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The Norwegian sheep farming production system

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SUMMARY - The Norwegian sheep farming system is based on extensive use of natural open ranges pastures where 40-50 percentage of the total annual feed can be consumed. Lambs are born during late winter or spring, and sheep and lambs graze on fenced farmland before being released on open forested or alpine ranges. The animals are gathered in September, and selected lambs are then slaughtered. After a period of autumn grazing on farmland, retained animals are again fed indoors. There are several local adaptations. In coastal areas the sheep can graze outdoors all year round, while owners without adequate land for spring grazing let the animals out on the open range pastures directly from their in-house feeding. This paper discusses the environmental impact and problems for the sheep industry caused by the extensive use of open ranges and the protection of carnivores, and draws attention to some measures to be evaluated if co-existence is to be made possible.

Key words: Norway, sheep farming, production system, carnivore preventive measures.

RESUME - "Le système de production ovine en Norvège". Le système d'élevage ovin en Norvège est basé sur l'utilisation extensive des pâturages naturels sur parcours ouvert sur lesquels les animaux prélèvent 40 à 50% de la totalité de la ration ingérée. Les agneaux naissent en fin d'hiver et au printemps, les adultes et les agneaux pâturent d'abord des prairies clôturées sur des parcours ouverts forestiers ou d'altitude. Les animaux sont rassemblés en septembre et les agneaux sélectionnés sont alors abattus. Après une période de pâturage d'automne sur les terres de l'exploitation, les animaux retenus sont alimentés en bergerie. Il y a diverses conduites selon la situation locale. Dans les zones côtières, les moutons peuvent aller pâturer à l'extérieur toute l'année alors que les exploitants sans terres adaptées pour faire pâturer les animaux, les mettent sur des parcours ouverts en complément de leur alimentation en bergerie. Cet article discute de l'impact sur l'environnement et des problèmes des productions ovines liés à l'utilisation extensive des parcours ouverts et à la protection des carnivores. Il attire l'attention sur quelques mesures à tester si la coexistence entre l'élevage ovin et la présence des carnivores doit être l'objectif à atteindre.

Mots-clés : Norvège, élevage de moutons, systèmes de production, mesure de prévention contre les carnivores.

Introduction

Norway's main physiography is formed by the long north-south running Scandinavian mountain range. The coastline is fragmented with thousands of islands and with fjords penetrating deep into the mountain range. East of the range are boreal coniferous forests, extending across the boundaries to Sweden, Finland and Russia. The country has been glaciated several times, soil conditions are rather poor and the area of agricultural land limited. However, due to the Gulf Stream, the climate is wet and relatively warm and well suited for production of grass and other herbs. These are found throughout the country's mountains and forests and constitute the basic feed for herded domestic reindeer as well as for other husbandry animals which have traditionally been of utmost significance for inland settlement and development of the local economy.

The husbandry animals, sheep, goats, cattle etc. were introduced into Norway more than 5000 years ago as settlement became more permanent. While modern cow milk production is based upon use of concentrate and fertilized pastures the sheep industry is still based, to as great an extent as possible, on the use of open ranges. This makes the sheep vulnerable to protected carnivores, and there are locally considerable losses. This paper will describe the system of the Norwegian sheep industry with particular attention to these environmental problems and discuss some preventive measures within the current system model. It is based on an environmental impact assessment of the

effects of viable populations of brown bear, wolves, wolverines, lynx and golden eagles in Norway (Mysterud and Mysterud, 1995) and more recent work on evaluating preventive measures (Asheim, in prep).

The Norwegian sheep husbandry system

Modern Norwegian sheep husbandry is a sustainable meat production system adapted to the local ecological and economical constraints. The generalized annual production cycle is shown in Fig. 1. Lambs are born during late winter or early spring while the sheep are fed indoors. Exact birth time varies with local conditions. Reproduction is under control as part of a breeding program. The rams are kept in separate pens and brought together with the ewes during reproduction only. It is strictly forbidden to release rams free on the open ranges.

