention, but in both countries there is an on-going discussion about the Sámi rights to lands they traditionally inhabited and used. Even though planned new land use activities often include environmental impact assessments and local stakeholder consultations, the impact of Sámi herders and local people on final decision making is often considered to be fairly minor (e.g. Joona 2011; Raitio 2008). International law may be helpful here as the states that have ratified the ILO Convention are obliged to effectively implement its provisions, including land rights, participation in decision-making and meaningful consultation.

Many questionnaire respondents noted that the EU should acknowledge indigenous land rights more and monitor the performance of states regarding indigenous rights. Formal recognition of indigenous rights could have positive impacts on northern socio-natural capital in the following ways. Firstly, institutionalization of land use rights would decrease the possibility that the

northern environment is used in an ecologically and socially unsustainable way and for external benefits. Secondly, institutionalization would give Sámi political bodies, such as Sámi Parliament, more power, and thus Sámi bodies could better develop leadership on indigenous issues. Thirdly, formal recognition of indigenous rights would create more trust between indigenous people and the state. Fourthly, institutionalization also creates for all land users a clearer and more straightforward situation. Even mining companies say that it is easier to operate in areas where the land rights and land ownership are clear and resolved. On the other hand, stronger institutionalization of indigenous rights may put other northern local people into an inferior position, and it is questionable that indigenous people would in fact use the lands in a more sustainable way.

Increasing Knowledge Generation and Sharing

In the workshop and questionnaire results it was stressed that facilitating knowledge exchange between regions, providing tools for collaborative research, developing a formal consulting mechanism and stakeholder engagement tools would increase the knowledge sharing and the quality of decision-making. Furthermore, collaboration between Scandinavian countries and Russia is very relevant for the European Arctic, where the EU is also a major policy actor. Territorial cohesion and exchange of experience between regions was seen by questionnaire respondents and workshop participants as increasing the sustainability of northern land use. Various Arctic actors need knowledge on land use developments and their interrelations. Without knowing how people use the land, including reindeer herding, subsistence use of forests, hunting and all aspects in everyday life, it is impossible to assess the impacts of the new initiatives and plan for sustainability. One questionnaire respondent commented that *"without knowledge it's hard to expect a proper management of these important [land use] issues".* A key challenge for decision-makers is to create governance structures where European and national policy and governance forums would be connected to regional and local decision structures so that knowledge can also flow bottom-up. Furthermore, according to a questionnaire respondent, EU and rural development policies should encourage and facilitate multi-directional knowledge exchange in order to *"promote new innovations, which are based on exceptional arctic environment and cultures".*

Increased knowledge sharing would have positive impacts on Arctic socio-natural capital. Firstly, it would enhance the potential for collaboration when different actors from different institutional levels know what other actors are doing. Secondly, according to one questionnaire respondent, holistic and cumulative impacts of land use should be taken better into account by currently separate management and policy processes. This would increase the possibility for adaptive learning from past activities and further develop more informed future practices and thus increase the socio-natural capital. Thirdly, it would be important also for socio-natural capital to establish more close linkages between science, policy and stakeholders, and between knowledge holders (e.g. scientists, traditional knowledge) and knowledge users (e.g. policy makers).

Enhancing Social Impact Assessments

Environmental Impact Assessment (EIA) processes have become widely used as a proactive planning tool also in the Arctic regarding large-scale environmental projects like mining or

energy production. In the workshop and questionnaires, the need for more detailed and effective Social Impact Assessment (SIA) was stressed. *"To stay within ecologically defined frames is an imperative for future sustainability. Social and cultural values must define societies' development, and the economy must be developed and managed in order to achieve social objectives".* Yet, social impact assessments are not necessarily conducted or their role in EIA is minor (Suopajärvi 2013). The EU is currently working on amending its EIA directive, and there is a possibility to raise the importance of social impact assessment, and ultimately the inclusion of social aspects in all environmental impact assessment processes. That is important especially in the areas which are sparsely populated and should take account of activities which require extensive land use (like reindeer herding) and are affected by new developments expected in rapidly changing European north.

