Old Norse sheep farming

Former Head of cultural landscape research at the Norwegian Institute for Agricultural and Environmental Research, **Ann Norderhaug**, and PhD candidate, **Liv Guri Velle**, explain how their novel study of Old Norse sheep grazing on coastal heathland can help preserve an endangered Atlantic landscape

What are the key objectives of your research into Old Norse sheep in coastal heath environments?

The main goal of our project is to contribute to the development of a sustainable Old Norse sheep farming industry, and success requires a holistic approach. Securing the welfare of grazing sheep on the heathlands year-round depends on securing the availability and quality of pastures.

At the same time, maintenance of the biodiversity of the heathlands also depends on effective heathland management, which needs to be optimised for both the grazing animals and the natural habitat. In addition, it is necessary to secure the sheep farmer's livelihoods, because if Old Norse sheep farming were not an economically viable way of life, it would die out, resulting in overgrown heathlands and loss of wildlife.

Why is it so vital to conserve and revive these landscapes?

Coastal heathlands once covered the Atlantic coast from north Norway to Portugal. However, due to land use changes during the 20th Century most have disappeared and the coastal heathlands are now classified as endangered.

Heathland ecosystems are thousands of years old and of high conservation value. In Norway, heathland habitats have developed in coexistence with the ancient Old Norse sheep breed and traditional land management. Year-round grazing and heath burning is of crucial importance for the maintenance of them.

Could you briefly outline the tenets of traditional heathland management?

The vegetation dynamics in traditional heathland farming are strongly related to the cycle of heathland growth and re-growth. Traditionally, burning has been performed in order to optimise the production of the heaths, and burning rotations of between 10-20 years are common, although there are regional and local variations.

When the heather gets old and less nutritious it will be burnt, which results in grassland and the eventual re-establishment of heath. Through regular burning, a mosaic of grassland for summer grazing and heath patches for winter grazing is formed. Heath burning was usually carried out during winter when the soil was wet or frozen, as this prevented damage to the organic soil and the seed bank in the upper layer of the soil.

How does your research aim to combine tradition and culture with modern agricultural techniques and industry in order to provide a solution to the destruction of coastal heath?

Heathland farming almost disappeared during the 20th Century because it was not seen as economically feasible. However, a new interest in local food by producers and consumers has created new possibilities for Old Norse sheep farming.

The ability of this breed to utilise nutrient-poor pastures and graze outdoor all-year-round, combined with low complication rates during lambing make it possible for heathland owners to take part in other activities in addition to Old Norse sheep farming. Many farmers therefore decide to restore degenerated heathlands and our research makes it possible to advise farmers how best to achieve sustainable livelihoods.

How does your research work towards a vision of sustainable Old Norse sheep farming for the 21st Century?

Some heathland farmers are successful, while others struggle with low slaughter-weights and quality, failing markets and fluctuating subsidies. The Old Norse sheep breed has developed over thousands of years to withstand poor nutrient environments. However, animal conditions considered satisfactory decades ago are not necessarily in agreement with today's welfare standards. For a sustainable sheep farming industry in heathland we need to have a good knowledge of grazing preferences across the whole year to secure for farmers' livelihoods and animal welfare.

Can you highlight the key findings of the research to date?

Our research has revealed that the best way to manage coastal heathlands with regard to biodiversity and grazing is to implement small-scale burning. It is also crucial to adapt the management of the heathlands to local conditions because the growth rate of lambs from spring to slaughtering in autumn differs greatly between localities along the coastline.

Our research has provided better understanding of nutrition for lambs during the summer season and adult sheep throughout the year. Our research also underlines the need to time lambing to vegetation development and to have a well-balanced grazing pressure to secure good body growth, which ensures higher carcass weight in the autumn and in turn winter survival and welfare for the sheep population.

OLD NORSE SHEEP IN COASTAL HEATH

Preserving past practice

A landmark study on **Old Norse Sheep in Coastal Heath** at the Norwegian Institute for Agricultural Research is helping to stop coastal heathland from vanishing by supporting an ancient Norse land management technique

SINCE THE NEOLITHIC period, sheep farmers of the Norse coast have survived in harmony with their environment. Over the past 5,000 years a strip of poorly cultivated land from Mandal in the south to Helgeland in the north of Norway was transformed by the human use of a now-ancient breed called Old Norse sheep. From this prehistoric relationship a semi-natural ecosystem of heathland developed that could sustain human settlers, along with wildlife from a combination of sheep grazing with selective cyclic burning every 10-30 years, which reinvigorated the landscape with each succeeding human generation.

During the 20th Century, changes in land use in Norway and modernisation of pastoral farming practices and standards led to cross-breeding of native sheep for increased meat production and eventual abandonment of the delicate coastal heathlands, which foreign-bred sheep were less effective at feeding from. Without grazing and burning to manage and maintain the heathlands, they became unproductive to both domestic sheep and wildlife.

In the 1950s there were only 500-1,000 Old Norse sheep which led to recognition that this sheep breed – and the heathlands that depended on the ancient land management technique – needed to be rescued from the brink of extinction. Eventually, after a repopulation effort, more than 40,000 of the ancient breed currently live in the coastal heathlands.

SCIENCE FOR LIFE

Through a collaborative effort with academic colleagues, industry stakeholders and government agencies, project leader Ann Norderhaug and PhD student Liv Guri Velle, based at the Norwegian Institute of Agricultural Research, launched a project to save the coastal heathlands from decay by providing the science that could reinvigorate an ancient way of life.