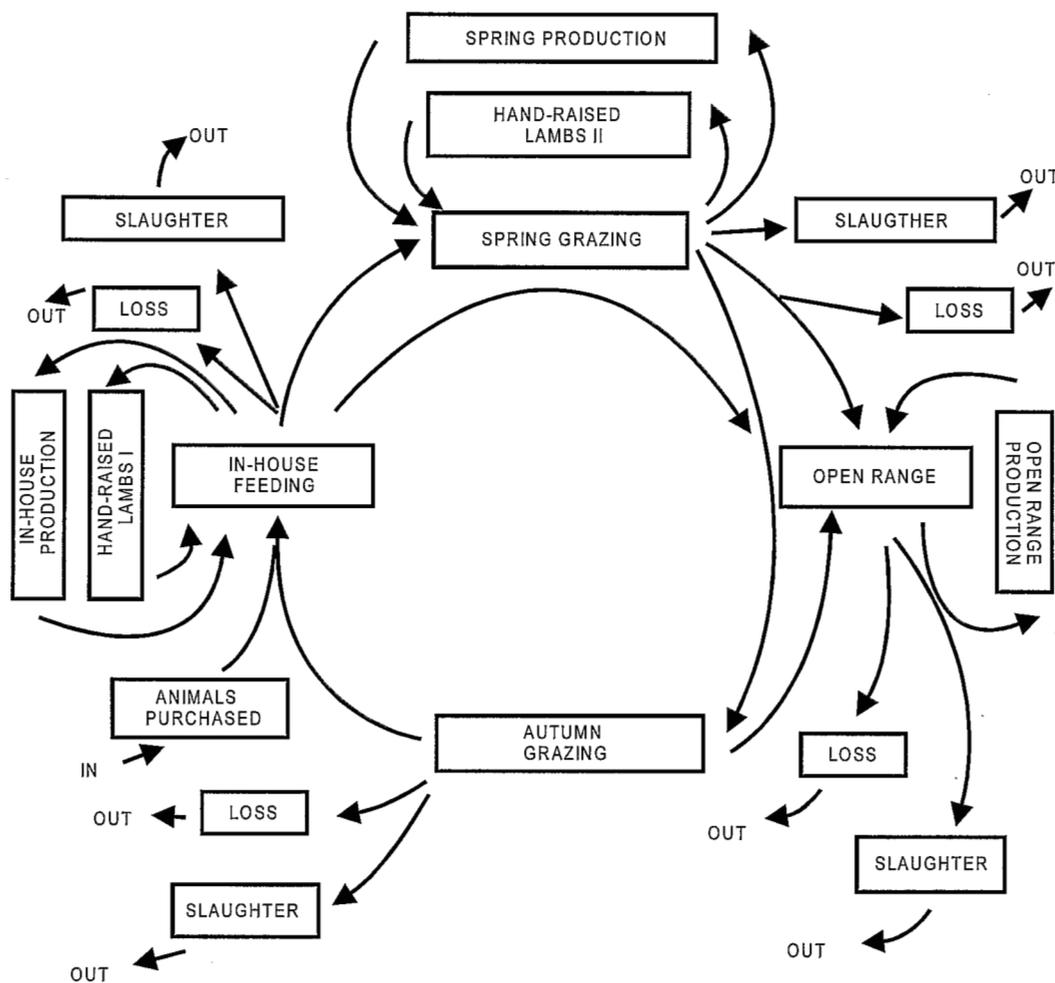


Fig. 1. Yearly production cycle in the Norwegian sheep farming system. (Redrawn from Mysterud and Mysterud, 1995).

