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## **PARTICIPATORY MONITORING OF RANGELANDS: CHALLENGES AND OPPORTUNITIES**

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### **ABSTRACT**

In recent years there has been a growing recognition among international agencies, scientific communities and land users that the monitoring of rangeland condition should be conducted in a participatory way. The advantage of participatory monitoring is that involvement of multiple stakeholders in the design and implementation of observing, systematizing and interpreting rangeland condition have led to joint decisions on adaptive rangeland management. However, there is little existing documentation of the realization of such an approach. This report is based on qualitative research, where the current rangeland monitoring system in Iceland was analysed and the challenges and opportunities for using participatory monitoring approaches explored. The research showed that the ecological condition of Icelandic rangelands is not systematically monitored nationwide; the monitoring is fragmented and scattered and not providing a comprehensive overview of the rangeland condition. Despite the encouragement for using participatory approaches in land management in Iceland, the understanding and the implementation of such approaches has not been fully adopted. The officials interviewed described participatory monitoring mainly as a tool to prove their own organization's progress but the sheep farmers' association representative thought that a holistic rangeland monitoring system can serve as a platform for building up mutual agreement on how to define sustainable grazing utilization of rangeland commons. The key facilitating factor is that idea of participatory monitoring met support, interest and willingness to participate from the grassroots level. The research revealed several factors that might impede the system's development in the environmental, societal and governance, and institutional contexts. However, the greatest limitations probably did not originate at local levels but rather in the context of governance and institutions.

**Keywords:** Participatory monitoring, conventional monitoring, common rangelands, stakeholders, Iceland

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## **1. INTRODUCTION**

The degradation of rangelands is one of the greatest ecological problems concerning land use in the world, negatively affecting the livelihood of pastoral farmers and other related households (Dregne & Chou 1992). Systematic monitoring of rangeland conditions can help to reveal potential degradation problems in their early stages and identify trends in rangeland conditions (Rasmussen et al. 2001). A monitoring system observes or measures changes in the ecological condition of the land over space and time and is an important management practice (Riginos & Herrick 2011). A rangeland monitoring system should be robust enough to give strong signals of the sustainability of the practiced grazing management and bring in guidelines for adaptive management when needed (Rasmussen et al. 2001).

There are two main approaches used to monitor the ecological condition of rangeland: conventional monitoring and participatory monitoring (Bayer & Waters-Bayer 2002). Conventional monitoring is based on bringing in external experts to measure performance by using pre-set indicators, standardized procedures and tools. This approach is also often used only for informing land users (Abbot & Guijt 1998). Participatory monitoring on the other hand is based on involving multiple stakeholders in the design and implementation of observing, systematizing and interpreting rangeland conditions as a basis for joint decisions on adaptive rangeland management (Rasmussen et al. 2001; Bayer & Waters-Bayer 2002; Reed 2005).

Conventional monitoring is the traditional approach used to assess the ecological condition of rangelands and its use is still widespread. In recent years, however, there has been a growing recognition among international agencies, scientific communities and land users that the monitoring of rangeland conditions should be conducted in a participatory way (Bayer & Waters-Bayer 2002). However, the approach of participatory monitoring is still not widely used and little documentation exists on why the approach is not implemented in practice.

Therefore, the study and analysis of what factors are enabling or creating the possible realization of participatory monitoring is very important. The information from this study provides understanding on who should be potential partners, what are their roles and how different stakeholders perceive participatory monitoring.

This report is based on qualitative research with the goal of analysing the current rangeland monitoring system in Iceland and exploring the challenges and opportunities for using participatory monitoring approaches. Its objectives were the following:

1. Review existing approaches regarding monitoring of rangelands
2. Analyse the current rangeland monitoring system in Iceland
3. Investigate the role, the capacity and interests of different stakeholders which could be engaged in participatory monitoring of rangelands
4. Explore factors which could potentially limit or facilitate participatory monitoring of rangeland conditions
5. Develop suggestions on how the Icelandic rangeland monitoring system can be improved

## **2. RANGELANDS – UTILIZATION AND SURVEILLANCE OF THEIR ECOLOGICAL CONDITION**

### **2.1. Rangelands as a common resource pool**

According to an international terminology for grazing lands (Allen et al. 2011, p. 5), rangeland is defined as: “land on which the indigenous vegetation (climax or sub-climax) is predominantly grasses, grass-like plants, forbs or shrubs that are grazed or have the potential to be grazed, and which is used as a natural ecosystem for the production of grazing livestock and wildlife.”

The importance of rangelands as a feed source for livestock, a habitat for wildlife, environmental protection and conservation of genetic plant resources is recognized all over the world (Suttie et al. 2005). Rangelands cover 70% of all agricultural lands and provide various ecosystem services, like soil conservation, carbon sequestration, the amelioration of regional climate, the maintenance of biodiversity and biomass production (Suttie et al. 2005). Pastoral farmers grazing their domestic livestock on rangelands rely on the vegetation biomass the rangeland systems annually produce as a source for their production of milk, wool and meat (Sala & Paruelo 1997). Livestock farming is socially and economically highly significant for rural livelihoods as around 200 million households worldwide base their income on extensive pastoralism (FAO 2009).

Unsustainable use of rangelands like overgrazing and mismanagement has led to severe degradation of the systems' ecological condition. A recent assessment states that around 73% of the world's rangelands are affected by degradation that significantly reduces their functional capacity and in some cases can even result in ecological collapse of rangeland systems (WOCAT 2009). Other socio-economic drivers for rangeland degradation include, for example, unclear land tenure and vague laws and legislation related to rangeland management (FAO 2009).

Changes in land tenure can trigger land degradation caused by a combination of a variety of factors (changes in behaviour and attitude and food security, market demands, etc.). The settlement of nomads can, for example, alter the behaviour of individuals and local communities, leading to overgrazing (FAO 2009).

The challenges individuals often face when collectively managing common resources were described by Garret Hardin in 1968 in his paper “The Tragedy of the Commons” (Hardin 1968). The author argued that every pastoral farmer seeking for individual gain wants to increase the number of his grazing animals but as the commons are finite, sooner or later the total number of livestock will exceed the carrying capacity of the grazing land. In Hardin's opinion, the only possible solution to secure a sustainable use of common resources was to use the coercive power of the state and/or the market to impose rules that could be followed by individuals to avoid the tragedy of the commons, or to privatize the ownership of the common resources (Hardin 1968).