In the context of mining, social licensing mechanisms have become an important instrument for better acknowledgement of local socio-cultural needs. Social license is acquired if there is an undeniable right and acceptance from the local population for the mine to operate. Mining companies have had a growing motivation to gain social license as investors are emphasising responsible production and would rather invest their money in companies with a good reputation (Heikkinen et al. 2014). Moreover, a major advantage of the notion of social license is that it is dynamic, i.e. constitutes a "process", where the social acceptance of activities is being revisited throughout the cycle of the mining project – thus, once obtained, social license may be lost. However, the weakness of social license is its abstract and imprecise meaning. It is largely a matter of perception of the company, community, groups of stakeholders as well as external actors. It is also difficult to define a threshold above which there is enough social consensus among stakeholders and the public that social license indeed has been obtained. Thus, to no surprise different actors may have varying views whether the social license is acquired, especially considering its dynamic nature. It is closely connected with the quality of social capital, the level of trust and communication channels within particular social contexts or the existence of networks. In sparsely populated areas characterised by long distances but also long-range environmental and social impacts, this is a particularly crucial impediment.

Taking social aspects better into account in impact assessments and land use planning could have positive effects on socio-natural capital by increasing knowledge about impacts and relationships between diverse actors. Firstly, environmental and social impact assessments should be done in transparent ways, because poor transparency will limit trust and create prejudices toward the company. Secondly, taking the social dimension into account early in the planning phase via interacting with local people creates space where networks and positive relationships can be built. Thirdly, impact assessments can be considered to nurture reciprocity, because they outline both negative and positive impacts.

Conclusion

The notion of socio-natural capital is well suited to examine and explore the sustainability of land use. When socio-natural capital increases among land use actors, the possibilities to achieve sustainability improve and come closer to achieving social consensus on what sustainability constitutes in the specific context. When talking about socio-natural capital, it is not enough to consider only capital within local populations, but also between local people and external land use actors. This is particularly important for reducing colonial practices of extracting northern

resources for external benefits. On the other hand, external actors can possibly nurture socio-natural capital. For example, the EU can enhance policy and governance instruments (both its own and those applied in the member states) that necessitate participation of Arctic people to decision-making, with a confidence that their views are taken into account, or by increasing demands for social impact assessments of land use in the planning phases. Nation states can encourage collaboration, but also institutionalize and formally recognize rights of Arctic indigenous people. The institutional ability to enhance socio-natural capital is also particularly strong in the case of institutionally requested interaction processes between various groups. For example, formal requirements for participatory planning and interaction or semiformal social licensing mechanisms are fruitful places where relationships among groups can be built.

On the other hand, socio-cultural capital can be built by individual people and various groups. For scientists, studies on how natural capital turns into human benefits are essential. Scientists' socio-natural capital can also be enhanced in transdisciplinary and participatory efforts where various disciplines and stakeholders interact to produce holistic knowledge on social-ecological interactions and land use (Sarkki et al. 2013b). Policy makers' understanding of various perspectives on sustainability of land use can be enhanced by increasing participatory processes, enabling multi-directional knowledge flows between stakeholders and policy makers, interaction between policy and governance structures from various institutional levels, and by enhancing science-policy interface. Local stakeholders' socio-natural capital can be enhanced by supporting local institutions promoting sustainable use of natural resources, by promoting self-organization capacity with external support for local action and leadership, by network building, and by increasing communication among local groups and between locals and policy makers in order to build trust between various actors.

Furthermore, institutions can arrange interactions that function as locations where socio-natural capital can be built among individuals and groups. However, people decide how they interact and how open they are in the given interaction processes. Thus, individuals can significantly hamper or contribute to the building processes of socio-natural capital. As such, institutions, individuals and social groups have a key role in building socio-natural capital. Socio-natural capital is thus often borne in interactions between various people, groups and institutions, but as a result it can be integrated into the values, practices and motivations of various actors, becoming then a property of the given social system enhancing, for example, sustainable land use in the north.

When socio-natural capital enhancing sustainable land use is better understood, sustainable land use can be better promoted. Thus, further research is needed especially on the factors that contribute to understanding properties of institutions and people that enhance sustainable social-ecological interactions. There is a growing body of literature, which aims to better comprehend linkages between institutions and sustainable use and governance of SES (Young et al. 2008; Folke et al. 2007). This article highlights that this SES focused literature could also take account the idea of socio-natural capital to better understand power relations in the form of institutional inclusion and exclusion, perceptions of sustainable use of natural capital, trade-offs between various stakeholders, environmental justice, and two-way relationships including trust or lack of it. When the features of socio-natural capital and their dynamics are better understood, it is possible to design policies, governance instruments, interactions and land uses in a way that

promotes development of positive capital that contributes to sustainable land use in the north and elsewhere.

Acknowledgements

References

Armitage, D., Berkes, F., Dale, A., Kocho-Schellenbergb, E., & Patton, E. (2011). Co-management and the co-production of knowledge: Learning to adapt in Canada's Arctic. *Global Environmental Change*. 21(3): 995–1004.

