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Landscape sustainability as a social construction: the confusion of ecological optimisation and social conflict solution

Jesper Brandt

Abstract

A traditional sheep grazing system on the Faroe Islands that has developed through 1000 years of continuous refinement based on a detailed regulation of the sustainability of all pastures. This is taken as a departure point for a general discussion of the relation between a geo-ecological interpretation of an optimal landscape use and a cultural geographical reconstruction of the social rationality of the related land use system. Ongoing discussions of the reasons behind widespread erosion problems on the Islands will be used to shed light on both the problems faced by and the responsibility of the sciences as regards their integration. In the face of the need to handle the complex of ecological and social conflicts in the transition towards sustainable development.

1. Introduction

Optimal ecological use of our landscapes has been central in landscape and physical planning since the environmental debate started in the 1970's, and new dimensions have been added since the Brundtland report announced the necessity to find ways ensuring sustainable development (Brandt, 1996a). Until the mid 1980's the solution of environmental problems was seen as primarily related to the development of natural science and technology, and its social implementation a matter of increasing the general public awareness of ecological matters in order to promote an understanding for the necessary technological changes (World Commission on Environment and Development, 1987). One of the most important messages delivered by the Brundtland report was that emphasis should be put on the inclusion of socio-economic aspects in environmental problems and the necessity of changes in social institutions as an important part of sustainable development, since social institutions are the most important carriers of both obstacles and enabling factors for the transition process.

From an operational point of view, the involvement of social institutions in the implementation of sustainable development can be regarded as a question of putting ecology on the agenda for the structural development of the institutions, with emphasis on defining and keeping interest in the management of thresholds such as different kinds of carrying capacities. Only built-in structural mechanisms can be expected to keep an institution's strategy on the right ecological track.

Going back through history we can apparently find many examples of such principles for ecological regulations, which are often cited in the contemporary discussion of sustainable development. But here we have to be careful. Such examples can seldom be taken literally as purely ecological statements, but typically they should rather be understood as social constructions with primarily social functions, not necessarily supporting sustainable development, may be even quite the opposite.

Many years' research on the historical development of ecological regulation of resource management on the Faroe Islands has convinced me that although we can learn from history in our search for future models of ecological regulation, we should be careful in our interpretation.

Today the Faroe Islands, located in the Atlantic between Scotland and Iceland, are a rich fishery nation, where agriculture contributes under 1% of the national product. But until sea fishing began in the middle of last century, agriculture was the dominant occupation. Here sheep breeding held a unique position as it produced an essential product for export and formed the main basis of taxation on the islands, which in this period were subject to the Danish Crown's trade monopoly and substantial Danish Crown estate. Wool and its products thus amounted to approximately 90 % of exports during the entire 18th century. Therefore, from a historical point of view, especially since the 14th century strong inducements have risen to increase the exploitation of the acreage available to the Faroese communities, primarily by means of increased sheep breeding.

However, already in 1298 a special law for the Faroe Islands, Seyðabreiv (the sheep letter) was passed, which among other points stated that *'the number of sheep to be kept on an area of pasture land shall remain the same as it was in previous times, unless men see that it can accommodate more'*. This figure, in the Faroese language called skipan – in fact an old form of the English shipping – expressed the carrying capacity of each individual location, and to this day it is used as an expression of the optimum carrying capacity for the various parts of the islands. Additional skipans for cows, horses, dogs, geese and so on were also developed (Brandt, 1984).

2. The traditional Faroese land use system

The total area of the Faroe Islands is only 1400 km², with a population of about 48000, living on 17 islands, of which the largest, the 400 km² Streymoy, also comprises the capital, Tórshavn, today concentrating about 1/3 of the total population.

Despite the smallness of the Islands, there are in fact about 90 old villages. Today almost all of them are connected by an extensive infrastructural system of roads, tunnels and ferry routes. However until the second world war the villages were in fact rather isolated, due to the mountainous topography, and difficult climatic and oceanographic conditions, making sea transport a necessary, but also risky way of communication due to very unstable weather conditions and strong tidal currents between the islands.