In contrast to Hardin's arguments (1968) a wide range of empirical studies made by Ostrom (1990) revealed that individuals can jointly manage shared resources if they agree to set commonly accepted rules that lead to sustainable management of the commons. Reed (2005) has further supported Ostrom's findings and pointed out that that adaptive management options can only be applied under common property regimes. The benefits gained from

supporting and stimulating local innovation and adaptation by strengthening common property regimes instead of privatization of land resources are also seen to overshadow the challenges usually following the collective management of common resources (Reed 2005).

An active surveillance system that systematically assesses the condition of common resources is seen as one of the main basic principles needed to ensure sustainable utilization of common resources (Anderies et al. 2004). The surveillance system should be based on a general inventory of ecological indicators but also on monitoring the commons' condition and utilization patterns according to selected management goals (Gintzburger & Saïdi 2009).

## **2.2. Approaches to assess the condition of common resources**

There are several ways used to assess the ecological condition of rangelands. The most general one is rangeland inventory. It is based on using methodologies that can be repeated at different places and at a set date aiming on characterizing the rangelands' current ecosystem condition (Gintzburger & Saïdi 2009). Rangeland monitoring on the other hand is based on repeated observations that are conducted within fixed sites that are believed to capture qualitative and quantitative changes and range trends over time (Gintzburger & Saïdi 2009). Regular monitoring of rangeland conditions can provide land users with information about degradation problems early, identify trends in rangeland condition, confirm whether good or not management practices have been applied, and what decisions and actions should be taken to ensure a more sustainability (Rasmussen et al. 2001).

Monitoring is defined as an: “intermittent (regular or irregular) series of observations in time, carried out to show the extent of compliance with a formulated standard or degree of deviation from an expected norm” (JNCC [Joint Nature Conservation Committee] 2013). Based on this definition of the state of the rangelands, the desired objectives or targets need to be defined and then monitored to ascertain whether the objectives are being met (JNCC [Joint Nature Conservation Committee] 2013).

The monitoring of any policy, programme or project outcome has generally been performed by analysing project records to provide basic information on the expected outcome first and foremost for the government or donors. This method is called conventional monitoring as it bases its assessment of progress on the analysis of mainly quantitative data (Abbot & Guijt 1998). In recent years, this method has been increasingly criticised for being too specialized, neglecting the participation of beneficiaries and focusing only on quantitative measures (Estrella & Gaventa 1998).

To overcome the limits built into conventional monitoring methods, another method has developed quite quickly over the last few decades, parallel to the traditional one. This is participatory monitoring as it is based on involving key stakeholders in every step of the monitoring process and provides information that is valuable for all relevant stakeholders, not only the government and the donors (Kusek & Rist 2004). The World Bank defines participatory monitoring in the following way:

“Participatory monitoring & evaluation (PM&E) is a process through which stakeholders at various levels engage in monitoring or evaluating a particular project, programme or policy, share control over the content, the process and the results of the M&E activity and engage in taking or identifying corrective actions” (World Bank 2013).

These two evaluation methods differ in substantial ways but the greatest difference lies in the focus on participation (Estrella & Gaventa 1998) and how the relevant data and information is collected. According to Narayan-Parker (1993), the main differences are the following (table 1):

**Table 1. Difference between conventional and participatory monitoring and evaluation**

	<b>Conventional monitoring</b>	<b>Participatory monitoring</b>
Who participate	External Experts	Stakeholders, including communities and project staff, outside facilitators
What to monitor	Predetermined indicators, to measure inputs and outputs	Indicators identified by stakeholders, to measure process as well as outputs or outcomes
How to monitor	Questionnaire surveys, by outside neutral evaluators, distanced from project	Simple, qualitative or quantitative methods, by stakeholders themselves
Why to monitor	To make project and staff accountable to funding agency	To empower stakeholders to take corrective actions

Even though the approaches of participatory monitoring have been known since the 1970's, they have only recently gained increased recognition as being a more holistic method that provides a more comprehensive assessment than the conventional monitoring method is capable of (Estrella & Gaventa 1998). This development can be directly linked to other institutional changes that in recent decades have taken place in the international arena. International agencies are increasingly focusing on involving different stakeholders in me design, implementation, monitoring and evaluation as participatory approaches have proved to improve programme quality and sustainability and to address local development needs (Gosling & Edwards 2003).

The literature on participatory research and monitoring identifies different classification levels and forms of participation (Arnstein 1969; Pretty 1995; Ashby 1997; Probst et al. 2000; Lambrou 2001; Danielsen et al. 2005). One form of monitoring, for example, is citizen participation. This was defined by Bonney et al. (2009) as partnerships initiated by scientists that involve non-scientists in data collection. Citizen-science programmes have the aim of enhancing conservation literacy, scientific knowledge, and increasing scientific-reasoning skills among the public. Another example is a participatory agricultural research and monitoring system where the role of local stakeholders, their knowledge, capacities and priorities is underlined as a potential for a new and innovative approach in strengthening sustainable natural resource management (Martin & Sherington 1997; Abbot & Guijt 1998).

Researchers of conventional monitoring pointed out that participatory monitoring and evaluation does not provide specific information, is not accurate and not replicable. Similarly, the proponents of conventional research (El-Swaify et al. 1999; Bentley 1994) criticized participatory monitoring as islands of success, i.e. isolated cases not spread to a wider coverage. According to Estrella and Gaventa (1998), the promoters of participatory approaches argue that due to the variety of conditions and circumstances, participatory monitoring is not and should not be replicable. However, a participatory monitoring system responds to people's real life needs (Estrella & Gaventa, 1998). The diverse objectives of participatory monitoring should not be defined as weaknesses of the approach but seen as opportunities for, for example, using monitoring as a research tool, project management activities, building strategies of community empowerment, and supporting further learning and organizational change (Estrella & Gaventa, 1998).