During spring, the sheep and lambs are kept for a short period grazing on fenced land, before they are released on the open ranges. The system allows 40-50 percentage of the total annual feed to be consumed during only 90-100 days on the open range, as the main growth of the lambs occurs. The animals reside on open ranges until gathered during the autumn. The ideal production is to send lambs suited for slaughter directly from the range, unless strategies with advanced gathering and/or feeding adjustment are needed. After a period of autumn grazing on fenced areas, the animals are again fed indoors. After breeding the ewes again become parturient with next year's lambs.

Local differences of operations are reflected in different arrows in the figure. Some sheep holders live in coastal areas where the sheep can graze on open ranges year round, while a few owners do not have adequate land for spring grazing and let the animals out on the open range more or less directly from their in-house feeding. Other farmers may have so much fenced pasture that they can allow the animals to reside on this year round and so on - local operational details can be many.

The number of ewes fed during winter is just over 1 million animals (Table 1), and the population of ewes and lambs grazing on open ranges during the snow free period is ca. 2.4 million, unevenly distributed throughout the country. The most important sheep farming regions are the western and south-western parts of Norway, with ca. 53% of the sheep in these regions. Losses to predators are greatest in rural Trøndelag and northern Norway, as well as in rural eastern Norway, regions which contain ca. 40% of the country's sheep population. The animals are not herded, but supervised at regular intervals. About 70 percent of the sheep holders are members of centrally organized grazing groups, which work with programs to prevent losses.

Table 1. Total number of sheep (winter-fed) and average flock size in different regions of Norway as of January 1, 1993

Region	Total	Per cent	Sheep per farm
Central areas around Oslo and Trondheim	77,019	7	44
Eastern Norway, rural areas	186,680	17	48
Southwest Norway	246,472	23	51
Western Norway	329,161	30	36
Rural Trøndelag and northern Norway	255,261	23	49
Total	1,094,593	100	44

Around 25,000 farms in Norway have sheep, averaging 44 winter-fed animals. Production typically takes place on fairly small farms; in 1989, about 60% of the sheep were on farms with less than 10 hectares of arable land, compared with only 17% of Norway's cows. Due to the seasonal variation in labour input, combination with forestry, and historically also fishing, has been common, since such activities traditionally have had their peak labour season during the winter. Today, different combinations of off-farm work for either the farmer or spouse make sheep farming the most common agricultural activity on part-time farms outside the central grain growing areas.

Based on statistics for sheep subsidies as of January 1992 and standard labour input values for sheep farming, it has been estimated that around 52% of the sheep were on specialized sheep farms (including part time farms) that is, farms where sheep accounted for more than 85% of the farm labour input (Asheim, 1995). Sheep in combination with mainly dairy farming accounted for another 28%. In this study the total weighted net farm income from agriculture for all sheep farms amounted to ca. 4 billion Norwegian kroner (NOK), not including income from forestry and other work and off-farm activities. A considerable proportion of this is not due to sheep farming. Based on the share of the specialized sheep farms, total net farm income from the sheep was estimated to be NOK 886.1 million (Asheim, 1995).

Environmental problems and measures to be evaluated

Towards the end of the last century and into the 20th century, populations of several predator species were significantly reduced and even exterminated over large areas. However, after being protected, their populations seem to be increasing. According to Asheim (1995) the yearly cost to the sheep farmers of the carnivore regime in Norway amounted to NOK 20-86 million (minimum and maximum values) and are expected to increase to NOK 36-139 million if Norway is to introduce demographically viable populations of bears and wolves. However, without undertaking cost considerations, the political establishment in a new Carnivore Management Act has subsequently

mandated the establishment of demographically viable populations of bears and wolves in addition to the other predators (Ministry of the Environment, 1997).

So far no management strategy for a more permanent solution, based on efficient preventive measures, to adapting the sheep industry to higher densities of carnivore populations has been worked out. Due to the severity of the conflict a co-operative research project on new models of handling the conflict has been initiated. This project involves on-farm economic evaluation of preventive measures. For this purpose two linear programming models have been constructed, one for rural eastern Norway and another for rural Trøndelag and Northern Norway (Asheim, in prep). There exist no models for western Norway where the losses are small by comparison and where there currently are no bears and wolves. The models take the system model (Fig. 1) as their basis and measures under evaluation could be introduced either on the farm or on the open range.