Each village existed as a typical infield-outfield agricultural system, with a little infield located by the sea and surrounded by a 1-meter high stone wall, dividing the infield from the surrounding extensive outfield. The most important farming activity was cow and sheep rearing. There was a close relationship between these two stocks and the use of infield and outfield: in winter, the cows were confined to the byre and fed on hay harvested the previous summer in the infield. The sheep, which remained outside during the winter, grazed the fields of the infield and the lower part of the outfield. In summer the cows returned to the lower outfield, while the sheep were shepherded to the upper outfield. There were no fences in the extensive outfields before the 1960's, nevertheless the grazing depended on a very distinctive but flexible territorial structure of pastures, each carrying between 12 and 90 ewes (Brandt, 1996b).

Not only were the carrying capacities of the approx. 250 outfields of the Islands carefully stated and used for taxation, but also at the local level, within the single outfield, a detailed regulation of the number of sheep in each flock was maintained.

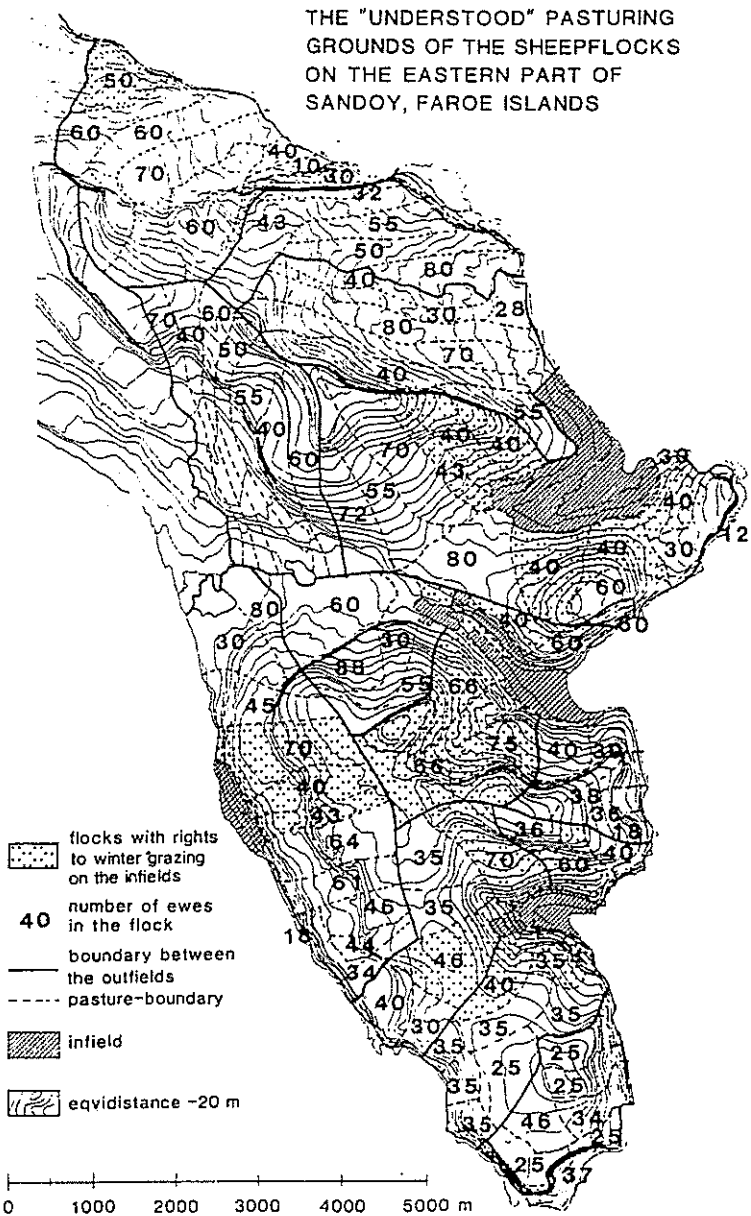


Fig. 1: The pasturing grounds on the eastern part of Sandøy, Faroe Island

Fig. 1. showing the single pastures including the fixed number of ewes in one part of the islands, was arrived at through interviews with old shepherds in the middle of the 70ties, and although slightly modified, the pastures have in principle been rather constant for at least 500 years.