In addition, promoters of conventional monitoring systems have criticized the supporters of participatory research and monitoring systems, stating that they do not have a consistent approach or view of monitoring objectives. They have further pointed out that scientific views vary between researchers placed at the centre of political action for empowering the poor and marginalized (Fals Borda & Rahman 1991), and involving farmers in the process of technological development and natural resource management (Werner 1993; Farrington 1998).

A literature review of participatory approaches showed at that time that scientists strongly believed in the use of this approach and that it could significantly improve the traditional monitoring systems, but few cases existed that described the practical experience of the users of this approach and in general the functionality of monitoring systems. At that time rangeland monitoring was also mainly based on conventional approaches conducted by professionals (Kellner & Moussa 2002).

### **2.3. The current state of participatory monitoring of rangelands in different regions and countries: limiting and facilitating factors**

Participatory monitoring has emerged over the last twenty years due to several driving forces: a move towards decentralization, need of new visions of development, shortage of funds, the growing capacity of different local and international community-based organizations and NGOs (Estrella & Gaventa 1998). The interest of development agencies in applying participatory monitoring in rangeland management was determined by the willingness to empower local entities and individuals to manage their common natural resources through learning and joint collaboration. Danielsen et al. (2005) stated that investment by government into monitoring which includes the participatory approach is more effective than to invest only in conventional scientific methods

In the developed countries, participatory approaches are increasingly used to monitor the progress of natural resource management and the process is often facilitated by citizen-science programmes (Danielsen et al. 2009). Citizen-science is scientific research conducted, in whole or in part, by volunteers or nonprofessional scientists. Citizen scientists often cooperate with professional scientists to achieve common goals (Cohn 2008; Bonney et al. 2009; Silvertown 2009). Large volunteer networks often allow scientists to accomplish tasks that would be too expensive or time consuming to accomplish through other means. Besides, citizen scientist programmes also aim to reinforce public confidence in science based decision making through data collection by volunteers (Pfeffer & Wagenet 2007). Citizen science monitoring programs are highly developed and supported by governments in North America, Europe and Australia (Bonney et al. 2009; Conrad & Hilchey 2011; Mackechnie et al. 2011).

O'Connor et al. (2011) in the Australian Murray-Darling Basin illustrated that monitoring programs involving community participation are forms of citizen science. The facilitating factor in such types of monitoring is the high interest and motivation of participants. The author underlined the fact that the participants get pleasure and satisfaction from their monitoring activities. They wanted to increase their knowledge of natural resources and that the data they collected were practical and of value for the society. Professional and institutional support provided by the Natural Resources Management Board and its partner organizations is another facilitating factor for further successfully operating monitoring systems (O'Connor et al. 2011). The main challenges for the ongoing participatory monitoring programmes are, according to O'Connor et al. (2011) lack of funding and

inconsistency in funding availability that increases the complexity or length of time spent for monitoring and dealing with bureaucrats (apathy).

Participatory monitoring approaches and citizen science are less used in the developing countries than in the developed ones. There are several reasons for this: the governance does not support the development of a culture for volunteerism, governmental agencies have small budgets, few volunteers and the group of professionals is small (Danielsen et al. 2005).

When it comes to countries in a transition period, the challenges for the development of participatory monitoring systems in natural resource management get very specific. Some examples are illustrated by several case studies from the mountain area of Kyrgyzstan (Busler 2010) and from South Gobi, Mongolia (Schmidt 2006). These authors showed that within countries with a transformation economy, participatory pasture monitoring<sup>1</sup> is very often tightly connected with the introduction of a community-based rangeland management system, under which rangeland access and utilization are to be managed by local user-groups.

In the case of Kyrgyzstan (Busler 2010) the activities of different NGOs and international development agencies policy and a legal framework facilitated the establishment of a participatory monitoring system with the aim of decentralizing the decision making process and empowering the local communities so they could use and manage the common pasture resources in a more sustainable way. New pasture laws were introduced in 2009 obligating all pasture users to form a local pasture user's union. Each local union should elect its own executive body; a pasture users' committee (Crewett 2012). These pasture users' committees are locally responsible for planning, controlling, and monitoring the use of the pastures in addition to maintaining infrastructure, including roads.

Despite the legal support for the design and implementation of community based pasture management and monitoring, the related governance structure seems to be weak and lacking the institutional capacity needed for the system's further development (Ykhanbai et al. 2004). According to a regional NGO representative familiar to the system (A. Isakov, 15 March 2013, Central Asian Mountain Partnership Ala Too, personal communication) there might be several reasons for why it's not functioning as expected. The reasons could be that:

- 1) The pasture user's committee currently lack the experience, knowledge and capacity needed to implement an efficient and systematic pasture monitoring system.
- 2) Organizations responsible for the training of pasture committees also need to be trained on how to communicate with locals and adapt monitoring system to local needs.
- 3) No motivation for pasture users to conduct monitoring.
- 4) Selected indicators and the assessment procedures are too complicated for local people to measure.

In the case of South Gobi in Mongolia, Schmidt (2006) illustrated that indicators for monitoring were developed jointly with local communities and thereby provided a tool for local planning and monitoring, both at the household and community level. However, Schmidt (2006) underlined also that the monitoring and evaluation system is still evolving and indicators are being adapted to local conditions.

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<sup>1</sup> In Kyrgyzstan and Mongolia pasture is the commonly used term even though this term means the same as rangelands.

According to Ykhanbai et al. (2004) the Mongolian institutional capacity for participatory monitoring is still weak and due to the bureaucratic practices within the current governance system, the shift from top-down to bottom-up approaches is requiring a longer time than expected.

There are radically different approaches concerning rangeland assessment and monitoring in the countries of Africa where rangelands are considered as the basis of pastoralism. Approaches for monitoring in African countries are mainly directed on identifying indigenous or local indicators of degradation and changes in vegetation with the aim of further integrate it to scientific monitoring led by researchers or extension agents (Reed & Dougill 2002; Oba & Kaitira 2006; Roba & Oba 2009). The authors underlined the importance of local knowledge for monitoring and pointed out that such knowledge is seldom acknowledged.

Although Bayer and Waters-Bayer (2002) recognized that research on identification of local indicators is needed for monitoring, the authors at the same time criticized the fact that the monitoring system remained very often externally managed where, at best, local indicators were just incorporated. The authors suggested to scientists that pastoralism should benefit to the same extent as scientific monitoring benefits from indigenous monitoring.