Biggs, R., Schlüter, M., Biggs, D., Bohensky, E.L., BurnSilver, S., Cundill, G., Dakos, V., Daw, T.M., Evans, L.S., et al. (2012). Toward Principles for Enhancing the Resilience of Ecosystem Services. *Annual Review of Environment and Resources*. 37: 421–448.

Bourdieu, P. (1986). The Forms of Capital. In J.G. Richardson (ed.). *Handbook for Theory and Research for the Sociology of Education* (pp. 241–258). New York: Greenwood.

CICES. (2013). Towards a Common International Classification of Ecosystem Services. Available at: http://cices.eu. Accessed 25 April 2014.

Costanza, R., d'Arge, R., deGroot, R., Farber, S., Grasso, M., Hannon, B., Limburg, K., Naeem, S., O'Neill, R., Paruelo, J. et al. (1997). The value of the world's ecosystem services and natural capital. *Nature* 387: 253–260.

Cote, M. & Nightingale, A. J. (2012). Resilience thinking meets social theory: Situating social change in social-ecological SES research. *Progress in Human Geography*. 36(4): 475–489.

Daily, G. (1997). *Nature's services: societal dependence on natural ecosystems*. Washington: Island Press.

Folke, C., Hahn, T., Olsson, P., & Norberg, J. (2005). Adaptive Governance of Social-Ecological Systems. *Annual Review of Environment and Resources*. 30(1): 441–473.

Folke, C., Pritchard, L., Berkes, F., Colding, J., & Svedin, U. (2007). The problem of fit between ecosystems and institutions: ten years later. *Ecology and Society*. 12(1): art. 30.

Forbes, B.C. et al. (eds.) (2006). *Reindeer management in northernmost Europe: linking practical and scientific knowledge in social-ecological systems*. Ecological Studies 184. Springer-Verlag, Berlin.

Fukuyama, F. (2002). Social Capital and Development: The Coming Agenda. *SAIS Review*. 22(1): 23–37.

Haines-Young, R. H., & Potschin, M. (2010). The links between biodiversity, ecosystem service and human well-being. In: Raffaelli, D., Frid, C. (eds.), *Ecosystem Ecology: A New Synthesis. BES Ecological Reviews Series.* (pp. 110–139): Cambridge: Cambridge University Press.

Hazleton, V., & Kennan, W. (2000). Social capital: Reconceptualizing the Bottom Line. *Corporate Communications: An International Journal.* 5(2): 81–86.

Heikkinen, H. I., Lepy, E., Sarkki, S., & Komu, T. (2014). Challenges in Acquiring a Social License to Mine in the Globalizing Arctic. *Polar Record.* (In press).

Heikkinen, H. I., Moilanen, O., Nuttall, M., & Sarkki, S. (2011). Managing Predators, Managing Reindeer: Contested Conceptions of Predator Policies in the Southeast Reindeer Herding Area of Finland. *Polar Record.* 47(242): 218–230.

Heikkinen H. I., Sarkki, S., Jokinen, M., & Fornander, D. E. (2010). Global Area Conservation Ideals versus the Local Realities of Reindeer Herding in Northernmost Finland. *International Journal of Business and Globalization.* 4(2): 110–130.

Heikkinen, H. I., Sarkki, S., & Nuttall, M. (2012). Users or Producers of Ecosystem Services? A Scenario Exercise for Integrating Conservation and Reindeer Herding in Northeast Finland. *Pastoralism: Research, Policy and Practice.* 2: 11.

Hiedanpää, J., & Bromley, D. W. (2011). The Harmonization Game: Reason and Rules in European Biodiversity Policy. *Environment Policy and Governance.* 21(2): 99–111.

Hsieh, H-F., & Shannon, S. E. (2005). Three Approaches to Qualitative Content Analysis. *Qualitative Health Research.* 15(9): 1277–1288.

Jokinen, M. (2014). Heated and frozen forest conflicts: Cultural sustainability and forest management in arctic Finland. In*:* Katila, P., Galloway, G., de Jong, W., Pacheco, P. & Mary. G. (eds.). 2014: Forests under pressure – Local responses to global issues. *IUFRO World Series.* 32: 318-398.

Joona, T. (2011). The Historical basis of Saami Land Rights in Finland and the application of the ILO Convention No. 169. *Yearbook of Polar Law.* 3.