3. Ecological optimisation of the agricultural system?

Obviously the concept of skipan could be regarded as a measure to regulate sustainability in the traditional Faroese agricultural infield-outfield system. Indeed through the years I have put much energy into studying the ecological optimisation process behind this structure (Brandt og Rasmussen, 1979; Brandt og Guttesen, 1980; Brandt, 1987; Brandt, 1984; Brandt, 1992; Brandt og Guttesen, 1980; Brandt og Guttesen, 1978). This optimisation could partly be seen as a question of finding a balance between on the one hand land use and productivity of the infield and outfield and on the other the need for risk-minimisation as regards the availability of fodder for cows and sheep. Due to the agriculturally marginal position of the Faroe Islands and the very limited amount of well-drained lowlands the production of fodder was reserved exclusively for the cows, leaving the sheep breeding as a more or less risky pursuit. The oceanic position gives an average July temperature of only 11° C, but with mild winters of an average of 4° C in January outdoor grazing was possible in general year-round. However, on an average of every 14th year, a severe winter situation, in Faroese called a felli, occurs where frost and snow affect the pastures which in the past caused the death of at least 1/3 of the sheep population. This certainly influenced the optimisation process that had to include this risk, as shown in figure 2, since it took years before the size of the stock returned to the normal level.

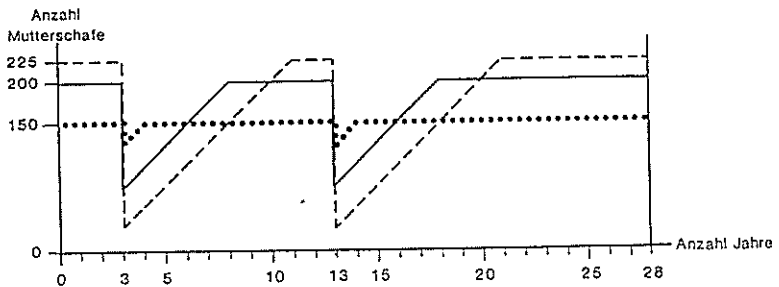


Fig. 2: The principal influence of a felli (irregular unfavorable winter weather conditions reducing the stock of ewes by at least 1/3) on the optimisation of sheep breeding in a faroese outfield. Provided the slaughter percentage is 50 (the historical average at the Faroes), the total yield in the 28 years shown for the full line (normal skipan or carrying capacity: 200 ewes) would be 2488, whereas it for the dashed line (normal skipan: 225 ewes) and the dotted line (normal skipan: 150) would be 2350 and 2088 respectively. Thus the full line represents an optimum skipan (carrying capacity) of around 200.

DIVISION OF EASTERN SANDOY IN 4 CHOROLOGICAL UNITS

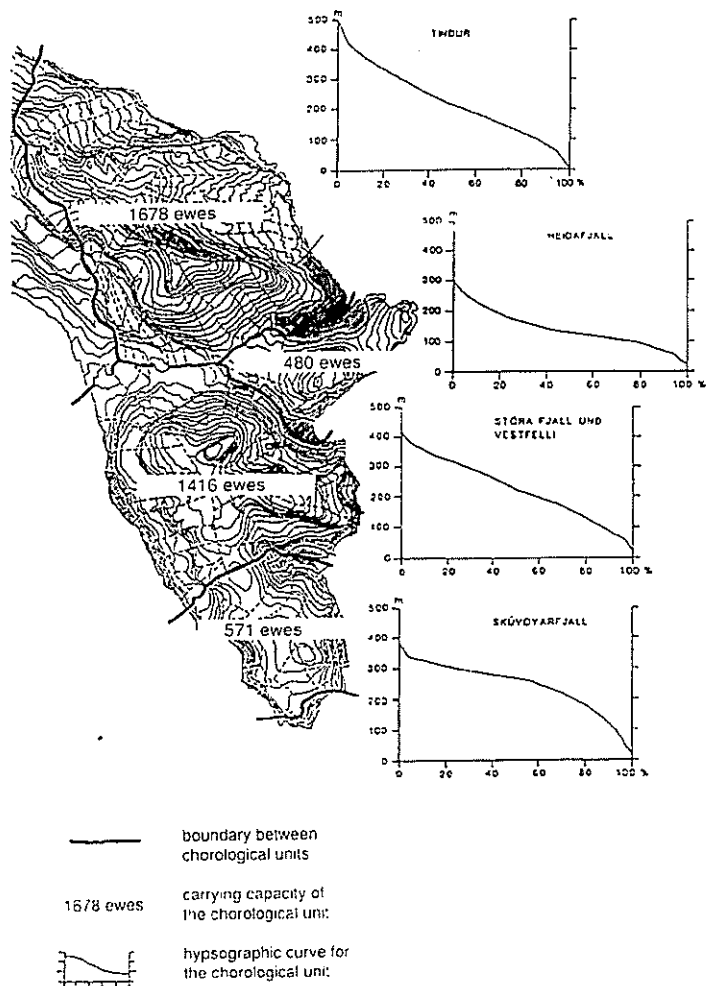


Fig. 3: Division of the eastern part of Sandoy into four chorological units

These principles of optimisation had to be adapted to the local landscape conditions, which was reflected in the different character of the territorial organisation of the pastures within the different chorological landscape units, as shown in fig. 3.