#### **2.4. Participatory approaches in rangeland management of Iceland**

Participatory approaches in land management started to be applied in 1990 when the Soil Conservation Service of Iceland (SCSI), inspired by the Australian Land Care concept, began to involve local land users in restoration activities (Crofts 2011). Before that time, the SCSI had made efforts to fight soil erosion at national level. However, these efforts were not enough to mitigate the extensive rangeland degradation (Arnalds 2005). The rangelands in Iceland are divided into two types: privately owned rangelands on lowlands and commonly owned rangelands in the highlands (Arnalds & Barkarson 2003).

One of the reasons why these efforts were not fully successful in the past was that the SCSI implemented restoration activities by itself, with little involvement of land users. Taking into account the lessons learnt, the programme “Farmers Heal the Land”, which focuses on the restoration of degraded ecosystems in the lowlands, involved individual land users in restoration activities. As a result, many lowland areas were restored and collaboration and communication between farmers and the SCSI were improved (Arnalds & Runolfsson 2005). During the last few decades many farmers have applied restoration methods on their private land through public projects (Petursdottir et al. 2013)

Regarding the common rangelands in the highlands, the situation is quite different. The common rangelands in the highlands are considered more sensitive to grazing than the lowland areas due to their fragile ecosystems that are highly vulnerable to harsh climatic conditions and volcanic activity (Arnalds 2005). Most of the highland rangelands are used for sheep grazing as “commons” by local communities. Grazing the commons has ancient roots tightly connected with the Icelandic culture and traditions and sheep farmers try to keep the rights to graze it (Barkarson & Johannsson 2009). The size of the common rangelands ranges from less than 100 km<sup>2</sup> to over 5000 km<sup>2</sup> (Arnalds & Barkarson 2003). The majority of sheep farmers still use the commons in the traditional way of free roam grazing, with the exception of some changes like shortening of the annual grazing period from year-round down to six months and restriction of grazing horses on commons. As argued by Barkarson and

Johannsson (2009) old grazing practices will probably continue because there are no alternative opportunities for a livelihood or land use options.

Such an option was suggested in 2004 with the introduction of a new policy that aimed at linking production subsidies with quality management, including sustainable land use. However, as stated by Arnalds and Barkarson (2003), the financial incentives for sheep farmers encourage a reduction in grazing pressure on the commons but do not exclude unsustainable grazing practices.

Besides sheep quality control, there is the project “Landbótasjóður“, controlled by the SCSI, where local stakeholder groups can apply for a grant to work on restoration of the common grazing land (SCSI 2013).

Despite all these actions, there are still debates and discussion in the Icelandic society regarding the use and the management of the commons between the different stakeholders (Th. Petursdottir, 25 June 2013, SCSI, personal communication).

One of the objectives of participatory monitoring is to integrate different stakeholders for better communication and collaboration. This research project explored what perceptions the different Icelandic stakeholders hold on participatory monitoring and what could potentially be limiting and facilitating the application of participatory approaches.

### **3. METHODS**

The research was conducted in South Iceland, in the Rangárþing district. It was based on in depth semi-structured interviews with pre-selected stakeholders. As the research was a preliminary one the author contacted only selected persons that were thought to be representative of their field/sector. The main criterion used for selecting these key informants was their experience and knowledge about monitoring rangelands in Iceland.

The author conducted four semi-structured interviews with governmental officials and farmers. This group consisted of representatives from the SCSI, the Ministry for the Environment and Natural Resources (MENR) and the Sheep Farmers’ Association (SFA). The interviews were made in the period from June to August 2013, but before the questioning potential themes were pre-tested. The main topics discussed in the interviews were the following: benefits of monitoring, institutional capacity for the implementation of rangeland of participatory monitoring, collaboration between stakeholders in the area of rangeland management, and the policies of rangeland management.

In addition to the semi-structured interviews, the author discussed the matter informally with several employees of governmental agencies such as the SCSI and did observational research when she visited farmers with an SCSI district officer for one day. In the trip, three farms were visited and the farmers informally interviewed. The age of those who participated in the research ranged from 30 to 70 years. Both women and men participated and all had practiced sheep farming more than 10 years. Most of the visits took about two hours. Informal questions included information about their farm activities, common grazing land, the farmers’ perceptions of changes after restoration activities and common grazing land, gender roles in sheep farming, and collaboration with the SCSI. The interviewees and farmers were informed beforehand that the anonymity of the respondents would be maintained.

The semi-structured interviews were taped and transcribed word for word and treated with coding methods (Taylor & Bogdan 1998). Field notes from the observations and the main points from the informal discussions were also analysed and incorporated into the results.

## **4. RESULTS**

### **4.1. The current state of rangeland inventory and monitoring in Iceland**

Most of the interviewees stated that a holistic monitoring system for rangelands in Iceland currently does not exist. Some mentioned that several decades ago the Icelandic government tried to build up a monitoring system based on predicting the annual vegetation biomass and link it to the systems' carrying capacity. Unfortunately, this approach failed as the annual biomass production varied highly and turned out to be an unreliable indicator for estimating the livestock carrying capacity of the rangelands.

All the interviewees mentioned that within every municipality there should be a locally elected committee: a Vegetation Conservation Committee (VCC) that according to law is responsible for annually determining vegetation spring growth and recommending when the sheep farmers can release their flocks to the common rangelands in the highlands. Some interviewees pointed out that the VCCs should act according to the law but that in some regions they were not active. One of the officials mentioned that these Committees were established in the 1970's but in most cases they didn't function properly. The reason for this was explained as that the VCCs members didn't see the results of their work because land degradation was stimulated by high subsidies which were directly linked with production. Most of the interviewees stated that after the establishment of the sheep quality control programme, the VCCs in the Rangárthing District area are significantly more active than previously. They also stated that those committees now include an SCSI official in their work and the annual field estimation of the condition of the vegetation in the spring is conducted jointly by the members of the VCC and the SCSI official. However, one of the officials pointed out that they [the VCC and SCSI] were not ready to conduct monitoring:

“We are not yet at the place to use measurement to decide when to start... These tours could be improved a lot.”