Norderhaug and her collaborators were sure an interdisciplinary approach would be crucial in saving the traditional Nordic landscape and the wildlife that depends on it. The team has been successful in gaining widespread support for its research and recognition that the old breed was valuable: "Our project was financed by the Norwegian Research Council but also by the slaughter industry, regional authorities, coastal municipalities and farmers," Norderhaug explains. It is widely understood that Old Norse sheep have several attributes worth maintaining because compared with more domesticated breeds of sheep they are able to utilise nutrient-poor vegetation.

The Old Norse ewes have a gestation period of nearly five months, which means the natural oestrous cycle for sheep results in a lambing season from the beginning of April until mid-May. This coincides with the rapid growth of new grass, which is essential for the ewes' milk production. Ewes normally have one lamb weighing about 1.5-2 kg at birth. Velle explains the value of Old Norse sheep grazing on areas with few if any alternative agricultural uses: "This sheep is small and meat production per ewe is low compared with other sheep, so incomes are small but so are the costs. Combined with the present support schemes, it is possible to earn a reasonable income".

21ST CENTURY VISION

The research group began by developing their project's three main packages. The first was sheep holding, production and animal welfare; the second studied the effect of management on the coastal heathland vegetation, and the third economy and development of local industry.

Velle has a vision of an ancient grazing technique made sustainable for the 21st Century: "Some heathland farmers are successful, while others struggle with low slaughter-weights and quality, failing markets and fluctuating subsidies," she explains. "A successful sheep farming industry needs a good knowledge of grazing requirements during the whole year to secure good growth and sufficient economy for individual farmers."

The research activities have involved the study of post-fire vegetation development, vegetation mapping, and examination of selected plants on defined locations for digestibility, nutritional value, macro-minerals and trace elements. They have also conducted research into plant and vegetation preferences in June, August, October and February/March by micro-histological analyses of faeces, as well as taking part in market research and gaining statistics from abattoirs.

Sheep from 10 locations were weighed three times a year, and blood and faeces were sampled so that blood serum parameters can be examined and parasitic egg counts could be performed. Vegetation mapping was completed in 10 study areas, and floristic data from the post-fire succession were recorded in permanent plots in five main locations.

SEASONS REVEALED

Together with the project team, Velle and Norderhaug have discovered that the growth rate and carcass weight of the old breed sheep increases with increasing content of grass in the vegetation available. The growth rate of lambs from spring to slaughtering in September and October differs greatly between localities along the coastline: "This may be caused by several factors, such as differences between the localities with regard to the amount of vegetation at the pastures, as well as the content of energy, protein and minerals in winter and summer fodder," Norderhaug outlines.

Preliminary results of the micro-histological analyses have revealed different grazing preferences across both localities and seasons. Heather is not only an important winter plant species for grazing but is consumed all year round, particularly in October, while sedges are grazed especially in the winter when they play an important role with regard to energy and protein. In addition results show that the studies of post-fire vegetation development and succession after experimental fires reinforced the importance of burning as part of the land management regime.

Velle summarises how their findings suggest a return to Old Norse practices would be beneficial: "Management and climate strongly influence the re-vegetation dynamics. Continuance in burning practises should be preferred as it reduces implications concerning the post-fire substrate of mosses and litter". Results have clearly demonstrated that old heaths develop characteristic heathland vegetation and structure after fire, despite lower successional rates.

ADDED VALUE

During the development of the project the researchers have communicated closely with stakeholders, slaughtering industry, academia and government through yearly reports, conferences, seminars, workshops and courses: "We are still analysing a lot of data and will go on to communicate our results, not only as scientific papers but also as popular scientific articles, booklets, brochures and courses for agricultural and conservation authorities as well as farmers," Norderhaug states.

Since the Norwegian food regulators approved 'Old Norse sheep from the Norwegian coast' as a protected geographic designation for the meat, some consumers prefer Old Norse meat to consuming meat from domestic breeds. This might increase the market potential for meat from Old Norse sheep and additional value can be created by local processing of meat and other products.

CHALLENGE TO INDUSTRY

New possibilities for Old Norse sheep farming have caused a fast-paced expansion of this type of farming to new locales, including those outside the traditional distribution area. This effect could be a challenge to the industry because it could result in the weakening of branding by sheep-holdings that do not meet the standards of traditional Old Norse meat. As Norderhaug highlights, this could potentially confuse consumers: "It may also result in insufficient grazing conditions for the sheep and unsatisfactory animal welfare. By disseminating our knowledge we hope to influence and change this development".

OLD NORSE SHEEP IN COASTAL HEATH – DEVELOPING A SUSTAINABLE LOCAL INDUSTRY IN VULNERABLE CULTURAL LANDSCAPES

OBJECTIVES

To develop Old Norse sheep farming into sustainable agriculture, based on the idea that a combination of innovation and management will be a cost-effective tool for preservation of coastal heathlands and the natural and cultural heritage they represent.

PARTNERS

Professor M Ulvund, Norwegian School of Veterinary Science • **Professor V Vandvik**, University of Bergen • **Assistant Professor T H Garmo**, University of Life Sciences • **Dr A Hegrenes**, Norwegian Agricultural Economics Research Institute • **Dr S Øpstad** and Researcher **P Thorvaldsen**, Bioforsk West Fureneset • **Dr LS Nilsen**, Norwegian Nature Inspectorate

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ANN NORDERHAUG is an ecologist and has studied cultural landscapes for a long time, during the last 10 years as the head of cultural landscape research at the Norwegian Institute for Agricultural and Environmental Research. In 2005 she was awarded by the Nordic Council for her broad work with the Nordic cultural landscapes.

LIV GURI VELLE is a vegetation ecologist (Cand.scient, 2003) and was employed at the Norwegian Institute for Agricultural and Environmental Research in 2004. She works with cultural landscapes, and has a special interest in coastal heathlands. Velle is a PhD-student for this interdisciplinary project.