In the northern part of the area the composition of the landscape allows for a distribution of different grassland types giving bearable conditions under most weather conditions, and importantly tolerable winter grazing, also during harsh weather conditions. Accordingly the territorial structure of the flocks has been built up in strips running from the grass-slopes good for summer grazing near the summits down to the harsh heather and moor-vegetation near the sea or lowland-areas not so attractive for the sheep, but on the other hand safe in most winter situations. In the southern part the topographical conditions are less favourable, since the heather and moor vegetation are situated on the high plateau, and the luxuriant grass-slopes are located down along the coast. This has obviously given rise to a more complicated pattern of small grazing areas with rather small flocks, easier to manage under these difficult conditions. On the whole the system worked, but a *felli* in this area could be disastrous since no lowland winter grazing areas usable under harsh conditions were available. Therefor the skipan had to be kept at a rather low level.

Through mathematical modelling of the relation between the territorial structure and a vegetation survey, it has been shown that the grazing systems in the southern areas were able to use only half of the outfields' mean annual production of digestive organic matter, whereas this percentage was raised to 2/3 in the northern outfield, thus showing a better adaptation of the grazing system to the landscape composition (Brandt, 1992).

One could argue that social mechanisms of optimal and sustainable use of the grazing potential was a built-in characteristic of the agricultural society, legally grounded in the Sheep Letter of 1298.

This law was changed several times, especially up to the 18th century, where the growing fragmentation of private property made it still more difficult to maintain the skipan, which was in disfavour especially with the king's tenants and other big farmers (Brandt, 1987). Therefore joint management of the sheep, and ownership based on the farmers' share of the total value of the village – the so-called *marketal* – was forced through. This development could also be interpreted ecologically as a measure to ensure an optimal resource use, since joint management was based on the election of joint shepherds who had total control over the pasture. So nobody, not even the owners, was allowed to cross the outfield without the permission of the shepherds.

Of course these rules also had social consequences. Expansion of the infield following population growth from the beginning of the 19th century, giving rise to a growing rural proletariat, was difficult to handle due to the common property rights of the outfields. High prices on woollen products made it in principle possible for this new class to make a living from knitting socks and sweaters, however legislation made it illegal to collect the necessary wool in the outfields, although it was often dropped by the sheep. To maintain the labour supply for the bigger farms additional legislation was passed, forbidding young people to marry without having a legal occupation; knitting was not such an occupation!

4. The development of unsustainable fishery

From the middle of 19th century a transition towards a society based on fishery took place in the Faroes. It started as small-scale fishery from open boats, but from the end of the century a major part of the increased population was integrated in a commercialised sector of sea-going fishery with export of salted and dried fish to Southern Europe. This modern capitalist sector

succeeded in breaking the established powers of the old agricultural society, through legislation which permitted the establishment of small-scale farms in the outfields. With the introduction of small-scale dairy farming and potato growing, a cheap supply of labour for the new sea-going fishery was ensured. Due to a long tradition of efficient large scale English and Dutch fishing around the Faroe Islands, the Faroese themselves had to travel abroad to Iceland, Greenland, New Foundland and the Barents Sea to find available fishing waters.

If the tradition for resource management in the old agricultural society had been a reflection of a basic ecological awareness in society, one would expect this knowledge to have been at least partly reflected in Faroese society's new resource use, fishery. This was however by no means the case. There has never been any type of ecological regulation of the Faroese fishery, although it has now been the main stay of the economy for several generations. Even after the increase of the international fishing limit to 200 nautical miles in 1977, giving the Faroe Islands full control of the fishing grounds around the Islands, it has been impossible to prevent a still on-going depletion of fishing stocks. As early as the 1970's, marine biologists were becoming alarmed at the increasing fishing capacity operating within the Faroese fishing waters. In spite of being judged too large in the 1980's, capacity continued to be modernised, and expanded by 40% between 1982-89. This was just one of the reasons behind the collapse of the Faroese economy from the end of the 1980's, resulting in a large-scale depopulation. Within only 5 years 10 % of the population left the islands. This crisis has been overcome, and the economy is again moving forward rapidly with increased Faroese fish stocks and today's high fish prices. But there is still no efficient ecological regulation of the fishery (Guttesen, 1996).