Some of the officials mentioned that several monitoring projects that touch upon rangeland monitoring exist. However, they also mentioned that none of those projects are designed explicitly to monitor rangeland conditions; they are fragmented and they don't give comprehensive information about changes in the condition of common rangelands. These projects are mainly driven by the obligation of the Icelandic government act in conformity with international agreements or by the need of the SCSI to estimate the progress of its own projects. For example, one of the monitoring projects was launched in 2007 by the initiative of the government of Iceland under obligations under the Kyoto Protocol and implemented by SCSI. Service. During communication with officials of the SCSI it was mentioned that soil samples and vegetation assessment was carried out within operation areas of the SCSI services and included areas mainly protected from grazing and only a small part of common grazing areas, or approximately 0.4% of the whole country. As emphasized by the official, the task of this project was not to monitor rangeland conditions but rather the ecological progress within areas under restoration treatments.

Another project mentioned in regard to monitoring common rangelands was the “Landbóttasjóður“ where the SCSI gives annual grants to the community from the fund for restoration of the common grazing land. One of the officials pointed out that people from the community signed a contract with Soil Conservation Service that pointed out the obligations of rangeland users to indicate where and how much fertilizers and seeds were applied on the common rangelands. However, it was highlighted by the official that changes in land condition after the restoration work were not measured or by the farmers rather only a visual observation as to whether or not the vegetation started to grow.

#### **4.2. Stakeholders in the common rangelands: roles, capacities and interest in being involved in participatory monitoring**

The interviewees identified sheep farmers and those who hold the right to utilize the commons as the main stakeholders in rangeland management. However, one of the interviewed officials noted that, in all fairness, this could mean everybody in the Icelandic society. The reason, for this as he explained it, is the ash from volcanic eruptions in the vicinity of the common rangelands which can be blown to other areas with a devastating outcome if the commons are barren or poorly vegetated.

All the interviewees mentioned the following major stakeholders as directly or indirectly linked with grazing management on the common rangelands: sheep farmers, the SFA, VCC, agricultural advisors, the SCSI and the MENR.

According to the interviewees, sheep farmers are the largest group of stakeholders which directly utilizes the common rangelands. Observations, communications and interviews with farmers showed that the typical Icelandic sheep farm has 300-500 sheep, in most cases several horses and sometimes a few cows for their own dairy consumption.

Most of the sheep farmers interviewed or observed, graze their sheep on the common rangelands during the summer but they also use parts of their privately owned land in the lowlands for grazing. Often these lowland areas are not fenced off but utilized and managed jointly by the adjacent farmsteads that have ownership over it. Haymaking is an important factor in Icelandic sheep farming as the sheep are housed and fed inside from November until June. The hayfields are usually close to the farm and so are the sheep barns.

The observations and the interviews revealed that women and men equally take part in all the workload that sheep farming entails, except for haying, that requires the use of agricultural machinery and is usually done by men. Both women and men participate in gathering the sheep from the common rangelands in the autumn.

The common rangelands are owned by the State but managed by the adjacent local municipality. According to the interviewees, there exists an informal rule between municipalities that they utilize only the common rangelands they are responsible for managing.

The rangeland commons were highlighted by the farmers as an important part of their livelihood, not only from an economic but also from a social and cultural point of view.

The sheep farmers are the main decision makers on how to use and manage the commons and the grazing practices based on the traditional rules of free roam grazing on the rangeland commons. Communications with the farmers showed that they highly value their rights to use the commons and want to keep those rights in the future.

Observations and communications with sheep farmers showed that they perceive themselves as highly aware of the annual ecological condition of rangelands. They recognize that degradation problems do exist on the commons. However, they claimed that the condition of the common rangelands is improving and supported their statements with several reasons like less grazing pressure and the shorter annual grazing period. As an example, one of the farmers said that:

“...now it’s only a few farms which used common grazing areas and that is less than it was 40-50 years ago”.

Changes in weather conditions were often mentioned by farmers as factors contributing to the improvement in land condition. As one of the farmers stated:

“...now we have more mild weather, which is good for vegetation.”

Volcanic eruptions were mentioned both as a negative factor for rangeland conditions, as well as a positive factor which helps to improve rangeland conditions. One of the farmers said:

“...when the ash from a volcano lands on grazing land, the vegetation grows better and the sheep gain more weight than they used to.”

The sheep farmers’ local knowledge regarding land condition is mainly retrieved from life experience and direct observations through dealing with land and livestock. Indicators for land assessment mentioned by the farmers have general characteristics and are not based on specific plant species, although the sheep farmers recognize palatable plants from those less palatable.

The indicators most frequently mentioned by farmers for estimating changes in rangeland condition are the appearance or lack of vegetation cover and the appearance of birch as an indicator of improvement. Farmers also perceived land to be “good rangeland” if the sheep gained weight. Barren land was seen as an indicator for “bad rangeland”.

Farmers perceived the importance of monitoring or observation to be more a joint activity that should be implemented with the SCSI, especially to know what happens after fertilizing and/or seeding degraded areas in the common rangelands.

According to the interviewees, the sheep farmers lobby their interest through the SFA. The SFA are an important stakeholder that influences governmental decisions regarding the utilization of the common rangelands. The SFA has the legal authority to negotiate with the government about the interests of farmers. The interviews revealed that the SFA has three main objectives: the first is to identify and show market opportunities for farmers, the second one is to participate in policy making concerning rangelands and advocate the interest of the farmers, and the third objective is to increase awareness of sustainable land use and management. The representative of the SFA expressed an interest and readiness to take part in

future participatory monitoring. The role of locals is seen by the SFA representative as very active – to estimate or to be trained to estimate the ecological conditions of the land.

The interviewees working for the SCSi evaluated the agency as an organization with good human resources in terms of knowledge, experience and skills in the field of restoration work and communication with people. The staff of the SCSi have mainly an agricultural or natural science background and claim to understand the importance of communication with people and the importance of speaking the same language – to know farming in Iceland in order to understand it. As one of the officials said:

“I don’t know another organization in Iceland which has such close and good relations with farmers.”