Measures on the farm

Moving the sheep to an area without predators might probably become most significant in Northern Norway, utilizing pasture on predator-free islands. It might also be evaluated in rural eastern Norway to move the sheep west of the north-south running Glomma river. The solution will require investments in the new area and is constrained by veterinary restrictions on where to move sheep due to scrapie and other husbandry diseases. Locally it can also be possible to put the sheep on fertilized pastures, which will have to be established.

Delayed open range release of the sheep might be most significant in areas with red foxes and/or golden eagle predation. The lambs will be larger improving the chances for surviving attack on the open range. However, veterinary problems associated with lack of pasture during spring might become critical. Both measures either require more land, reduced number of animals or more purchased feed. Earlier gathering of the sheep seems most interesting in areas with bears and wolverines, since these predators attack particularly in the latter part of the grazing season. Combination of delayed release and earlier gathering is a possibility, however considerable areas of new pastures will have to be established.

Other on-farm measures include use of anti-predator collars, aversive chemical odours or different guarding animals like lamas or donkeys. Some effect might also be likely from changing flock structure or breeding measures, however the cost-effectiveness of these measures are uncertain.

Measures introduced on the open range

Greater supervision of the herd animals involve patrolling the fringe of the open range during evenings and nights with a dog. Farmers may then need to hire more labour. Herding the sheep with 1-2 night corrals for the sheep would require even more labour and dogs and would likely be cost in-effective. Combining extended supervision during early summer and herding during autumn when the weather is worse, nights longer and predator attacks more frequent seems more promising. Other measures on the open range might include fencing the range areas either by electricity or other ways to prevent sheep from leaving the area and predators from entering. Such measures would definitely be negative from an environmental point of view.

Discussion

Today the conflict with predator management is the most important environmental problem associated with the sheep farming system in Norway. The new predator regime including viable populations of bears and wolves will greatly affect the industry in its present form and management calls for new strategies for sheep farming if coexistence is to occur. The current research takes the sheep system model as its basis and aims to evaluate preventive measures which might be efficient against predators on open ranges. A final measure might be to exchange sheep farming for other businesses not depending on the open range or develop production systems on animals less vulnerable to predators. Some people in Norway also advocate the idea of establishing different economic compensatory mechanisms for lost husbandry activities.

References

- Asheim, L.J. (1995). Kap 5: Økonomiske konsekvenser for saueneæringen. (Chapter 5 Economical consequences for the sheep industry). In: *Perspektiver på rovdyr, ressurser og utmarksnæringer i dagens- og framtidens Norge: En konsekvensutredning av rovviltforvaltningens betydning for småfenæring, reindrift og viltinteresser (Perspectives on predation, resources and range users in Norway - today and in the future. An environmental impact statement for sheep production, reindeer herding and ungulate hunting interests)*. Mysterud, I. and Mysterud, I. (eds). Final report, KUR project, p. 336 (in Norwegian, English summary).
- Asheim, L.J. (in prep.). Forebyggende tiltak mot rovviltskader på sau. (Preventive measures against predators on sheep).
- Ministry of the Environment (1997). Stortingsmelding nr 35 (1996-97) Om rovviltforvaltning. (The Carnivore Management Act), (in Norwegian).
- Mysterud, I. and Mysterud, I. (eds). (1995). *Perspektiver på rovdyr, ressurser og utmarksnæringer i dagens- og framtidens Norge: En konsekvensutredning av rovviltforvaltningens betydning for småfenæring, reindrift og viltinteresser (Perspectives on predation, resources and range users in Norway - today and in the future. An environmental impact statement for sheep production, reindeer herding and ungulate hunting interests)*. Final report, KUR project, p. 336 (in Norwegian, English summary).