5. An ecological lesson from history?

Why didn't the Faroese fishery sector, borne out of the agricultural tradition (which still has an important cultural and political position in Faroese society), learn from history and developed the 1000-year-old concept of skipan for the contemporary economic and social situation? Probably because it was never in reality an ecological concept, but a social construction invented for the regulation of social problems, not ecological problems.

The sheep letter in fact did not regulate a carrying capacity, but social conflicts due to uneven grazing pressure on a single island. The territorial system of grazing was upheld by the principle of the different flocks being deliberately "shepherded against each other", that is the grazing pressure of each flock was kept at the same level, so that there was no reason for a systematic trespassing from one ground to another. But if the owners were able to agree on an over-exploitation of all the pastures, they were allowed to do it. The Sheep letter continues: *'If they agree that it can accommodate more, then they can have as many (sheep) as they can agree upon, and every man can have as many sheep, as his share of the property can justify'*. This was obviously often done, giving rise to overgrazing and widespread soil erosion, as had been reported constantly through history.

Historically the skipan of the different parts of the Faroes have developed as shown in Table 1.

On average, skipan was reduced with 1/3 from the beginning of the 17th century to the end of the 19th century, but at different rates in the different regions. The stabilisation within the last century probably implies continued overgrazing, since no increase in the carrying capacity can be observed despite the introduction of modern medicine, winter shelters and a growing amount of imported winter fodder that should have allowed for an increase in the skipan. In

general productivity has however increased in terms of number of slaughtered sheep and an increase in slaughter weight.

<i>App. year</i>	<i>1600</i>	<i>1780</i>	<i>1870</i>	<i>1988</i>
Suðuroy	17.578	15.600	11.949	10.111
Sandoy	12.412	10.375	7.760	7.738
Vágar	11.220	8.820	6.730	7.540
Streymoy	21.740	16.110	15.549	14.577
Eysturoy	19.840	13.703	13.824	14.155
Nordoy	13.759	10.931	8.296	10.026
Total	96.549	75.539	64.108	64.147

Sources: (Brandt, 1987) and *Árbók fyri Føroyar* 1991

Table 1: The development of the total sheep stock on the Faroe Islands 1600-1988

A purely social interpretation of the use of skipan is also supported by the fact that considerable differences in the weight and slaughter percentage exist between the different islands, thus indicating very different degrees of grazing pressure. These differences can at least partly also be linked to marked variations in soil erosion between the different islands.

Departures from this general trend do exist. (Svabo, 1783) comments on the general decline of the skipan since the beginning of the 17th century, but adds a handful of exceptions, notably the Island of Nolsøe, 'where the old skipan was 900, but due to the skill, industry and good management of the inhabitants had been raised to 1100'.

Soil erosion is a clear fact everywhere in the Faroese outfields and has been so for centuries. It is however in general considered a 'natural process', not related to sheep grazing, and any attempt to relate the phenomenon to overgrazing of sheep is in general not socially acceptable in the Faroe Islands. This is probably linked to a conception of the Faroese cultural landscape as a social construction, with erosion legitimated as a natural process which has been observed during hundreds of years in the islands' development. The concept of skipan is not a tool for ensuring sustainability, but quite the opposite: an official blindness for overexploitation.

6. Conclusion

After many years search for an ecological interpretation of the optimisation of the classical agricultural system of the Faroese Islands, I have realised that the central concept of skipan, officially expressing the carrying capacity within the agricultural system, in fact was a social construction, developed solely as a tool for social regulation of conflicts between land owners. It has in general not functioned as a regulator of the ecological carrying capacity, although examples of such an interpretation can be found.

Parallels in today's environmental regulation can indeed be found. In such a way recipient planning of the inner Danish fjords based on a similar principle of an overall purifying capacity, that was developed during the 70's, was almost given up due to the tendency towards a social interpretation of the minimum acceptable discharge as the sum of the actual discharge by the

individual polluters in the catchment area, thus legitimating the existing level of pollution independently of an ecologically based evaluation of the carrying capacity for pollutants.

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Trees and the cultural landscape in Cumbria, north west England.