This perceived good relationship between the SCSi and farmers was further confirmed by farmers in the observations and communications.

The collaboration between sheep farmers and the SCSi also takes place in the special project “Landbótasjóður” where stakeholder groups can apply for grants to work jointly on restoration activities in the common rangelands. The SCSi’s officials explained that management plans regarding these restoration activities (time to start, amount of fertilizer and seeds, areas to be revegetated) are discussed together with local communities and implemented by the locals.

Observations and interviews showed that the grazing control of the commons is a sensitive issue for the sheep farmers but also for the SCSi. According to law, the SCSi should ensure that the common rangelands are kept in good ecological condition but there is no legal mandate for following it up (personal communication with A. Arnalds, 15 March 2013, Agricultural University of Iceland). The cost-shared collaborative programme “Farmers Heal the Land” has resulted in improved communications between the SCSi and sheep farmers. Anyhow, as the policies on rangeland utilization are weak, the SCSi officials don’t want to upset their relations with the farmers and choose in some cases rather to keep silent than to get into conflict. One of the officials said:

“You can’t tell them don’t use it [commons]. It would be a negative effect both on the farmer’s society, farmers union and our collaboration with farmers. It could damage our work together.”

Despite some disagreements regarding grazing the SFA representative stated that, in collaboration with the SCSi, they should build up a participatory monitoring system. As the representative said:

“The Soil Conservation Services would be the best organization to work with ...they have professional knowledge of the condition of the vegetation and a network throughout the country.”

The MENR is the governmental body that deals with controlling the work implemented by agencies like the SCSi and directly involved in policy setting regarding land management. An official of the ministry underlined that its potential role in participatory monitoring would be to create incentives for the farmers to do monitoring in a systematic way and to play the role of the negotiating partner between different stakeholders.

Agricultural advisors such as the SCSI consulting sheep farmers; however collaboration between two these organizations is very weak. The SFA representative felt the disconnection between the agricultural sector and the MENR doesn't see the agricultural advisors as collaboration partners in a participatory monitoring system, at least not in the beginning. The representative said "it could be late in the future."

Despite the fact that some farmers mentioned birch vegetation of the commons as a very important indicator, forestry actors are not considered by the interviewees as potential partners in controlling the commons rangelands and are even perceived as antagonists to each other:

"I think that they [forestry staff] thought it impossible to have forestry and grazing animals. At least that the forest would not regenerate. But we know that is not true."

### **4.3. The perceived benefits of participatory monitoring**

All the interviewees recognized the importance of monitoring. But most of the expectations of officials from monitoring have as priority evaluation and progress of their own aims.

A key informant on the decision-making level highlighted the importance of the monitoring in regard to the need to evaluate the progress of the sheep quality management programme which was set up a decade ago:

"Can we say that we reached our goals (sheep quality programme) we started with at the beginning? Can we measure the progress of the land? I'm sorry to say that we don't have data to say it is going well."

The need for social monitoring as a tool to observe changes in people's attitudes and practices in grazing management was also highlighted by one of the officials as very significant for further decision making.

The SCSI staff mentioned first of all the importance of the monitoring for the evaluation of the agency's own progress in restoration work. The second reason mentioned was to get endorsement for future support from decision makers and the third reason was to improve their own knowledge as researchers.

Benefits both for farmers and the SCSI officials from monitoring were mentioned in the context of learning from each other during communication with farmers about restoration work.

Three interviewees mentioned that monitoring data is necessary and important for better communication, understanding and even for conflict resolution among rangeland users, the SCSI and researchers on the topic of the impact of different degrees of grazing pressure on rangeland condition. One of the officials mentioned that the farmers were lacking a comprehensive knowledge on how to estimate how much grazing pressure various vegetation communities can withstand.

“Farmers don’t know what is slight grazing. Slight grazing depends on vegetation. If we have a very poor area with thin soil and a very low yield, one animal can constitute very high pressure. You must always link together the condition of the land and the grazing pressure.”

However, none of the officials mentioned monitoring as the way to enhance the local capacity for recording and analysing changes and improved community-based initiatives.

For the representative of the SFA monitoring was perceived as a beneficial tool to find a common platform both among farmers themselves and the SCSI for conflict resolution and better collaboration. The following statement illustrates this:

“Monitoring could give the indication to find a platform for everybody just to talk together.”

#### **4.4. Factors potentially facilitating or limiting the use of participatory monitoring approaches**

All the interviewees mentioned both facilitating as well as limiting factors for participatory monitoring. The SCSI officer and the SFA representative highlighted the first agreement regarding the necessity of participatory monitoring between the SCSI, the farmers and the FSA which was reached last winter.

The officials also stated it to be an important change that now the VCC together with an SCSI official jointly decide when to start grazing the commons in the spring. This change became possible due to the sheep quality management programme which has the objective of linking government subsidies and land use practices for sustainable management.

The interviews showed that local organization such as the SFA have an interests and motivation to participate in establishing participatory monitoring together with other stakeholders. Different quick and simple methods were suggested by officials as promising for applying in participatory monitoring.

The interviewees identified multiple limiting factors for participatory monitoring. Their replies were divided into three main groups: limiting factors in the environment, societal and governance factors, and the institutional context and listed as in Table 2.

The slow changes in vegetation succession on degraded rangelands were mentioned by two interviewees as a factor that potentially might be limiting the participation of local stakeholders. At the same time another official argued that the slow process of revegetation is not considered a limiting factor by farmers:

“If we look at the map [erosion map of Iceland, 1997] we said there is no change since that. But they [farmers] said there is a change and we don’t believe it. So, there is no belief that our assessment monitoring is right even though we think that it is right.”

The societal limiting factors mainly include the lack of experience in conducting any type of monitoring and society’s misunderstanding for what monitoring is needed. The following statement illustrates this:

“There is no culture for monitoring... We have a short history of monitoring. Icelanders don’t know much about monitoring and think that governmental bodies just spend money on it.”