MA. (2005). *Millennium Ecosystem Assessment. Ecosystems and human well-being: synthesis.* Washington: Island Press.

Olsson, P., Folke, C., & Berkes, F. (2004). Adaptive Comanagement for Building Resilience in Social-Ecological Systems. *Environmental Management.* 34(1): 75–90.

Puhakka, R., Sarkki, S., Cottrell, S. P., & Siikamäki, P. (2009). Local discourses and international initiatives: sociocultural sustainability of tourism in Oulanka National Park, Finland. *Journal of Sustainable Tourism.* 17(5): 529–549.

Putnam, R. (1993). *Making Democracy Work. Civic Traditions in Modern Italy.* Princeton, New Jersey: Princeton University Press.

Raitio, K. (2008). 'You can't please everyone' – Conflict management practices, frames and institutions in Finnish state forests. PhD dissertation, University of Joensuu, Finland.

Sarkki, S. (2011). 'The site strikes back': Multi-level forest governance and participation in northern Finland. PhD thesis, Universitatis Ouluensis, B 102.

Sarkki, S., & Heikkinen, H. I. (2010). Social Movements' Pressure Strategies during Forest Disputes in Finland. *Journal of Natural Resources Policy Research.* 2(3): 281–296

Sarkki, S., Heikkinen, H. I., & Karjalainen, T. P. (2013b). Sensitivity in transdisciplinary projects: Case of reindeer management in northern Finland. *Land Use Policy.* 34: 183–192.

Sarkki, S., Heikkinen, H. I., & Puhakka, R. (2013a). Boundary Organisations Between Conservation and Development: Insights from Oulanka National Park, Finland. *World Review of Entrepreneurship, Management and Sustainable Development.* 9(1): 37–63.

Sarkki, S., & Karjalainen, T. P. (2012). Science and Issue Advocacy in a Forest Debate in Finland. *The Polar Journal.* 2(1): 125–138.

Sarkki, S., & Rönkä, A. R. (2012). Neoliberalisations in Finnish Forestry. *Forest Policy and Economics.* 15: 152–159.

Serageldin, I., & Grootaert, C. (1999). Defining Social Capital. An Integrated View. In Dasgupta, P., & Serageldin, I. (eds.), *Social Capital. A Multifaceted Perspective* (pp. 40–58). Washington DC: The World Bank.

Simkovic, M. (2013). Risk-Based Student Loans. *Washington and Lee Law Review.* 70(1): 8.

Spangenberg, J. H., Görg, C., Truong, D. T., Tekken, V., Bustamante, J. V., & Settele, J. (2014). Provision of Ecosystem Services is Determined by Human Agency, Not Ecosystem Functions. Four Case Studies. *International Journal of Biodiversity science, ecosystem services & Management.* 10(1): 40–53.

Stepien et al. (2014). Arctic Indigenous Peoples and the Challenge of Climate Change. In Tedsen, E., Cavalieri, S., Kraemer, A. R. (eds.), *Arctic Marine Governance. Opportunities for Transatlantic Cooperation.* Springer: Berlin.

Stirling, A. (2008). "Opening Up" and "Closing Down": Power, Participation and Pluralism in the Social Appraisal of Technology. *Science, Technology and Human Values.* 33(2): 262–294.

Suopajärvi. L. (2013). Social impact assessment in mining projects in Northern Finland: Comparing practice to theory. *Environmental Impact Assessment Review.* 42: 25–30.

Vuojala-Magga, T. (2012). Adaptation of Sámi Reindeer Herding: EU Regulation and Climate Change. In Tennberg, M (ed.). *Governing the Uncertain: Adaptation and Climate Change in Russia and Finland* (pp. 101 – 122). Springer: London & New York.

Ylimuonion valtionmaiden käyttösuunnitelma (2014). Muonion kunta & Metsähallitus. 45 p. In print.

Walker, B. H., Holling, C. S., Carpenter, S. R., & Kinzig, A. (2004). Resilience, Adaptability and Transformability in Social-Ecological Systems. *Ecology and Society.* 9(2): Art. 5.

Wilson, A. & Cervantes, M. (2014). Survey of Mining Companies 2013. *Fraser Institute Annual.* Available at: http://www.fraserinstitute.org/publicationdisplay.aspx?id=20902&terms=sweden+mining. Accessed 29, August 2014.

Young, O. R., King, L. A., & Schroeder, H. (eds.) (2008). *Institutions and Environmental Change. Principal Findings, Applications, and Research Frontiers.* Cambridge MA: MIT Press.