**Table 2. Factors potentially limiting participatory monitoring**

Type of group	Limiting factors
<b>I. Environmental context:</b>	<ul style="list-style-type: none"> <li>• Slow changes in re-vegetation of degraded rangelands</li> </ul>
<b>II. Societal context</b> <i>Cultural norms and stereotypes:</i>	<ul style="list-style-type: none"> <li>• Short history of monitoring</li> <li>• The society doesn't understand the necessity of monitoring</li> <li>• Absence of experience of local people to participate in monitoring</li> </ul>
<b>III. Governance and institutional context:</b>	<ul style="list-style-type: none"> <li>• The SCSI's, the Agricultural University's and the farmers' perceptions on how sustainable rangeland management should be defined are different</li> <li>• The absence of common agreements between scientists on what to do and how to carry out monitoring</li> </ul>
1. <i>Conflicting interests and visions</i>	<ul style="list-style-type: none"> <li>• The absence of common agreements between scientists on what to do and how to carry out monitoring</li> </ul>
2. <i>No interaction and collaboration between different stakeholders, between and within institutions</i>	<ul style="list-style-type: none"> <li>• The scientists and locals are not speaking the same language</li> <li>• Perceived that monitoring should be purely a scientific approach</li> <li>• The lack of knowledge on what should be the links between researchers, land users and practitioners</li> </ul>
3. <i>Organizational norms and culture</i>	<ul style="list-style-type: none"> <li>• Resource constraints: money, time and human resources of SCSI</li> <li>• No priority for monitoring in time and human resources</li> <li>• The lack of experience to conduct monitoring by specialists</li> <li>• Suspicion against monitoring practices due to past failures</li> </ul>
4. <i>Lack of top level support for monitoring</i>	<ul style="list-style-type: none"> <li>• No financial support for monitoring</li> <li>• No appropriate policy for monitoring</li> </ul>

Factors categorized as limiting in the context of governance and institutions are considered to be the largest group. Conflicting interest and perceptions of different stakeholders such as farmers, researchers, staff of SCSI, politicians and decision makers was highlighted by one of the officials as a significant limiting factor for the creation of a participatory monitoring system. The representative of SFA mentioned that there were on-going conflicts between sheep farmers and the SCSI regarding the utilization of some of the common rangelands. There is a lack of a common agreement even among scientists on what indicators should be monitored because their interests focus only on their own field. One of the officials mentioned:

“There are some who think there is no proper monitoring if you are not taking soil samples.”

However, the conflicts of interest and perceptions were mentioned less than the lack of interaction and collaboration between different stakeholder groups, between different institutions and even within one institution. One of the officials said:

“We are few but we scattered. We are not trying to work together.”

One of the officials mentioned that the lack of collaboration and interaction between researchers and farmers has led to understanding that monitoring would be limited by a purely scientific approach:

“The problem between scientists and locals is that they are not speaking the same language. Maybe scientists collect the data and the users are not aware of it or they don't understand it or they don't want to understand it.”

The lack of understanding of the nature of the links between researchers, farmers and practitioners was highlighted by one of the officials:

“It is problematic to find the methods and indicators which are suitable for participatory monitoring ....It is difficult to find farmers who are responsible for managing the land to do the measurements.”

Lack of knowledge and experience not only among the local people but the specialists on how to conduct monitoring together with other complementary factors as financial stoppage, expensive cost for monitoring, the narrow group of people who can make use it, and the lack of time have led to failures in several attempts to find a proper monitoring system. Some of the officials mentioned that several attempts have already been made to establish a proper monitoring system but they were not successful. They said that these negative experiences have led to a certain suspicion amongst stakeholders that the rangeland should be monitored and somehow block further efforts.

As shown, the interviewees very often neglected monitoring in relation to finance, human resources and priority in the work. However, there was no common agreement among the staff of the SCSi that in future the same limiting factors such as money or human resources would not again be constraints for the establishing of participatory monitoring. For example, one of the officials said:

“I think there are enough human resources to do it. And this will not cost more money than we already using. We are already using some money so how to use it should be more focused.”

Another factor which potentially might be limiting participatory monitoring is the perceived lack of top-level support for monitoring, both from the financial as well as from the policy side. One of the officials said:

“It is very difficult to get money for monitoring. It much easier to receive money for fertilizer than for monitoring.”

The remark of the representative of the SFA regarding the sheep quality management programme emphasises that there is no link between policy and monitoring:

“You could have land still in a bad condition but vegetation succession is improving the land, but still this land is ranked as unsustainable.”

#### **4.5. Suggestions made by interviewees**

The suggestions made by interviewees on how to establish a monitoring system were diverse. They ranged from suggestions on establishing a conventional scientific monitoring system to the development of a few simple methods for land users. Very often the suggestions were connected with the interviewees' answers on how they perceive the importance of monitoring. The officials who emphasized the importance of monitoring in relation to improving their work suggested that more research should be added or to do scientific monitoring in order to have more detailed information. They suggested that several sites should be selected for detailed monitoring of the rangelands' ecological condition. However, some of the officials

underlined the necessity to develop simple methods that could be introduced to land users to monitor the land and insisted that these simple methods should be established on a scientific basis. The compromise between the two different methods was also suggested by combining simple and quick monitoring methods with the methods that give more deep information, but the frequency of these two programmes will be different. The representative from the SFA suggested the establishment of a common baseline on how and what to monitor that would create a common understanding for all who engaged in using and managing common rangelands.

Responses on how to motivate farmers to participate in monitoring were also varied. One of the officials suggested that participation in monitoring should be financially supported because the farmers are only interested in economic benefits. However, another official emphasized that not only economic interests motivate the farmers. Motivations like practical use also awaken their interest. The SCSI officials also suggested that motivation of the farmers could be raised through argument on the benefits for the whole society and nation.

The representative of SFA suggested increasing awareness and education among farmers and underlined that the training should be an obligatory part in the framework of sheep quality control and could include how to monitor land conditions.

## **5. DISCUSSION**

The interviews, observations and communications gave understanding of what is the current state of monitoring of rangelands and indicated possible gaps in this system as well as opportunities existing for participatory monitoring.

Monitoring is considered as a significant management tool in sustainable rangeland management because it helps to reveal changes in the condition of rangelands under different livestock pressure or changes after restoration work. In Iceland common rangelands play an important environmental, economic, social and cultural role for local communities. About half of the total area of the common rangelands is in poor condition (Arnalds et al. 1997). However, efforts at revegetation and restoration are also taking place in many parts of Iceland. There is an obvious need to assess the changes in rangeland conditions.

Nevertheless, this study showed that monitoring in Iceland is not designed explicitly to monitor rangeland conditions and can be characterized as fragmented and scattered data collection and analysis conducted with the help of the conventional approach and driven by external needs and interests.

In contrast to conventional monitoring, participatory monitoring builds on involving local communities in recording, observing and analysing changes in local conditions (Abbot & Guijt 1998). This approach is now recognized worldwide because it helps land users to understand whether management practices are good or not and to make their own decisions on how to improve the condition of the commons (Reed 2008). In Iceland participatory approaches are also recognized by the SCSI as very important in conservation and restoration of land resources (Arnalds 2005) and the first attempts to introduce these approaches were already undertaken in 1990 (Arnalds & Runolfsson 2005).

This study tried to explore perceptions of interviewees on participatory monitoring and the challenges and opportunities that exist to establish monitoring. Posing such questions helps to make clear who can and should be doing the monitoring and if it can really be participatory.

These questions emerged because very often, as underlined by Pretty (1995), the term “participation” is fashionable in many development agencies and governmental organizations but has many different interpretations which sometimes create paradoxes.

The research revealed that even though all the officials claimed participatory monitoring to be beneficial for farmers, none of them mentioned it as a way to enhance the local capacity of decision making through learning how to record and analyse changes and to improve community-based initiatives. First of all, for the interviewed officials participatory monitoring is a tool to prove and check their own track and results as an organization. This is what Pretty (1995) classified as functional participation i.e. when participation is seen by external agencies as a means to achieve project goals.

These research findings are in line with the findings of Berglund et al. (2013) where the authors concluded that participation was perceived by SCSI’s officials as a method to realize the agency’s task and primarily focused on project outcomes. As was highlighted by Berglund et al. (2013), the balance between the product and process aspect of participation should be to optimize for the effectiveness of participatory approaches.

Another important question is who should be engaged in participatory monitoring because the role of stakeholders, their capacity, knowledge and interests and ability to collaborate together may lead either to success or failure. In Iceland two local institutions are seen as future partners in participatory monitoring: the SFA and VCC. In addition, both institutions are seen by the SCSI as future collaborative partners. It is very important that monitoring can be launched from the grass-roots level with the help of external organization.

The experience of Kyrgyzstan shows that even though participatory monitoring was launched under a legal framework, the lack of the pasture committee’s knowledge, experience and interest in carrying out monitoring have led to the rethinking of its functionality. Additionally, agricultural extension agencies which were expected to train pasture committees also haven’t the knowledge and experience of how to do it in a simple way understandable for farmers. This study is based on the results of four interviews where time limitations didn’t allow taking interviews with representatives from different areas and institutions, although all interviewees were carefully selected so they represented their own sectors. Thus, further research is required for a better understanding of the different roles of different stakeholders such as agricultural advisors, universities and NGOs in the area of rangeland management.

The third question of this study tried to answer something that very often remains unstudied in many participatory monitoring studies. What facilitating factors can promote participatory monitoring or limit it? The study showed multiple limiting factors in different contexts. The largest group of limiting factors originated not at only at the local level due to the lack of knowledge and experience of farmers in participating in monitoring but mainly on the level of governance and institutions.

The results of this research agree with the research findings of Petursdottir et al. (2013) who found that lack of effectiveness in the governance system and poor interactions can restrict the progress of policies toward sustainable rangeland management in Iceland. There are still not enough interactions among researchers, land users and practitioners, a situation that has led to the lack of knowledge about socio-environmental linkages. Combining different types of knowledge for learning and co-production of knowledge probably could lead to mutual understanding which could in turn facilitate participatory approaches. Olsson et al. (2007)

emphasized that the ability to create such interlinkages at the appropriate time in multilevel governance systems is crucial for building up social–ecological resilience.

According to Abbot and Guijt (1998) one of the objectives of participatory monitoring is to support decision making and planning. In connection with this the question could be raised: will participatory monitoring in Iceland lead to changes in land use practices, scaling up restoration activities on the commons if, despite moral values like respect and care for the land and a positive attitude toward restoration activities, the majority of sheep farmers still apply traditional methods and practices of land use? Participatory monitoring can change unsustainable practice but only if accompanied with increasing awareness and education among farmers, support from the governmental level and an appropriate policy framework.

## **6. CONCLUSIONS AND SUGGESTIONS**

There is no holistic monitoring system of rangelands in Iceland despite the fact that all interviewees recognized the importance and necessity for it. Conventional monitoring is fragmented and scattered which doesn't allow a comprehensive picture of the dynamics of the state of the rangeland in different parts of Iceland under different climatic conditions, vegetation and soils.

Opportunities for establishing participatory monitoring in Iceland exist. Among them first of all is the interest and support of participatory monitoring from the SFA. The second is joint summer tours of the VVC and SCSI for making decisions on starting an agreement on vegetation which could give a good opportunity for identifying together indicators and methods for assessing rangeland conditions. The third opportunity is that a first agreement between the SCSI and farmers has been reached, and this is also a small step towards joint monitoring and evaluation.

At the same time there exist multiple limiting factors which make the setting more complicated. Lack of interaction and collaboration has led to knowledge gaps on what should be the linkages between the social and ecological systems, which is the fundamental basis for well-designed participatory monitoring.

This research study suggested two local institutions which can be potential actors in a participatory monitoring system and play an important role for its promotion: the SFA and VCC. These two institutions seem to be capable of securing a sustainable ecological condition of rangeland on the assumption of its future capacity, have the needed influence and authority to represent the interest of rangeland users, and at the same time negotiate these interests with other stakeholders in the field of rangeland management.

Based on key findings the following suggestions were made:

- More applied and transdisciplinary research regarding common rangelands
- Build up interconnections among different actors involved in rangeland management
- The SCSI together with the SFA should motivate farmers to participate in training courses on estimating and monitoring rangeland condition
- Encourage and motivate joint activity of local Vegetation Conservation Committees with the SCSI

- Influence decision makers and politicians to provide support for monitoring (both conventional and participatory)

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